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ADDRESS: CESKOSLOVENSKE ARMADY 300, 500 03, HRADEC KRALOVE, THE CZECH REPUBLIC, TEL.: 498 651 292, EMAIL: INFO@MAGNANIMITAS.CZ

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## **A SOCIAL SCIENCES**

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|----|---|
| AA | PHILOSOPHY AND RELIGION                                     |
| AB | HISTORY   |
| AC | ARCHAEOLOGY, ANTHROPOLOGY, ETHNOLOGY                        |
| AD | POLITICAL SCIENCES  |
| AE | MANAGEMENT, ADMINISTRATION AND CLERICAL WORK                |
| AF | DOCUMENTATION, LIBRARIANSHIP, WORK WITH INFORMATION         |
| AG | LEGAL SCIENCES  |
| AH | ECONOMICS   |
| AI | LINGUISTICS   |
| AJ | LITERATURE, MASS MEDIA, AUDIO-VISUAL ACTIVITIES             |
| AK | SPORT AND LEISURE TIME ACTIVITIES                           |
| AL | ART, ARCHITECTURE, CULTURAL HERITAGE                        |
| AM | PEDAGOGY AND EDUCATION                                      |
| AN | PSYCHOLOGY  |
| AO | SOCIOLOGY, DEMOGRAPHY                                       |
| AP | MUNICIPAL, REGIONAL AND TRANSPORTATION PLANNING             |
| AQ | SAFETY AND HEALTH PROTECTION, SAFETY IN OPERATING MACHINERY |

## DEVELOPMENT OF CATEGORY "ACCESSION" WITHIN RUSSIAN CIVIL LAW: THEORETICAL AND JUDICIAL LINGUISTIC RESEARCH

<sup>a</sup>MARINA RYAZANOVA, <sup>b</sup>OLGA AKSYONOVA,  
<sup>c</sup>GULNARA AKHMETZHYANOVA, <sup>d</sup>SERGEY BARYSHEV,  
<sup>e</sup>DIANA ZDUNOVA, <sup>f</sup>SERGEY SAGITOV,  
<sup>g</sup>GUZEL TUKTAROVA

Kazan branch of the Russian State University of Justice, 7a, 2-ya  
 Azinskaya st., Kazan, 420088, Russia  
 email: <sup>a</sup>grimdim@mail.ru, <sup>b</sup>aksjus@mail.ru,  
<sup>c</sup>axmetzanova\_gula@mail.ru, <sup>d</sup>barsh1976@yandex.ru,  
<sup>e</sup>Artemey78@yandex.ru, <sup>f</sup>smsagitov@mail.ru,  
<sup>g</sup>guzeltuktarova@yandex.ru

**Abstract:** The paper presents the results of analysis made by the authors on features of exercise of the concept "accession" within Russian civil law. The object of research within the paper is expressed in a retrospective analysis of social relations emerged with the challenge to determine the accessory of the property. In 2013 some amendments were made to the Civil Code of the Russian Federation on the legal procedure for incrementing things and establishing a legal connection between the main thing and its accessory. Scholars generally note the need to return legal traditions which were in the Russian Empire in relation to accessory attributes of a property. Deprivation of these historical features causes an increase of controversial issues, which depend not on a single legislative position but judicial discretion.

**Keywords:** accession, main thing and accessory, complex things, property, real estate, history of civil law, Russian civil law.

### 1 Introduction

A term "accession" was initially used in civil law to denote the fact that one object belonged to another one. So, in Roman law there was a property category in which the main thing and its accessory were distinguished. The long-term realization of accession as a fruit (*Latin* "fructus") affected the emergence of the classical rule: a secondary thing (part of a thing or a serving thing) is always legally connected with the main thing.<sup>1</sup> At the same time, Romans did not consider such types of property as separate categories. Anything consisting of the main subject and its appurtenance was recognized as a single (whole) object in civil law.<sup>2</sup> The necessity to separate the composite property was named "accession" to confirm the extension of ownership to all the appurtenance of the thing. In judicial linguistics the term *accession* is classified as being a non-equivalent lexical unit, it was borrowed directly not forming a calque for it is a loanword and a culture-specific element. The lexical item "accession" is not included in general defining dictionaries (by S.I. Ozhegov, V.I. Dal, A.P. Evgenyeva), but presented in dictionaries of legal terms.<sup>3</sup> In legal texts in the Russian language the term is used as *aktsessiya* (accession).

Afterwards, the term "accession" became more complicated, specifying not the fact only of belonging of one thing to another one, but also a legal circumstance giving rise to a property-legal status. Thus, the composition of some chose transitory (things) was divided into some types depending on the content of objects themselves. Mixture of things with generic characteristics (liquid, loose, etc.) was defined as the terms of "confusio" and "commixtio".<sup>4</sup> In the case of a combination of things of different characteristics Roman law distinguished the notion of "adjunctio".<sup>5</sup>

Accession extended to real estate if it was necessary to legitimize the ownership of certain chose transitory for a certain land. Accession was also in force in the cases of addition of land property by the effect of natural causes (disappearance of water bodies on a land plot, heaving or failure of soil, etc.).

This mentioned historical background affected Russian legislation regulating the ownership of both complex and multiple things. At the same time, the classic property rules of accession acquired some features at different stages of legislation development in Russia.

### 2 Methods

Several methods of legal science were used to carry out the research. In analyzing the laws, the authors used the system-functional method to determine the basic legal norms and specifications of accession. To reveal the essence of the category "accession", a hermeneutic method was used, which allows revealing the hidden meaning of civil law norms. To determine a consistent pattern of development of Russian law and European law, the historical method and the method of comparative law were applied. They allowed to establish the historical and legal traditions of the application of accession to certain types of property and to some contractual structures. The formal legal method has helped the authors to relate the content of legal norms lost their legal force with modern provisions of civil law. The method of complex analysis made it possible to draw generalizing theoretical conclusions about the evolution of the term "accession" in Russian civil law over several centuries, taking into account legal positions developed by courts.

### 3 Results and discussion

Within the historical and legal context accession was of value in land title. Before the rule of Peter I, legislation did not define objects exactly belonging to a landowner — soil layer only or subsoil included. However, according to the Petrovsky Decree on the Berg-Collegium 1719, the monopoly on the extraction of mineral resources was assigned to the state.<sup>6</sup>

Peasants belonging to lands and factories was of an accessory nature. While Peter I extended the opportunity to get possession of them in such a way and not only to nobles but also to merchants, then under the rule of Peter III and that of Catherine II this title was again narrowed to privileged estates only.<sup>7</sup>

Institution of accession in Russian legislation of the XIX century was of land-industrial character. In particular, in book 2 of the 10<sup>th</sup> volume of the Code of Laws of the Russian Empire 1832 there was distinguished a whole set of norms, specifying parts forming a certain property.<sup>8</sup> Thus, as it was prescribed by the Article 388, factories and plants consisted of buildings, pipes, utensils and tools, assigned villages and peasants, and also included land, forests, vegetation suitable for use in industry or agriculture. The note to this provision stated that with purchase of a plant or a factory, the peasants passed into possession along with the property bought, and it was forbidden to release them. Although the peasants themselves were not considered to be property, in their attachment to real estate there were obvious signs of an accession.

The Article 389 of the book 2, volume 10 of the Code of Laws of the Russian Empire 1832 contained an accessory description of a

<sup>1</sup> Hill D. Book reviews, *Light from Roman Law* // *The Expository Times*. 1986. T. 98. № 2. C. 55. Shiriev V.A. Legal notion of a thing in Roman private law // *Vestnik Moskovskogo gosudarstvennogo oblasnogo universiteta. Seriya: Yurisprudentsiya*. 2009. № 3. Pp. 61-66.

<sup>2</sup> Seletskaya S.B., Shpagonov A.N. Reception of the Roman Law in modern business activity *Journal of Economics and Economic Education Research*. 2016. T. 17. № 4. C. 35-40.

<sup>3</sup> Kuznetsov V.V. *Law dictionary* / V.V. Kuznetsov. Izd. 2-e. Rostov n/D: Feniks, 2010. P. 13.

<sup>4</sup> Hickey R. Dazed and confused: accidental mixtures of goods and the theory of acquisition of title // *Modern Law Review*. 2003. T. 66. № 3. C. 368-383.

<sup>5</sup> Levchko V.V. Legal nature of subsurface management in the first half of XVIII century in Russia *beka* // *Vestnik Voronezhskogo gosudarstvennogo universiteta. Seriya: Pravo*. 2014. № 2 (17). P. 62.

<sup>6</sup> Levchko V.V. Legal nature of subsurface management in the first half of XVIII century in Russia *beka* // *Vestnik Voronezhskogo gosudarstvennogo universiteta. Seriya: Pravo*. 2014. № 2 (17). P. 70.

<sup>7</sup> Kurbanova E. A. KypaHona Э.А. Serfdom law in Russia: general stages of development // *Zhurnal nauchnykh publikatsiy aspirantov i doktorantov*. 2010. № 4 (46). Pp. 138-139.

<sup>8</sup> Code of laws in imperial Russia. Consolidated text 1832-1917 years: [in 16 volumes] / otv. sost.: A.R. Sokolov, D.I. Raskin. Sankt-Peterburg: Avror, 2007. Volume 10. P.302.

house. Its materials included interior and exterior finish, as well as decorations. Impossibility of separating these elements from the house itself without their inappropriate damage was legally defined as a sign of an accession. Objects of such minor parts were: floors made of marble, precious woods and other materials; marble, copper and cast iron fireplaces; expensive wallpaper and in-walls mirrors. The list was left open, therefore, other elements of home decor corresponding to the common features of accessory, could have an accessory character as well.

The Imperial legislation delimited real estate on the basis of its division into separate parts. When such a division allowed to use the generated property element as an independent object, then such a property was called "separate property".<sup>9</sup> At the same time, such complex types of real estate as courtyards (except those owned by city residents or located in the capital), factories and plants, land plots provided to state peasants, as well as rented real estate, gold mines, etc., were considered inseparable.

Scientists note that such a classification of things according to the Code of Laws of the Russian Empire 1832 did not fully comply with the Roman legal tradition.<sup>10</sup> The state was entitled to determine what property should be classified as inseparable one, even if it was with signs of a separate real estate. In ancient Rome accession was not applicable to people, while in the Russian Empire such a legal validity was formed in relations of peasants and large property complexes (lands, factories, plants).

Accession in pre-revolutionary Russian legislation was understood in its wide sense. It was applicable not only to minor things, designed to serve the main property, but also to complex types of real estate. The legal sign of accession was considered to be the purpose of minor things – handling main (central) property, herewith, an independent property value allowed to consider separable parts of a thing as an object of civil law.

In the first Civil Code of the RSFSR (Russian Soviet Federated Socialistic Republic) 1922 accession was defined in article 25.<sup>11</sup> It represented the legal nexus of the main thing and its accessories. Such a stay was of two key features: the purpose of property (it served as the main thing) and its general economic purpose along with the main thing. The Roman legal axiom that an accessory always shares the fate of the main thing had a reservation in the civil legislation of the RSFSR: this rule was allowed to be changed due to a statutory requirement or with a contract. Under Article 196 of the Civil code of the RSFSR 1922, e.g., a buyer was obliged to check the presence of an accessory in a thing being purchased. If a buyer took the property without the appropriate materials, then it meant that the buyer agreed to such a contract.

Similar rules on accessions were prescribed in the Civil Code of the RSFSR 1964. If the main thing and its material were distinguished, then they legally were inseparable from each other. Only cases statutorily prescribed could be excepted from the rule. E.g., under Article 300 it was forbidden to consider part of a room, an adjoining room, or utility room as the subject of a rental agreement. Such residential premises could be transferred on terms of a lease only with the whole apartment (house).

Soviet civil law performed rejection of the legal technique used in laws of the Russian Empire. The statement is proved with the fact of absence of a list of separate and inseparable things. Civil codes of the Soviet period did not indicate examples of the main thing and its materials. Thereby it was not determined what things exactly could be considered as a minor property.<sup>12</sup>

Instead, laws prescribed only two common grounds: the single property purpose of such things and attachment of a minor subject to provide the main thing functions.

Civil code of the Russian Federation 1994 drew toward the tradition existed in the legislation of the Russian Empire.<sup>13</sup> In Article 133, things were classified into divisible and indivisible, but without a detailed listing of examples of such a property division. Accession resulted in materials belonging to an indivisible thing, those which inextricably bounded up with its legal fate. A similar rule applies to transactions with complex things (Article 134). Such things are a set of property, the set is a single subject in its integral form.

Unlike the Soviet civil legislation, in Civil Code of the Russian Federation 1994 the exception to accessory to the main thing can be established only by an agreement. It means that the minor thing is associated with the main thing in all transactions, as well as when it is being levied. Such exceptions are no longer provided legally.

A term "accession" was not applied in Russian laws, but it was actively used in the science of civil law. E.g., the possibility to apply this Roman legal principle toward real estate in the Russian Empire was considered by S.S. Abamelek-Lazarev in his work in 1902.<sup>14</sup> Peculiarities of the accession in civil law were investigated by a well-known Russian civil law scholar G.F. Shershenevich.<sup>15</sup> However, the primary purpose of an accession in Russian legal science was subsoil use.<sup>16</sup> At the same time, researchers emphasized the need to realize traditional Roman law principle of accession within Russian legislation, taking into account peculiarities existed in Russian property relations.

#### 4 Summary

The classic principle of accession has acquired certain peculiarities in Russian civil legislation. During the period of serfdom, the "main thing and accessory" model was applied to peasants, i.e. to subjects, and not to property objects. Accessory signs were distinguished to large and valuable real estate objects that were of special legal protection. At the same time, the legislation of the Russian Empire listed examples to which the principle of accession was applied.

Under the pre-revolutionary civil law, accession is a legal characteristic of a property, in which all minor things of a single property purpose are recognized as a part of a certain main thing. Such property was forbidden to be divided as a result of transactions and upon collection of debts on it.

Two criteria were legal signs of an accession:

- 1) a general property purpose of a compound thing – the thing and its accessories could only be used together for the purposes for which such a property was acquired;
- 2) inability to use an accessory to a thing as being an independent object because of an inappropriate damage to it or as a result of its narrow property function.

Occurrence of accession in the form of general rules in Soviet civil law was accompanied by a small category of contracts that could contain an exception for this principle application. This feature explains the fact of disappearance of the possibility in modern civil law of Russia to establish through legal norms the peculiarities of an accession. Parties to the contract are entitled to determine exceptions in accessory appurtenance of the property being passed round.

<sup>9</sup> Code of laws in imperial Russia. Consolidated text 1832-1917 years: [in 16 volumes] / otv. sost.: A.R. Sokolov, D.I. Raskin. Sankt-Peterburg: Avropa, 2007. Volume 10. P.302.

<sup>10</sup> Apolsky E.A. History of concept of national property law evolution in development of law of things in Russia // Problemy sovremennoy nauki i praktiki. 2009. № 3 (5). Pp. 128-130. Andrews T.R. Income from separate: towards a theoretical foundation // Law and Contemporary Problems. 1993. T. 56. C. 171-216.

<sup>11</sup> Civil code of the RSFSR 1922 // Foundation for research on P.A. Stolypin legacy [URL]: <http://myzeifpeforma.pf/node/13715> (access date - 01.05.2019).

<sup>12</sup> Golovanov N.M. Development of trendiness on property in soviet civil law // Vestnik grazhdanskikh inzhenerov. 2014. № 3 (44). Pp. 276-282.

<sup>13</sup> Civil code of the Russian Federation (I part) under 30.11.1994 N 51-FL Corpus of legislative acts of the Russian Federation, 05.12.1994, N 32, article 3301.

<sup>14</sup> Abamelek-Lazarev S.S. Issue on sub-soils and mining industry development in XIX century. SPb., 1902. P. 109.

<sup>15</sup> Shershenevich G.F. Russian civil law textbook (on edition 1907). M., 1995. P. 174.

<sup>16</sup> Yanovsky A.E. Яновский А.Е. First principles of mining legislation and its restatement in Russia. S.-Peterburg, 1900. P. 141. Shtof A.A. Do we need "mining liberty"? Kharkov, 1908. P. 16.

## 5 Conclusions

Russian civil law borrowed Roman principle of accession. The term initially had a fragmentary performance in the form of listing cases when things were of an accessory nature. With the development and codification of civil law, there was a change towards its general (abstract) characteristics from the establishment of special provisions for accession. It arises under condition that there is a complex thing in which the main (central) property and its accessories are distinguished. All accessories acquire a minor property character, therefore they do not represent economic value separately from the main thing. It is legally demanded that transactions with such a property apply to all accessories, but it is not fully determined what exactly is an accessory (minor thing). The same rule is applied to complex things, where it is not possible to establish the main property, while its parts are all of a single purpose.

Abstractly formulated civil law rules on accession open the way to courts in their discretion to think fit to recognize certain property objects as accessories to a larger (valuable) property. We do believe that in Russian civil law it is necessary to establish boundaries to the application of accession in order to prevent a double interpretation of an act of legislature.

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**Primary Paper Section: A**

**Secondary Paper Section: D, G, L**

# ICT-SUPPORTED EDUCATIONAL PROJECTS IN TEACHING AND LEARNING BIOLOGICAL AND ECOLOGICAL SCIENCES ORIENTED

<sup>a</sup>RENÁTA BERNÁTOVÁ, <sup>b</sup>MILAN BERNÁT, <sup>c</sup>LUBOMÍR ŽÁČOK, <sup>d</sup>MICHAELA SEPEŠIOVÁ

<sup>a</sup>PgF Prešov, University of Prešov, in Prešov, Slovak republic

<sup>b</sup>PFHPV PU Prešov, University of Prešov, in Prešov, Slovak republic <sup>c</sup>Faculty of Natural Sciences, UMB Banská Bystrica, Slovak republic, <sup>d</sup>FF Prešov University of Prešov in Prešov, SLOVAK REPUBLIC,

email: <sup>a</sup>Renata.Bernatova@unipo.sk, <sup>b</sup>milan.bernat@unipo.sk, <sup>c</sup>Lubomir.Zacok@umb.sk, <sup>d</sup>michaela.sepesiova@unipo.sk,

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**Abstract:** The paper investigates the designing and the application of ICT-supported projects in teaching and learning Biological and Ecological Sciences oriented curricula. The purpose of ICT support is to enrich a traditional form of project learning concept with the ICT platform. Moreover, this platform provides a prerequisite for visualizing processes and phenomena at such a level of clarity that cannot be achieved with other forms of visualization. As a part of the application of the mentioned projects in teaching and learning, there are newly-designed concrete teaching models with a comprehensive methodology of their application. The effectiveness of the experimental teaching and learning was verified by the method of pedagogical experiment.

**Keywords:** educational projects, biologically and ecologically oriented curriculum

## 1 Instruction

Computer technologies have importantly influenced almost every aspect of our lives. They have also had a great impact on education. Our challenge is to make effective use of new technologies in the educational environment. This powerful tool helps advance the transformation of the teaching and learning process. It has brought new prospects for the introduction of computer simulation and animation into the pedagogical process. The aim of this paper research is to demonstrate the inevitability of creating a high quality platform for visualization of objects, processes and phenomena in the teaching of natural and technical sciences. The authors attempt to prove that simulation may become a powerful teaching and learning tool in educational subject (Natural Science) for teacher education [5]. [8-10].

A lot of dynamicity and evolution have been noticed in computer terminology and its translation. In the past years new technical terms have been coined or the meaning of already existing terms has been completely changed or made more exact. Sometimes it has resulted in creating a number of definitions of the same phenomenon. There are a number of definitions characterizing an applet. The following one is chosen from Wikipedia. In our view, it gives relevant and sufficient information about the investigated object [1].

An applet is a software component that runs in the context of another programme, for example a web browser. An applet usually performs a very narrow function that has no independent use. Hence, it is an application -let. The term was introduced in AppleScript in 1993. An applet is distinguished from 'subroutine' by several features. First, it executes only on the 'client' platform environment of a system, as contrasted from 'servlet'. As such, an applet provides functionality or performance beyond the default capabilities of its container (the browser). Also, in contrast with a subroutine, certain capabilities are restricted by the container. An applet is written in a language that is different from the scripting or HTML language which invokes it. The applet is written in a compiled language, while the scripting language of the container is an interpreted language, hence the greater performance or functionality of the applet. Unlike a 'subroutine', a complete web component can be implemented as an applet.

This long definition, however, needs to be appended by another short description which characterises a Java applet from the didactics point of view. In our view, an applet is a 'small' special

mono-functional application programme used for example for interactive animations or calculations made by a client himself without the need of cooperation with a server. Being applied in the pedagogical process a Java applet enables a teacher to create texts with simulations. Thus, it becomes an instrument for creating interactive teaching materials.

The main goal of this research is to create Flash animations and Java applets for improving natural (and technical) sciences teaching. Our intention is to create an innovative system in educational subject (Natural Science) for teacher education. For this purpose we created over two hundred Java applets in the Java environment. The applets are made in the following way:

- the individual static pictures and figures from traditional printed text books are animated (or simulated);
- schemes included in the instructions manual for didactic construction kits are animated (or simulated).

Our final aim is to create a virtual visualisation 'supplement' that would enlarge the range of visualisation potentials of traditional printed text books (and didactic construction kits). We attempt to maximise existing tools and platforms and thus maximise the power and efficacy of visualisation.

Moreover, on one of the applets we demonstrate the way of its creation and its didactic application. The creation principles, strategies and tactics of the other applets are analogical. In general, the key point of the application of visualisation may be explained as follows:

- the phenomena, processes and objects such as a) pictures or figures in a traditional textbook, b) model construction kits, c) other three-dimensional models are to be visualised in a traditional (static) way;
- the phenomena, processes and objects that go beyond the boundaries of traditional and conventional ways of visualisation are to be visualized by means of Flash animations and Java applets ('enlargement of a hand of knowledge').

## 2 Strategy and tactics of creating experimental way of visualization

„The principled essence” of the difference between experimental and traditional way of visualization of natural processes in our research is that the traditional way of visualization was using “static” techniques of visualization of natural and technical system and the experimental way of visualization was furthermore using “dynamic” techniques of visualization (computer modeling and simulation and their results presented by computer graphics - Figure 1).

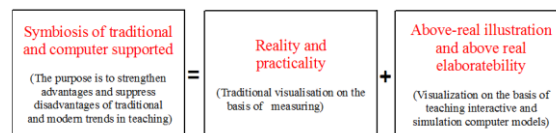


Figure 1 Scheme of strategy and tactics of creating experimental way of visualization

The innovative experimental system (called NIESVA) was designed to eliminate the above-mentioned drawbacks of the existing (traditional) ways visualization of natural processes for didactic purposes. The experimental way of visualization applied in the NIESVA, enables among other things, to accelerate, decelerate, run the action; this was the drawback of the physical measuring; further, it enables us to interactively enter into the course of visualization process and change the model parameters, which has been the drawback of the video-animation; and finally, the experimental way of visualization is practical and pragmatic and the visualization through computer

simulation lacks these features. These NIESVA attributes (including multimedia and the synergic effect of mutual intersection) also extends both quality and quantity dimensions of the degree of didactic visualization demonstrativeness beyond the possibilities of all the above-mentioned traditional forms of visualization. We have been also concerned with the issues of effectiveness of teaching in the NIESVA in comparison with the traditional teaching system (see the section – the experimental research).

### 3 Educational projects - applet set designed for thematic teaching in natural subjects begins with “Do you know why/how...?”

On the contrary, the visualization by means of a computer model may be improved by a practical and real attribute that is contained in a textbook or a model construction kit but not in a computer model.

The created collection of computer models was called : The world of natural and technical sciences (of younger pupils) in computer models (educational models designed for teaching natural sciences, technical work and essentials of ecological education at the first level of primary schools).. In order to strengthen the didactic application of the computer model the names of the individual computer models begin with the words. The individual applets of the packet start with the following words: How does it work/function? or Do you know why/Do you know how...? (Figure 2 - Figure 10).

Natural Science: How does the human body work? Do you know your digestive system? Do you know how it works? Do you know how your heart works? Do you know how the respiratory and circulatory systems work? Do you know how the musculoskeletal system works? Do you know how the nervous system works? Do you know how the endocrine system works? What do you know about human reproduction? How does the reflex arch work? How does the sense of sight work? How does the sense of smell work? How does the sense of touch work? How do we affect the environment? How does the hydrological cycle work? How does the nitrogen cycle in the nature work? How does the nitrogen cycle in the nature work? How does the feeding network in nature work? How is electric energy made in nuclear station? How is electric energy made in hydroelectric power station? How is electric energy made in thermal power station? How does production and energy distribution work from the power station to consumer? Understand why the alternate phases of the Moon?, Want to know why the alternate seasons ?, Want to know why there is a rotation of day and night ?the phenomena, processes and objects that go beyond the boundaries of traditional and conventional ways of visualisation are to be visualized by means of Flash animations and Java applets.

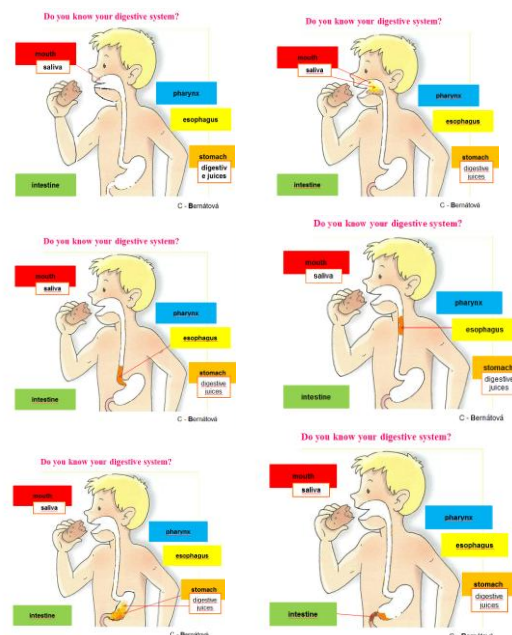
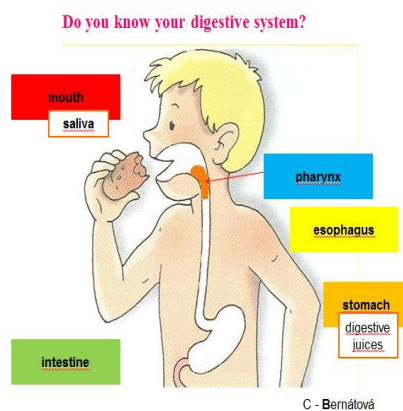


Figure 2 The applet (key sequence) - Do you know your digestive system? [2]

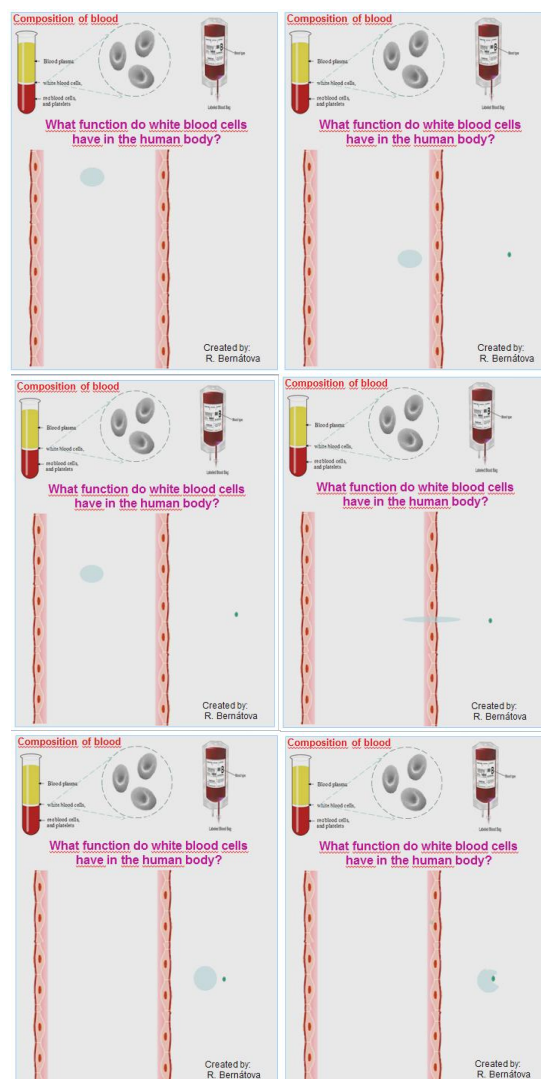


Figure 3 The applet (key sequence) - What function do white blood cells have in the human body?

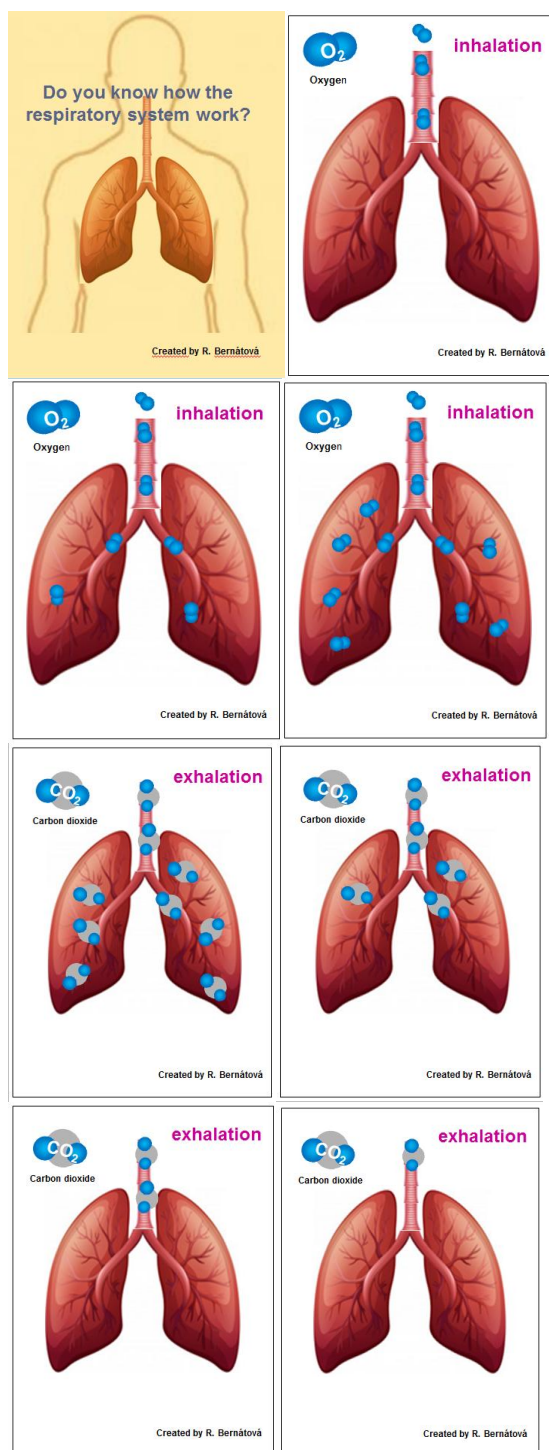


Figure 4 The applet (key sequence) - Do you know how the respiratory systems work ?

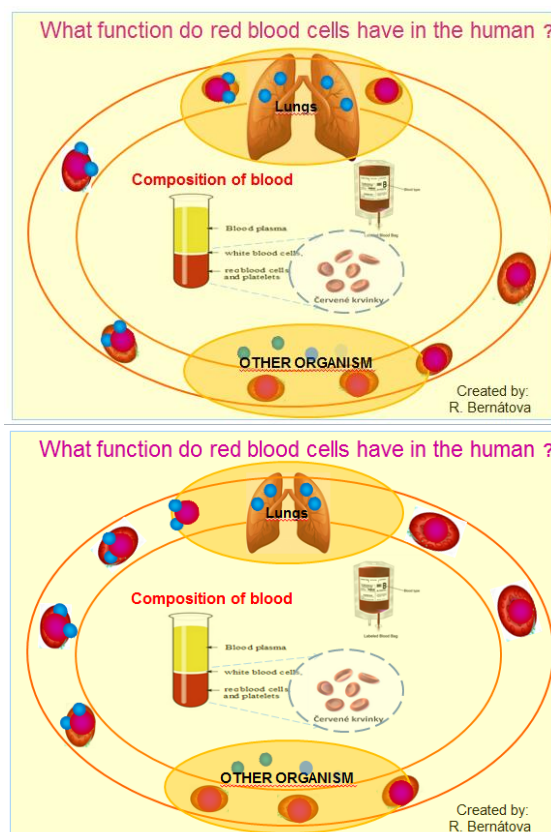


Figure 5 The applet (key sequence)- What function do red blood cells have in the human body?

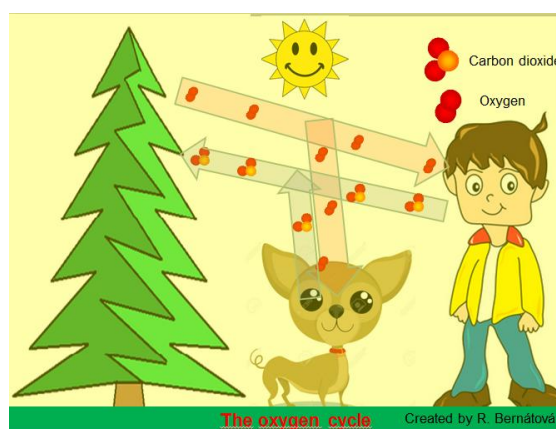


Figure 6 The applet (key sequence) – How does the oxygen cycle work ?



Figure 7 The applet (key sequence) - Want to know why there is a rotation of day and night ? [2]



Figure 8 The applet (key sequence) - Understand why the alternate phases of the Moon ? [2]

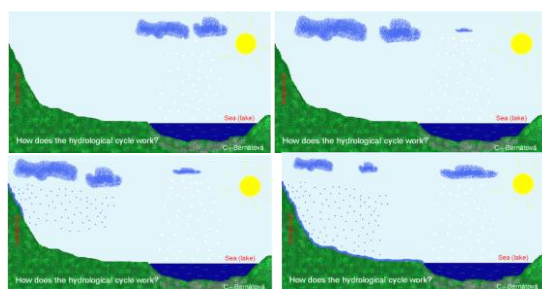


Figure 9 The applet (key sequence) - How does the hydrological cycle work ? [2]

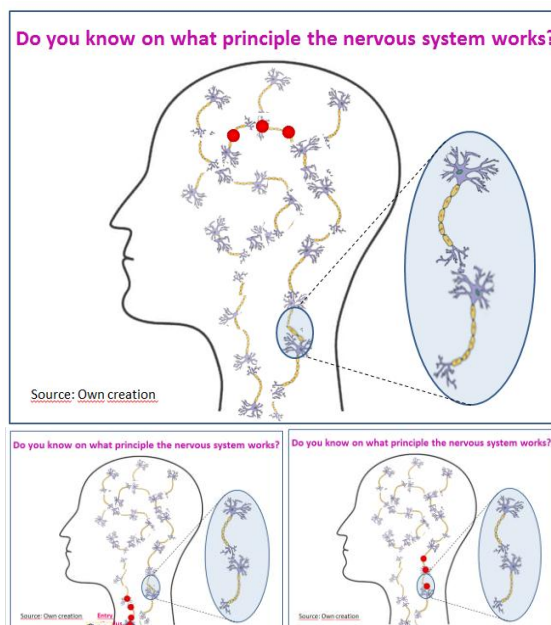


Figure 10 The applet (key sequence)- Do you know on what principle the nervous system works?

#### 4 Experimental research of educational project - Java Applets utilization in teaching

We made a database of Java applets that served as a platform for the creation of the experimental innovative teaching system called NIESVA. It was designed for visualization of teaching processes and phenomena through applets. In the process of our research the NIESVA system (in the form of concrete models designed for teaching selected thematic sections in teaching (pedagogical) faculties) was also experimentally verified.

##### 4.1 Experimental verification of their didactic effectiveness in the conditions of real school

The method of pedagogical experiment was used to compare the two teaching systems in the experimental group (the NIESVA system) and the control group (traditional teaching system). The principle of the pedagogical experiment is demonstrated in Figure 11. The concrete teaching system is demonstrated.

| Common Features  |   |
|--|---|
| In both the experimental and control groups an identical technical object, phenomenon, or process were visualised      |   |
| Different Features   |   |
| The control group  | The experimental group  |
| - a traditional technique of visualisation using static pictures in a textbook, transparencies (an overhead projector) | - an experimental technique of visualisation by means of a Java applet using computer animation and simulation (an LCD projector) |

Figure 11 The principle of the pedagogical experiment [1]

The main aim of the experimental research was to investigate the possibilities of the NIESVA system application in order to increase the effectiveness of the teaching process.

##### 4.2 Initial hypothesis of the research

H: The initial hypothesis: the proposed experimental teaching system (hereinafter NIESVA) will be more effective than the traditional teaching system. In order to be able to conduct successful quantitative and qualitative verification we divided the initial hypothesis into the following subhypotheses:

H1: The cognitive learning performance (the results of the output didactic test) of the students taught by means of NIESVA will be better than of those taught traditionally.

H2: At the end of the experimental period the students taught by means of NIESVA will achieve better or the same level of memory performance in comparison with the students taught in a traditional way (in the subtest N1 of the output didactic - test the learning taxonomies of Niemierko).

H3: At the end of the experimental period the students taught by means of NIESVA will achieve better or the same level in knowledge comprehension (in the subtest N2 of the output didactic test - the learning taxonomies of Niemierko) compared with the students taught in a traditional way.

We present here only the central subhypotheses in the cognitive area.

The effectiveness of the NIESVA application in the natural teaching process at (teachers) faculties was verified during a continuous series of long-term empirical research in 2015 – 2016.

The research sample consisted of 64 research samples were in educational subject Natural Science (the teaching biologically and ecologically oriented curriculum) for teacher education. The basis of results achieved in the input didactic tests divided into experimental and control group. 33 students were placed in the experimental group and 31 students in the control group. Pedagogical experiment was carried out from January to June (2015-16).

In the process of our research the following methods (the method of pedagogical investigation and psychological-pedagogical method) were used:

- 1) the pedagogical experiment the main method, a two-group model of the experiment (an experimental and a control group) conducted synchronously and simultaneously;
- 2) didactic tests,
- 3) the questionnaire method,
- 4) the method of dialogue,
- 5) the method of observation,
- 6) statistical methods of research data analysis.

### 4.3 The major experimental research analyses results

The statistical interpretation of the research analyses findings is concise as the graphs are explicatory enough – Figure 12 and Figure 13. They include the digital data related to the values in question as well as the basic characteristics of the statistical ensembles arranged into the tables. As we find them sufficiently descriptive we do not provide any additional verbal explanations – Tab I.

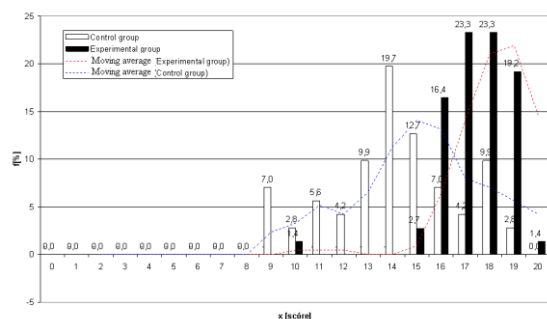


Figure 12 Frequency distribution of learners' performances achieved in the final didactic test within the pedagogic experiment

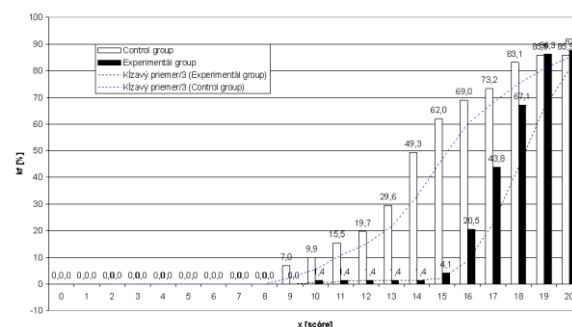


Figure 13 Distributive function of learners' (scores) achieved in the final didactic test within the pedagogic experiment

Table 1: Descriptive And Inductive Statistics

| Descriptive statistics |           |            |          |            |           |
|------------------------|-----------|------------|----------|------------|-----------|
| TAB 1.1E               | XmaxE=    | 20         | XminE=   | 11         | AverageE= |
| EXP                    | test.norm | Yes        | MedianE= | 17         | Mode E=   |
| 0quartile =            | 11        | 1quartile= | 16       | 2quartile= | 17        |
| 3quartile=             | 18        | 4quartile= | 20       |            |           |
| Descriptive statistics |           |            |          |            |           |
| TAB 1.1C               | XmaxC=    | 19         | XminC=   | 9          | AverageC= |
| CON                    | test.norm | Yes        | MedianC= | 14         | Mode C=   |
| 0quartile =            | 9         | 1quartile= | 13       | 2quartile= | 14        |
| 3quartile=             | 16        | 4quartile= | 19       |            |           |
| Inductive Statistics   |           |            |          |            |           |
| Stat. confid. (E-C)    | k = 2     | ni1 =      | 1        | ni 2 =     | 62        |
| Fkr[95%]=              | 6.8       | Fvyp =     | 94,14889 | signifik=  | yes       |
| Fkr[99%]=              | 3.9       |            |          |            |           |

### 4.4 Some results of the structural statistical analysis on the level of subtests system created on the basis of Niemierko's taxonomy levels of teaching

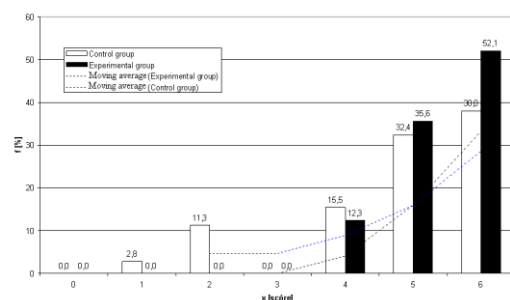


Figure 14 Frequency distribution of learners' performances achieved in subtest N1 (remembering) of the final didactic test within the pedagogic experiment

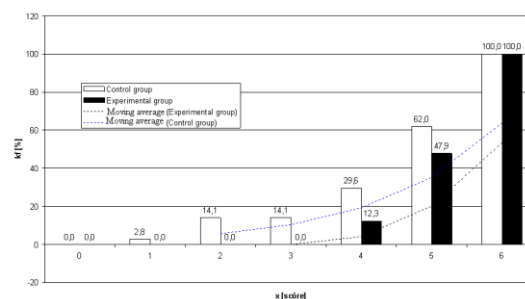


Figure 15 Distributive function of learners achieved in subtest N1 (remembering) of the final didactic test within the pedagogic experiment

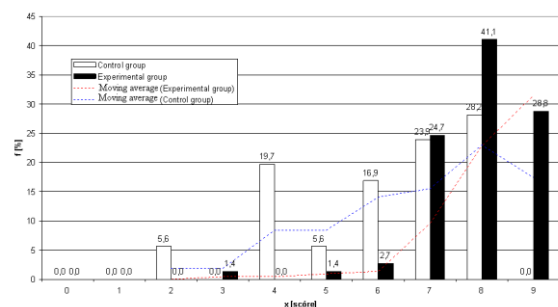


Figure 16 Frequency distribution of learners' performances achieved in subtest N2 (comprehension) of the final didactic test within the pedagogic experiment

There are frequency distribution graphs (Figure 6, Figure 8 and Figure 10) of subtests N1, N2 and N3 together with their distribution functions (Figure 14 - Figure 19).

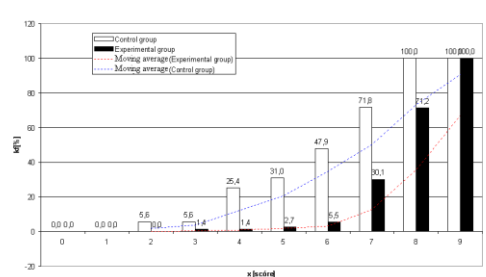


Figure 17 Distributive function of learners' scores achieved in subtest N2 (comprehension) of the final didactic test within the pedagogic experiment

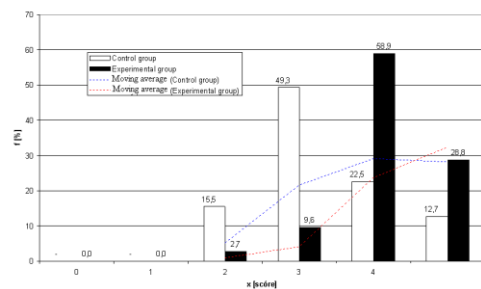


Figure 18 Frequency distribution of learners' performances achieved in subtest N3 (application) of the final didactic test within the pedagogic experiment

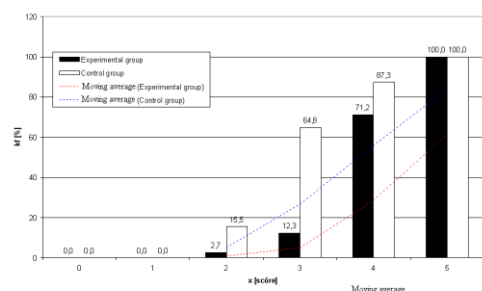


Figure 19 Distributive function of learners' scores achieved in subtest N3 (comprehension) of the final didactic test within the pedagogic experiment

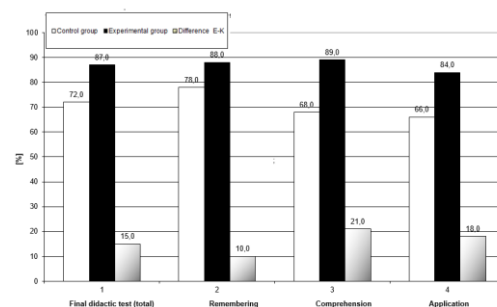


Figure 20 The comparison of the success rate of the individual subtests assessing the learning objectives (remembering, comprehension, application) in the experimental and control group in the final didactic test

Results of the quartile and cluster statistical analysis are shown in Figure 21.

#### 4.5 Some results of the quartile and cluster statistical analysis

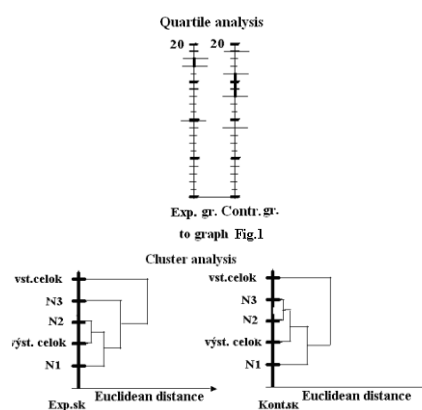


Figure 21 Results of the quartile and cluster statistical analysis

### 5 Conclusions and recommendations resulting from research results

Our arguments are primarily strengthened by the results presented in Figure 20. They demonstrate the comparison of success rate of the individual subtests assessing the learning objectives (remembering, comprehension, application) in the experimental and control group in the final didactic test. The results show that the differences in the success rate of individual subtests between the experimental and control group are as follows: 10,0 % in remembering, 21,0 % in comprehension, 18,0 %, in application and 15,0 in final didactic test application in favour of the experimental group (see Figure 20).

Our statements are supported by the results shown in the Table I (Descriptive and inductive statistics). The statistical significance of the performance difference between the experimental and the control group achieved in the final didactic test is demonstrated as a whole in the TABLE I Descriptive and inductive statistics (by the analysis of variance – F test). Calculated F was 94,14, Fkr = 6,8. Since  $F > F_{kr}$ , we can say that in the student's performance achieved in the final didactic test there is statistically significant difference between the experimental and control group at the significance level of 0,05. The interpretation of the subtest results N1 (remembering), N2 (comprehension), N3 (application) is analogous to the previous. (See Table 1: Descriptive and Inductive statistics).

Finally, we dare to say that the proposed experimental teaching system NIESVA used during this research appears to be more effective than a traditional teaching system. The students who participated in the experiment showed better performance in

cognitive learning as well as in all the other observed parameters (remembering, comprehension, application).

The overall analysis of the application of the present innovative teaching system utilizing computer animation and simulation of natural and technical processes and phenomena by means of Java applets proves the good prospective of the introduction of the innovative system into school practice. Moreover, it proves the system to become a valuable tool for increasing the effectiveness of the teaching of teacher faculties. Furthermore, it provides evidence to be a helpful means for achieving positive qualitative changes in students' knowledge structure. The most encouraging is the fact that the present innovative system can be introduced into the teaching process without any radical transformation of the traditional teaching system (and in our view it is its crucial advantage) as it was fully mentioned in [4]. This subject is elaborated in literature [5 -7].

In addition, the NIESVA system is considered to be a lot more attractive and motivating than the traditional system for the participants of the present research. What is more, the members of the experimental group stated that they were looking forward to being taught by means of the NIESVA system.

The research findings confirmed that the Java applet application in teaching in natural and technical subjects is of great didactic importance. It broadens the horizon of visualization, application, didactic and educational possibilities which cannot be made available by traditional techniques of visualization of objects, processes and phenomena in the teaching biologically and ecologically oriented curriculum.

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**Primary Paper Section: A**

**Secondary Paper Section: AM**

## DEVELOPMENT OF REGIONAL AGRICULTURAL MARKETS WHEN OPTIMIZING PRODUCTION

<sup>a</sup>STEPAN P. BURLANKOV, <sup>b</sup>MIKHAIL A. ANANIEV,  
<sup>c</sup>RAISA V. SAVKINA, <sup>d</sup>NATALIA A. KAZAKOVA

*Plekhanov Russian University of Economics, Stremyanny Lane  
 36, Moscow, Russia, 117997*

*email: <sup>a</sup>spburl1@mail.ru, <sup>b</sup>ama1959@mail.ru,  
<sup>c</sup>raisasavk@yandex.ru, <sup>d</sup>axd\_audit@mail.ru*

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 Russian Federation.

**Abstract:** The relevance of the study is substantiated by production problems of food supply systems and the impact of agrifood policy on these processes by using a system for forecasting the productive capacity of the agrifood sector of the regional economy. These circumstances determine that it is necessary to develop the agrifood policy based on optimizing production capacities, distribution areas, exchange and consumption of agricultural products, on the one hand, and the realities and requirements of regional and national markets, on the other hand. The agrifood policy pursued in this way will aim at the dynamic and efficient development of all sectors of the regional food supply system and will contribute to the systemic development of this sector of the regional economy. That is why this is an important national problem to understand the direction of developing the national food supply system, to substantiate its forecast parameters, taking into account the problem sectors of the agrifood market. At the same time the present management task is to substantiate the measures taken within the agrifood policy, and to improve instruments and approaches to forecasting.

**Keywords:** development, agrifood policy, forecasting, condition analysis, agrifood market, problem sectors, functioning.

### 1 Introduction

The increase in the productive capacity of the national food supply system requires reconsidering the methodology and mechanism for pursuing the agrifood policy [1]. Its main provisions should be aimed at optimizing production capacities and taking into account parameters of developing the exchange and consumption of agricultural products, and market requirements. In addition, such policy pursued by the state should be aimed at the dynamic and efficient development of all branches of agribusiness in order to improve living standards of the population.

This issue is relevant in the context of the sanctions introduced by Western countries. Therefore, it is important to understand the trends of developing parameters (forecasts) of the problem sectors of the Russian agricultural and food market.

### 2 Materials and Methods

The methodical approach to suggesting offers on developing the agrifood policy based on the optimization of production capacities and market requirements in the region, and the methods for forecasting parameters of problem sectors in the agrifood market were used in the present work.

The studies are based on understanding the development trends of the regional food supply system, substantiating forecasts and determining parameters of the problem sectors of the food market that are based on a comprehensive analysis of the regional food supply system, identifying the current problems and developing offers for optimizing production opportunities and taking into account the needs of the food market in the region.

### 3 Results

Studying the development of the agrifood policy based on optimizing production capabilities and requirements of the market in the Republic of Mordovia, the authors offer a system of measures that ensure the resolving of the above problems. They consist of a number of stages.

At the first stage, it is necessary to clarify the essence of the agrarian and agrifood policy, how these concepts are interpreted. After that it is necessary to carry out studies: to obtain official data on the volume of agricultural production, taking into account consumption rates, to analyze the dynamics of the population structure, and to determine sales volumes by product groups per person.

The concept of “agrifood policy” is interpreted as follows: this is a part of the economic policy of a state or region in the investment, price, financial and infrastructure areas, aimed at the integrated development of the food security system as an economic sector and meeting the needs of the agrifood market in order to provide the population with food [2, 3].

The overall focus of the agrifood policy is determined by the needs of:

- Agrifood markets for reliable food supply of the population,
- Provision of the population with high quality food products at reasonable prices, and
- Preservation of the environment, preservation and reproduction of soil fertility, growth of productive properties of agricultural plants and animals, and environmental protection [4, 5].

Along with this, it is important to determine the production of specific types of food products during the integrated economic interaction within the food subcomplex.

Based on evaluating the methodological approaches that determine the capacity of the food market, a system of measures is offered to solve the above problems. It consists of a number of stages.

At the first stage, it is necessary to carry out research activities aimed at studying the capacity of the food market, analyzing the composition, structure and dynamics of the population and sales of product groups per person.

The second step of the first stage is to systematize data, to form grouping and analytical tables, and time series of the indicators under analysis.

The first stage results in obtaining the analytical data that make it possible to define the ratio of the actual and science-based agricultural livestock and the volume of livestock production in the Republic of Mordovia (under the current output of products per one conditional head).

At the second stage, the problem production sectors are analyzed through the example of the Republic of Mordovia.

Table 1 – Ratio of the Actual and Science-Based Acreage and Gross Yield of Vegetables in the Republic of Mordovia (under the Current Yield).

| Indicators                  | Vegetables |        |        |        |        |        |
|-----------------------------|------------|--------|--------|--------|--------|--------|
|                             | 2011       | 2012   | 2013   | 2014   | 2015   | 2016   |
| Acreage, thous. ha          | 6.4        | 6.3    | 6.4    | 6.3    | 6.3    | 6.0    |
| Yield, centner/ha           | 134.06     | 145.87 | 132.97 | 143.02 | 154.13 | 161.67 |
| Gross collection, thous. t. | 85.8       | 91.9   | 85.1   | 90.1   | 97.1   | 97.0   |
| Actual sale, thous. t.      | 18.9       | 22.2   | 17.5   | 21.3   | 21.6   | 24.5   |

|  |                   |                   |                 |                   |                   |                   |
|--|-------------------|-------------------|-----------------|-------------------|-------------------|-------------------|
| Population, persons                                  | 833,263           | 825,454           | 818,566         | 812,156           | 808,900           | 807,453           |
| Under science-based indicators: vegetables – 130 kg. |                   |                   |                 |                   |                   |                   |
| Acreage, thous. ha                                   | 8.08              | 7.36              | 8.00            | 7.38              | 6.82              | 6.49              |
| Under the current yield, centner/ha (t/ha)           | 134.06<br>(13.41) | 145.87<br>(14.59) | 132.97<br>13.30 | 143.02<br>(14.30) | 154.13<br>(15.41) | 161.67<br>(16.17) |
| Science-based gross yield, thous. t.                 | 108.32            | 107.31            | 106.41          | 105.58            | 105.16            | 104.97            |
| Ratio of the actual and science-based acreage, %     | 79.21             | 85.60             | 80.00           | 85.37             | 92.38             | 92.45             |
| Ratio of the actual and science-based gross yield, % | 79.21             | 85.64             | 79.97           | 85.34             | 92.34             | 92.41             |
| Ratio of the actual and science-based sale, %        | 17.45             | 20.69             | 16.45           | 20.17             | 20.54             | 23.34             |

Table 2 – Ratio of the Actual and Science-Based Agricultural Livestock and Livestock Production in the Republic of Mordovia (under the Current Output of Products per one Conditional Head).

| Indicators   | Beef    |         |         |         |         |         | Pork    |         |         |         |         |         |
|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|  | 2011    | 2012    | 2013    | 2014    | 2015    | 2016    | 2011    | 2012    | 2013    | 2014    | 2015    | 2016    |
| Annual average livestock number (meat cattle, pigs and cows), thous. heads.              | 194.30  | 194.10  | 188.05  | 180.45  | 166.40  | 152.25  | 302.50  | 310.90  | 316.00  | 304.75  | 293.80  | 306.95  |
| Output of products per one conditional head of livestock, centner/head                   | 1.06    | 1.05    | 0.99    | 0.90    | 0.81    | 0.86    | 1.08    | 1.10    | 1.06    | 1.33    | 1.40    | 1.51    |
| Volume of production, thous. t.  | 205     | 203     | 186     | 162     | 134     | 131     | 326     | 342     | 336     | 406     | 411     | 462     |
| Actual sales, thous. t.  | 15.5    | 14.0    | 14.5    | 13.9    | 13.3    | 16.06   | 21.0    | 22.2    | 24.4    | 25.2    | 33.3    | 40.04   |
| Population, persons  | 833,263 | 825,454 | 818,566 | 812,156 | 808,900 | 807,453 | 833,263 | 825,454 | 818,566 | 812,156 | 808,900 | 807,453 |
| Under science-based indicators: beef and veal – 25 kg, pork – 14 kg.                     |         |         |         |         |         |         |         |         |         |         |         |         |
| Annual average livestock number, thous. heads  | 197.45  | 197.31  | 206.90  | 226.16  | 251.13  | 234.60  | 108.25  | 105.05  | 107.78  | 85.35   | 80.96   | 75.10   |
| Under the current output of products per one conditional head of livestock, centner/head | 1.06    | 1.05    | 0.99    | 0.90    | 0.81    | 0.86    | 1.08    | 1.10    | 1.06    | 1.33    | 1.40    | 1.51    |
| Science-based volume of production, thous. centner                                       | 208.32  | 206.36  | 204.64  | 203.04  | 202.23  | 201.86  | 116.66  | 115.56  | 114.60  | 113.70  | 113.25  | 113.04  |
| Ratio of the actual and science-based livestock, %                                       | 98.40   | 98.37   | 90.89   | 79.79   | 66.26   | 64.90   | 279.45  | 295.95  | 293.19  | 357.06  | 362.90  | 408.72  |
| Ratio of the actual and science-based gross production, %                                | 98.41   | 98.37   | 90.89   | 79.79   | 66.26   | 64.90   | 279.44  | 295.95  | 293.19  | 357.08  | 362.91  | 408.70  |
| Ratio of the actual and science-based sale, %  | 74.40   | 67.84   | 70.86   | 68.46   | 65.77   | 79.56   | 180.01  | 192.11  | 212.91  | 221.64  | 294.04  | 354.21  |

Thus, it is possible to make the following conclusions based on analyzing the ratio of the actual and science-based sales of agricultural products in the Republic of Mordovia in the area of problem sectors.

According to the indicators stated in Tables 1 and 2, it is possible to see that in the Re-public of Mordovia, in 2016 the actual production of vegetables and cucurbits was 23.3 % of the science-based volume, pork exceeded the science-based volume by 308.70 % in 2016, accordingly, in contrast to beef (in 2016, the actual production was less than the science-based one by 35.10 %).

The third stage is to forecast the development of the problem sectors of the agrifood market. Thus, in order to forecast indicators of the agricultural production and consumption based on taking into account the number of the population, the Excel

software and official statistical reporting data for the previous eleven years were used. This was done in order to forecast development trends in the future for 2018 – 2020, taking into account the probabilistic characteristics of the model.

In order to create terms and conditions for the sustainable development and functioning of the food supply system, it is necessary to forecast production: in crop production – vegetables and cucurbits, and in livestock production – beef and veal.

To forecast trends in the agricultural market under the current population, the authors use the capabilities of Excel and the official statistical reporting data for the previous ten years.

Taking into account the probabilistic characteristics of the model, the authors calculate the forecast data for 2017 – 2020 (Table 3).

Table 3 – The Actual and Forecast Indicators of Gross Collection and Per Capita Consumption of Vegetables and Cucurbits in the Republic of Mordovia.

| Year              | Population, thous. per. | Gross collection of vegetables and cucurbits, thous. kg | Per capita consumption, kg | Required production of vegetables and cucurbits, thous. kg (while the rational norm is 130 kg per capita) |
|-------------------|-------------------------|---|----------------------------|---|
| Actual indicators |                         |   |                            |   |
| 2004              | 878.3                   | 100,000   | 113.86                     | 114,179   |
| 2005              | 871.8                   | 87,500  | 100.37                     | 113,334   |

|      |       |        |        |         |
|------|-------|--------|--------|---------|
| 2006 | 864.7 | 83,400 | 96.45  | 112,411 |
| 2007 | 857.9 | 93,500 | 108.99 | 111,527 |
| 2008 | 851.7 | 88,100 | 103.44 | 110,721 |
| 2009 | 845.0 | 91,100 | 107.81 | 109,850 |
| 2010 | 839.2 | 69,900 | 83.29  | 109,096 |
| 2011 | 833.3 | 85,800 | 102.96 | 108,329 |
| 2012 | 825.5 | 91,900 | 111.33 | 107,315 |
| 2013 | 818.6 | 85,100 | 103.96 | 106,418 |
| 2014 | 812.2 | 90,100 | 110.93 | 105,586 |
| 2015 | 808.9 | 97,100 | 120.04 | 105,160 |
| 2016 | 807.5 | 97,000 | 120.12 | 104,970 |
| 2017 | 796.1 | 96,900 | 121.71 | 103,493 |
| 2018 | 789.9 | 90,100 | 114.06 | 102,687 |
| 2019 | 783.6 | 89,000 | 113.57 | 101,868 |
| 2020 | 777.4 | 88,900 | 114.35 | 101,062 |

According to the forecast indicators in Table 3, for 2017 – 2020, the population of the Republic of Mordovia should decrease by 30.1 thousand people. Accordingly, the consumption of vegetables and cucurbits during this period will be reduced by 3.27 kg per year.

Studying the forecast indicators, it is possible to note that the gross yield of vegetables and cucurbits during 2017 – 2020 should decrease and amount to 88,900 thous. kg, and the necessary production should decrease by 2,431 thous. kg and reach 101,062 thous. kg.

The development of the vegetable market is of great national economic importance. The lack of vegetables affects the health of the population of the Republic of Mordovia because they contain the vitamins required by the human body [6].

The beef market is one of the most important markets for livestock products in the Republic of Mordovia. However, the situation is quite complicated now.

Beef contains essential proteins, fats, minerals, vitamins, enzymes and other elements of animal origin and is of great importance for the formation, becoming and functioning of the human body. It is considered to be the most useful type of meat because the nutrients it contains are absorbed by the human body by almost 100 %.

According to the forecast, the gross production of beef and veal for 2017 – 2020 will decrease by 7,556 thous. kg and amount to 16,377 thous. kg, while the necessary production will decrease by 364 thous. kg and will be 9,798 thous. kg, i.e., the forecast of indicators in the beef market for the coming years is unfavorable. At the same time, the forecast accuracy is rather high due to the high values of the approximation coefficients ( $R^2 = 0.98$  and  $R^2 = 1.0$ ).

The analysis of the forecast indicators in Table 4 states the following: in the Republic of Mordovia for 2017 – 2020, the consumption of beef and veal per capita should decrease by 2.4 kg per year, which is a negative factor in the dynamics of consumption.

Thus, despite the fact that today the Republic of Mordovia manages to almost completely provide itself with many basic types of products, there are still considerable disproportions in the structure of markets: in some markets there is an overproduction of own products (for example, grain, eggs), and in others – underproduction (for example, vegetables, beef).

Thus, it is necessary to note that among the agricultural markets of the Republic of Mordovia, the most vulnerable are those of vegetables and beef. The actual sales of products in them lag behind the science-based indicators. Under the modern conditions, this trend is a threat to the rational food supply of the Republic of Mordovia and requires taking measures to eliminate it [7, 8].

The fourth, final stage is the development of directions of the agrifood policy that, on the one hand, takes into account the problem production sectors, and the forecast of the development of the agrifood market, on the other hand.

Based on analyzing the problem sectors and the forecast for the development of the agri-food market, it is necessary to formulate the following directions of the agrifood policy of the Republic of Mordovia:

- Formation of the production resource base (expansion of dairy and meat production, expansion of areas for greenhouses and open ground areas), clarifying measures on management by the state,
- State support of the breeding reproduction and creation of regional seed-growing structures, and
- Preservation and reproduction of the soil fertility of the existing areas for vegetable crops and the reproduction of the infrastructure for camping and stationary breeding of meat livestock.

#### 4 Discussion

It is offered to form the mechanism for pursuing the agrifood policy under the impact of external and internal factors as a set of measures of the economic policy of the state or region in the investment, price, financial and infrastructural areas aimed at meeting the needs of the state and the agrifood market in order to provide the population with food in accordance with rational norms consumption [8-11].

The overall focus of the agrifood policy is determined by the following areas [10, 12, 13]:

- Creating terms and conditions for the functioning of agrifood markets for sustainable and reliable food supply of the population,
- Provision of the population with high quality food products at reasonable prices, and
- Preservation of the environment, preservation and reproduction of soil fertility, growth of productive properties of agricultural plants and animals, and environmental protection.

It is possible to make the following conclusions based on analyzing the ratio of the actual and science-based sales of the agricultural products in the Republic of Mordovia in the area of problem sectors.

According to the indicators stated in Tables 1 and 2, it is possible to see that in the Republic of Mordovia, in 2016 the actual production of vegetables and cucurbits was 23.3 % of the science-based volume, pork exceeded the science-based volume by 308.70 % in 2016, accordingly, in contrast to beef (in 2016, the actual production was less than the science-based one by 35.10 %).

Thus, despite the fact that today the Republic of Mordovia manages to almost completely provide itself with many basic

types of products, there are still considerable disproportions in the structure of agricultural products markets: in some markets there is an overproduction of own products (for example, grain, poultry meat, eggs), and in others – underproduction (for example, lamb meat, fish, vegetables, fruits, beef).

## 5 Conclusion

Based on analyzing problem sectors and forecasting the development of the agrifood market, it is necessary to formulate the following directions of the agrifood policy in the Republic of Mordovia:

- Formation of the production resource base (meat production capacity (dairy and meat production), expansion of areas for greenhouses and open ground areas to produce vegetables, orchards and berry fields, production capacities for their processing) supported by the state and the region,
- State support of the breeding reproduction and the reconstruction of own seed-growing structures, and
- Preservation and reproduction of the soil fertility of the existing areas for vegetable crops and the reproduction of the infrastructure for camping and stationary breeding of meat livestock.

Thus, the relevance of this study is stipulated by today's lack of sufficiently substantiated approaches and offers for developing the agrifood policy related to the problem agricultural sectors in Russian regions.

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**Primary Paper Section: A**

**Secondary Paper Section: AH**

## VALUE ORIENTATION IN THE PROCESS OF THE WORLD'S GLOBAL DIRECTION AND ITS PROBLEMS

<sup>a</sup>JÁN DANEK

*University of Ss. Cyril and Methodius, Faculty of Arts,  
Department of Pedagogy, Nám. J. Herdu 2, 917 01 Trnava  
email: "jan.danek@ucm.sk"*

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**Abstract:** The study deals with contemporary issues of value orientation in the conditions around the world. The text analyzes current problems such as armed conflicts, multicultural contacts, morality, quality of education, dangers of life, cooperation between people and others, which all negatively impact the stability of human civilization. The author emphasizes the need for a direct approach to humanity as an essential subject of social development with proposals for greater application of the strengths and importance of education.

**Keywords:** value orientation, personality, society, education, globalization

### 1 Introduction

Value orientation is an important part of the scientific knowledge of pedagogy, as it is directly oriented to real life with its contexts and problems. Value orientation is represented not only as a state but also as a process associated with the facts of life with a focus on the norms of contemporary life in a globalized world.

Value orientation is a serious part of every person's life, more specifically, it can be said to be part of the quality of life. Quality of life is characterized as "personality cognitive-emotional psycho-reflexion of a particular person linked to the evaluation of the reality of personal life compared with the ideal in terms of experience and formed values in the context of society, civilization and culture" (Kováč, 2013, p.31). Quality of life is also influenced by social reality of a particular country as well as by overall morality, global economic and worldwide social reality including environmental conditions.

### 2 Methods

The issue at hand is researched by using the method of analyzing the reality of the present-day world and related contexts whose understanding should be realized in the process of education. We emphasize the aspects of eight deadly sins of contemporary mankind in Konrad Lorenz's interpretation. There is a need to highlight the development of life and goodness in interpersonal relations in the conditions of globalization, which is viewed as a "connection of different parts of the world in economic, political, information and social fields and which results in a higher level of present society's development" (Hubinková, 2008, p. 49). These are factors that can provide a peaceful future for human society in terms of mutual cooperation and globalization.

### 3. Analysis

While combining quality of life and value orientation, it should be noted that value orientation has two aspects: the procedural aspect, i.e. educational aspect and the positional, or social aspect. Both of these aspects represent facts related to taking a stand, having an opinion or viewpoint manifested in everyday life, as well as the facts related to certain navigating, influencing and searching for an objective position of man in society. When considering the reality of value orientation, it is necessary to address and take into account the various aspects of life and humans in it. Life is characterized as "physical, mental, and spiritual experiences forming human existence" (Webster, 1989, p. 691). From this point of view, it is necessary to observe and specify the following factors when analyzing value orientation:

- the position and importance of a person in an existing society,
- existing worldview,

- economic conditions and standard of life,
- general social culture,
- opportunities for work and remuneration,
- quality of education,
- health condition,
- interpersonal relationships,
- environmental conditions,
- security situation and
- progressiveness in acquiring information.

These factors are linked to living conditions and overall norms of existing relationships, influencing life orientation and the overall perception of one's own position in a particular situation. The position of value orientation is assessed by each person from his/her own point of view, that is from the position of either rudimentary, conformational or cultivated personality. This serves as an evidence supporting the need for dynamic education with an impact on the overall activation of each individual with an aim of forming a cultivated personality prepared for social as well as working life. This means a cultivated personality that is interested in overall social life, in solving his/her own problems with the effort of enforcing dignity, strength and ability of each person. It is necessary to gradually eliminate manifestations of rudimentary and conforming personalities, that is those who satisfy themselves with securing only basic needs or with taking advantage of the environment for their own benefit. We should take measures linked to activation of the overall social life, trying to prevent a situation in which decision making is solely in the hands of political parties and their agents, labeled as democratic. In this respect, the power of public opinion must manifest itself as a specific role of life, because political and state officials often promote their own interests or the interests of their associated groups or their own popularity, but do not address the contemporary phenomena of social life. Examples of this include the failure to cope with the refugee crisis, economic crises, cooperation between countries, poverty eradication, disease and world unemployment, promotion of the fundamentals of globalization or illiteracy. It is clear, that optimal enforcement of democratic conditions is not possible under conditions existing in the contemporary world, because, as stated by R. Dahl (2001, p.45), "democracy cannot ensure a situation in which all citizens would be happy, successful, healthy, wise, peaceful, and fair. No regime is able to achieve these goals and neither can a democratic one."

All these problems should be resolved through quality of education and upbringing. Countries with a strong support for educational systems can serve as a good example of this idea. By supporting their educational systems these countries enhance their internal social quality resulting in prosperity, internal tolerance, cultural communication, responsibility and morality in public life. Evidence can be found in Luxembourg, Finland, Singapore, The Republic of Korea, Japan, Germany, and other countries where education, teachers, responsibility, culture, and care for people are prioritized. All of these facts significantly affect value orientation, either as a process or as an existing state. The process or state of value orientation must be formed based on the overall world situation in social, economic, political and cultural sphere, as well as on domestic conditions of each person's own life and biographical work with people in a particular country. In a contemporary information filled world and society, people, children and adults acquire much information about nature, society and humanity, worldwide and national life, they recognize the causes of existing facts, are subjected to official ideology as conforming people, or try, despite problems, to solve existing phenomena as cultured personalities. In connection to global problems, Z. Helus (2009, p. 673) states that "five apocalyptic riders threaten modern humanity: the clash of civilizations with the threat of chemical, nuclear or biological weapons in the hands of terrorists, demographic disaster with unmanageable migration, AIDS pandemic (or other epidemiologic disaster), economic or ecological collision,

weakening of peoples' moral equipment, and the ability to adjust their life goals in favor of universal and higher values." It is necessary to work with the above-stated world issues through education on the basis of objective facts with a realistic approach to truth. In the process of education, it is necessary to combine international problems with domestic conditions, as stated by M. Šikula (2008, p. 23), that "the aim of education is not only to increase man's knowledge but at the same time to adjust attitudes towards himself/herself and to the social and natural environment he/she lives in". From the aspect of creating and maintaining value orientation, as a phenomenon linked to the quality of life, it is necessary to take seriously into account the personality of each and every person, as J. Danek (2011, p.59) agrees that "education, therefore, needs to be provided in the context of mutual connections, logic, continuity, methodical sequence, but not just through memorizing, and this can, indeed, lead to better use of natural resources, their protection, social harmony and the elevation of the position of man as the highest asset of each society ". The three aspects: international conditions, domestic conditions and the expectations and position of people in the country's social life greatly influence the process and stability of value orientation, which again puts emphasis on the quality of life with its indicators, which are the environment, health and disease, personal and collective security, quality of housing, interpersonal relationships, leisure time, social and technological characteristics of work, participation in corporate governance, social security and civil liberties. These indicators unambiguously point to the fact that value orientation is closely linked to quality of life and, above all, to the position of humanity in society. Every philosophy and every religion at the moment, emphasizes respect towards people and meaningful human relations, and this cannot be stressed enough when taking into consideration contemporary world conditions and situations. On a daily basis we must be conscious of and analyze the ideas stated by Nobel Prize winners such as M. L. King and the 14th Dalai Lama, for example. M. L. King articulated the following timeless words as a challenge to the process of education and social life: "we've learned to fly like birds in the winds, we've learned to swim like fish in the sea, but we have not yet learned the art of living together as brothers." This view is consistent with the analysis of human civilization expressed by the 14th Dalai Lama, who stated that the present world is threatened by three poisons, namely ignorance, intolerance and hatred. These ideas again emphasize the importance of education and upbringing in direct contact with the reality of life, and in accordance with scientific knowledge, objective truth and trust in the thinking ability of children, young people and adults, who need to develop and consolidate their wisdom, which is viewed as an integrated unity of reason and character (Ruisel, 2005), i.e. personality of a human. In this context, too, it is necessary to look at the importance of each person for the social life of every country and its economic and social order, while agreeing with Ch. Yost (1968, p. 21) that "peaceful co-existence is not threatened by capitalism, communism, imperialism or Maoism, but simply by human behavior." And human behavior is part of the formation and existence of value orientation as it is influenced by the overall social climate, relationships, quality of communication as well as the norms of an existing world-view in the conditions of quality of life.

The position of people in a country's social life is the fundamental point of this context. Constitutions of most democratic countries state that when it comes to dignity and rights all people are equal. However, it is also necessary to add that people are equal not only in rights, but also in duties. And, when it comes to value orientation, we cannot focus only on the Universal Declaration of Human Rights from 1948, but also on the text of the Universal Declaration of Human Obligations from 1996, on both international as well as national levels. The proof for this need can be also supported by eight deadly sins of the present time, as formulated by K. Lorenz in the 8 Deadly Sins (1990). They are the following shortcomings of the contemporary world:

- over-population of the Earth and growing lack of interest in the fate of other people, growing distance and indifference among people, loss of social contacts and decline in cordiality, hospitality, friendship between people and mutual sensitivity resulting in the growth of crime
- devastation of the environment, inability to regenerate nature, extinction of biocoenosis, diminishing appreciation of beauty not only in connection to nature, technocratic and economic thinking that dulls aesthetic taste and the consequent emergence of vandalism, lack of interest in historical monuments as well as cultural, unique and individualized environment
- overall hastiness resulting in undermining of people's health, emergence of stressful situations, increase in the number of heart attacks, lust for possessions and superior social positions, fear of not being able to manage all tasks
- degradation of emotions resulting in disappearance of emotional relationships with people, animals and things, unwillingness to suffer any physical exertion, dullness towards enjoyable experiences, retreating to comfort and strong experiences, often with drugs or other crimes
- genetic decline manifested through increasing feelings of entitlement and acquisition of things without increased effort, loss of sense of responsibility and of values created by previous generations
- separation from traditions visible in relationships between children and parents, promotion of moral ideals the children and adults have little knowledge of, rising of hate and decline in feelings, that can be misused either politically or for racial and nationalistic reasons
- increasing compliance with doctrines, manifesting itself through a loss of authenticity, lack of resistance to majority opinion or uniformity with the result of attempting to manipulate people, often via demagoguery of political parties, through stating certain political or economic doctrines as the only possible ones, or through the influence of advertising, fashion and other forces
- disintegration of human personality and a loss of individuality, which manifests itself in a conforming attitude towards existing society and the ruling group; people gradually lose self-respect, cease to be themselves, they satisfy themselves with partial joys and successes, cheer-up themselves by hedonism and day-to-day business without realizing the significant threat of destruction of humanity with various weapons

The above stated deficiencies fully coincide with the views of Z. Helus, M. L. King, the 14th Dalai Lama, Ch. Yosta and others. This situation, indeed, requires thorough education, teaching of life values, argumentation of acquired knowledge and justification of educational influences. While researching value orientation among pupils of elementary schools and secondary schools and university students, the following data regarding value orientation of these categories of young people were obtained. Primary school pupils, in the order of importance, preferred health values to moral, social, discipline, scientific (cognitive), economic, artistic values and the value of modern music. High school students preferred health, then moral values, social and scientific values, economic values, discipline, artistic values and the value of modern music. University students chose values of health and morality as the most important followed by social, scientific (cognitive), economic and artistic values. The value of discipline and modern music were at the bottom of university students' value scale. The fact that the differences between the age groups were not significant proves the influence of education.

When considering value orientation and solutions for the future of human civilization, contemporary society, with its economic, cultural, political and moral problems, requires not only educated people, but also cultured personalities, courageous and capable communicators, who will not succumb to any doctrines, ideologies or moral superficiality. They should also be resolute advocates of truth, justice, rights and obligations based on an objective understanding of reality on a national and all-human level.

#### 4 Suggestions

The analysis of conditions and contexts related to value orientation leads to pondering the direction of education, which should put children and young people in the position of determining subjects of social development. It is a position connected to quality of life, to strengthening the importance of people in society, and his/her impact on social development or living conditions.

Therefore, in the overall understanding of the essence and conditions of the process and state of value orientation the following ideas must be ensured:

- to teach values as an organic component of educational processes in schools in close connection with the reality of a narrower as well as wider social environment,
- to provide children and young people with truthful information and knowledge linked to scientific knowledge and associated with the activation of cognitive autonomy as a manifestation of acquiring wisdom,
- to create adequate space and support for children and young people in non-educational and social activities in accordance with realistic models, helpfulness and dignity,
- to clarify and explain the essence of individual life values in accordance with the educational approach of "using and creating living situations, in which the trainees come to certain conclusions, directly from the logic of the situation, and these are not only received, but at the same time confirmed by experience" (Pelikán, 2007, p.36).

When seen like this, value orientation can become an organic part of an educational activity, where trainees understand that the influence of educators (teachers, parents, etc.) lies not only in guidance but also in real help with gaining a relationship to life, nature, civilization, other cultures, to humanity and to oneself as an organic component of social life.

#### 5 Discussion and conclusions

Psychologists and teachers should work with units that represent a characteristic aspect of reality steering this matter towards understanding the development (in the retrospect of 60 years), while emphasizing emotional control, intellect, culture, responsibility and morality. With regards to determining the time for finding a solution, it is necessary to combine individual manifestations of personality centered on manifestations of the entire society such as ignorance and tolerance and, at the same time, to define a wider field for educational perspectives, such as:

- teaching autonomy,
- teaching solidarity and partnership,
- teaching pro-social activities and behavior,
- teaching prevention of egoism and ignorance,
- teaching to explore the meaning of life in society,
- teaching positive thinking,
- teaching active life position (Pelikán, 2007).

These are tasks which concentrate on those trends of education that lead to overcoming problems and orienting towards independence. This means they lead from closure to openness, from gaining to cooperating, from authoritarianism to democracy. This process can bring warmth to society, give preference to morality, civic activity, wisdom, hard work, responsibility, tolerance, friendly human relationships, nature conservation, cultural development and cultural communication, creativity to all human values related to democracy, humanism, human rights, and peace as a manifestation of true humanity. Therefore, humanity must be tied to aspects such as social conditions and ties. N. Pelcová (2010, p. 16) states that "the search for human identity and its formation can not only be a fact of reflection, but rather an object of human activities, the most important of which is education. It helps to develop not only the young person, but also his/her incorporation into society. Cultural traditions can be conveyed through education". This constitutes a fact of knowledge which means that education

truly belongs to the category of inseparable tasks of humanity and society, influencing general behavior of maturing generations in accordance with the needed continuity of generations.

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#### Primary Paper Section: A

#### Secondary Paper Section: AM

## AN INSIGHT INTO DECISION MAKING

<sup>a</sup>MARTIN DOBIÁŠ, <sup>b</sup>JAROMÍR DOLEŽAL, <sup>c</sup>ALENA KLESALOVÁ, <sup>d</sup>JONÁŠ ERLEBACH

<sup>a, c, d</sup> *Department of Economy, Management and Humanities,  
Faculty of Electrical Engineering, Czech Technical University in  
Prague, Prague, Czech Republic*  
<sup>b</sup> *Czech Institute of Informatics, Robotics and Cybernetics,  
Czech Technical University in Prague, Prague, Czech Republic*  
email: "martin.dobias@fel.cvut.cz"

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**Abstract:** Decision-making processes and decisions are the subject of long-term investigations by research teams and research centers all over the world. For centuries, various theories have been constructed, which first of all started out from the premise that during decision making we consider all the pros and cons, therefore that we behave logically and that our decision making is governed purely by reason (Lehrer, 2009). However, with the advance of scientific research, it has been determined and demonstrated that in decision making a role is played not only by rational behavior, but that another and no less significant role is played by our emotions and feelings (Bechara, 2004). For each correct decision, it applies that both sides of our brain should be used, and that it depends on the given situation as to when which side should take the lead. In connection with the development of eye-tracking technologies, new possibilities are constantly opening up for their application in practice. This study sets as its target a contribution to decoding the processes that take place precisely at the moment of decision making itself, whether it is possible to predict the choice or decision in advance, and whether it is possible to assess a certain characteristic according to the identified behavior with the aid of eye-tracking.

**Keywords:** Eye Tracking, Problem Solving, Strategy of Problem Solving, Prisoner Dilemma, Decision Making, Human Resources

### 1 Introduction

Observation of actual human behavior during decision making is relatively difficult, and as a result, psychologists since the time of Piaget and Kohlberg (Kohlberg, 1984; Piaget, 1932) have used hypothetical moral dilemmas when investigating moral decision making. This is usually a description of a certain situation or short story in the form of dilemmas, describing various manners of behavior, whereupon their 'rightness' is debatable at least to a certain degree.

The advantage of these dilemmas is above all the simplicity with which it is possible to alter their individual aspects, and then observe the effect of these adjustments on the evaluation of the described behavior. Originally psychologists assumed that moral judgements were based purely on a rational analysis of the situation, and as a result they concentrated only on those aspects that indicated whether a certain type of behavior was intentional or whether it was inadvertent. Joshua Greene with the aid of functional magnetic resonance imaging (fMRI) of the brain demonstrated that certain types of moral dilemmas activate parts of the brain connected with emotions (Green et al., 2001). This concerned situations in which a person is injured or killed by direct physical contact by a person who is acting with an intention to save other people. After this discovery there followed dozens of further studies which examined the role of emotions in moral decision making (Ekman, 1992) or (Bechara, 2004). On the basis of these findings, it is possible to state that if a dilemma evokes a stronger emotional reaction, people condemn the given behavior more.

As previous studies have already verified, with the aid of eye-tracking scientists are better able to understand visual attention and decision-making processes by recording to where the eye directed its gaze, observing pupil size, fixation and saccadic eye movements (Krajbich, Armel & Rangel, 2010). Regarding the fact that today methods for monitoring eye movements are ever increasingly being used for research purposes, the application of this technology in recent years has increased rapidly, especially in the field of behavioral economics and finance (Osborne & Rubinstein, 1994). Specifically, over the course of the last forty years, several studies e.g. (Peyakhovich, Vachon, Vallières, Dehais & Tremblay, 2016) have appeared which used tracking

of eye movements in order to examine the correlations between eye movements and cognitive processes within various situations, such as reading, perception or visual search (Russo, 1975; Rayner, 1998; Pomplun et al., 2001; Kuo, Hsu & Day, 2009; Day, 2010). Whereas traditional experiments within a laboratory environment do not usually provide information about fundamental decision-making processes, technological advance has enabled the development of supplementary methods which can help us gain an insight into the 'black box' of perception and processing of information.

These systems enable the tracking of eye movements and the conversion of the user's direction of gaze into the co-ordinates of a computer monitor. For these reasons eye movement can be recorded by modern video recording devices, which have demonstrated themselves to be a more reliable method than mylab and verbal protocols (Majaranta et al., 2012). Eye cameras mediate information which people use before selection, and subsequently use for selection. This information may be supplemented by further parameters such as how long subjects observe an object or information, sequence, whether they select chaotically or are structured and systematic, whether they consider all the options, the speed or tempo they work at. On the basis of an analysis of these parameters it is subsequently possible to assess the consistency or inconsistency of behavior, or the tendency toward socially acceptable or unacceptable behavior. Our study is based on tracking of eye movements during decision making, solution and selection of variants of answers for the set dilemmas. The added value of eye-tracking consists in its deeper and more detailed understanding of how the proband perceives moral problems and how they actually solve them, whether the proband's behavior (selection of variant of answer) is actually in accordance with their moral stance.

### 2 Material and Methods

#### 2.1 Participants

The pilot testing that took place within the period from the end of October to the end of November 2015 incorporated 27 subjects, of whom 21 were men and 6 women, who were students at the Electrical Engineering Faculty of the Czech Technical University in Prague. The average age of this group was 22.4 years. Further testing took place from October 2016 to January 2017. The target group in this case was managers and specialists at selected firms in various locations throughout the Czech Republic. This group incorporated 62 probands, of whom 31 were men and 31 women. The average age in this group was 36.3 years. The third group comprised psychologists and personnel consultants (HR specialists) and included 14 probands, of whom 5 were men and 9 were women. The average age of this group, which was tested during the course of May to June 2017 was 27.6 years. In all cases this concerned a population with normal or corrected vision (glasses/contact lenses).

#### 2.2 Apparatus

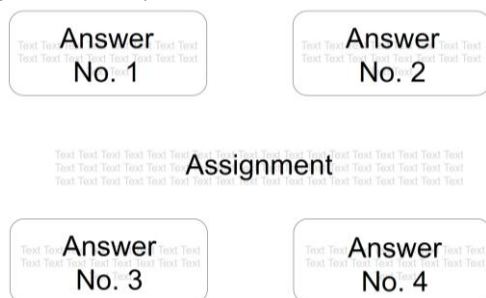
For measuring eye movements, we used a special eye camera, I4Tracking® Dist manufactured by Medicton Inc., which records the face of the tested subject and is capable of precisely detecting the location to where the subject focuses their view. With the aid of machine learning, the co-ordinates of the pupil and other points of interest are detected in the image. The eye tracker was calibrated on 9 points, and on the basis of the calibration measurement a geometric transformation was calculated, which subsequently converts the position of the pupils to the position of the view on the monitor. The device is capable of recording with a high image frequency. In the study we used a sampling frequency of 50 Hz, which enabled us to capture regular, 'observing' movements of the eyes. During the test exercises all eye movements were recorded, depending on what was displayed on the monitor. For the presentation we used the 24" monitor with a resolution of 1920x1200 at a distance of 60 cm.

## 2.3 Procedure

### 2.3.1 Schema of tasks

Within the framework of these tasks, five areas of interest were defined, and each contained a box with information (see Figure 1). The central part contained the described situation, and the boxes surrounding it (top left and right, bottom left and right) contained the individual answers.

Figure 1: Schema of the task



The proband's task was to select one of the offered answers. The experiments were carried out without a time limit. The assignment and answer variants were displayed on the monitor according to the above diagram. The proband should choose the answer that best fits his or her own, according to his/her assumed behavior in the given situation. The proband told the administrator the answer he had chosen and the administrator started the next task. The experiment was composed of four tasks, which observed moral dilemmas in decision making and selection of the variant of answer. Regarding the fact that only the task 'Prisoner's dilemma' was identical for all three groups the main conclusions will be based on comparative analyses relating to these data and results.

The task 'Prisoner's dilemma' (Kuhn, 2003):

'Imagine that you are imprisoned with your accomplice, that you are held separately, and that you are interrogated. You can choose to testify against the other or to remain silent. The police have almost nothing against you, and if you both decide to plead not guilty, you will only get a suspended sentence. But if you help to convict your colleague, he will get ten years and you will go free. The same applies on the both sides. If you both choose to testify against the other, you will both get five years. How do you choose?'

Answers to choose:

I will remain silent and rely on my accomplice to do the same.

I will testify against my accomplice, because I think that he will testify against me.

I will testify against my accomplice, because I think that my accomplice will remain silent.

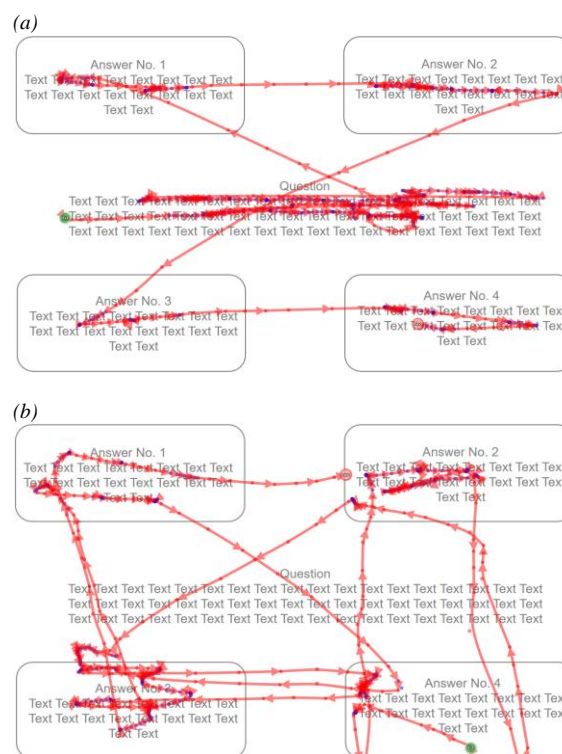
I will remain silent, because I think that my accomplice will testify against me and I will take the punishment.

### 2.4 Eye-tracker measures

Eye movements are composed of fixations (relatively stable positions of the eyes persisting for longer than 200 ms) and saccadic movements (fast changes in between fixations). Visual information is obtained during fixations. Decision making and selection depends on the processing of the information. Patterns of eye movements reveal the object or information the eye has looked at, but from these patterns we can additionally say how long, and how often. The task is displayed on the monitor within the schema illustrated on the Figure 2. The path of the gaze is shown by the red line. The blue dots indicate the places at which the tested person looked for a longer time ("fixation"). Figure 2a shows a typical reading pattern: to read the assignment first and

then to read each variant. Figure 2b shows an example of a decision making pattern: the gaze alternates between variants as they are considered.

Figure 2: Distribution of task and example of eye movements – reading pattern (a) / decision making pattern (b)



### 2.5 Data analysis

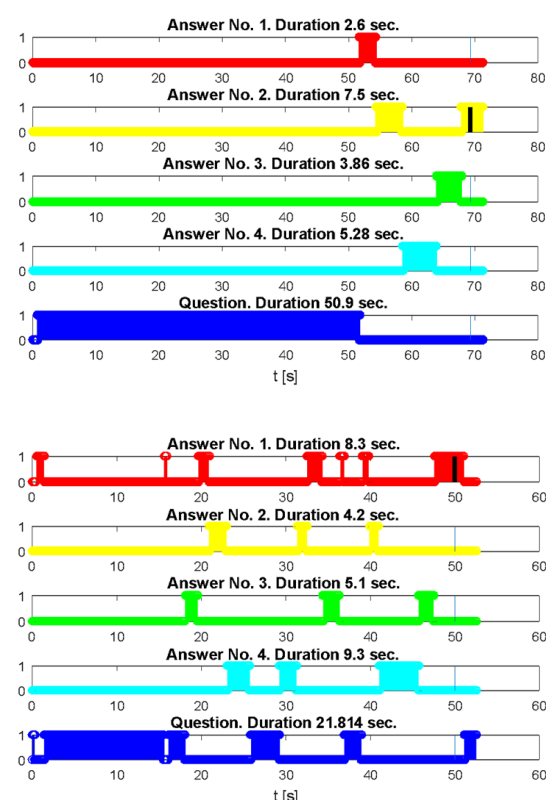
Altogether we defined five zones for the purposes of the analysis, so that we could easily identify the direction of the gaze and the length of holding in each zone. The zones corresponded on the one hand with the assignment and on the other hand with four possible answers located in rectangles in corners. The research didn't focus on fixations and saccadic movements during the reading of the text but monitored just the gaze in the designated zones. See Figure 1. Data from the eye tracker were analyzed using Matlab (The Mathworks Inc.). From the acquired data for each moment based on the gaze coordinates we calculated the distributions of the gaze into zones. The vector of distribution of the gaze into zones was subsequently filtered through a moving window of 400 ms length. This step evened out the process, eliminated artifacts and filled in missing samples caused by blinking. This vector of gaze distribution into areas of interest over time and the proband's chosen answer, represent primary data.

From this primary data secondary data was created by graphically representing the whole course of this experiment. The graphs depict the length of the holding of the gaze in the zones including all changes in the gaze, see Figure 3. Those graphs were subsequently assessed through expert analysis. Based on the comparison of all results, parameters were identified that described the proband behavior including the prediction of his competencies. The primary data - The distribution of the gaze into individual zones (areas of interest) over time - is shown in examples on the screen, where the zone (assignment and answer) at which the subject looks is systematically illustrated with the aid of color filling the relevant part of the graph.

In the left part of Figure 3 it is evident that the tested person first of all read the assignment (blue) and then the individual answers in the order of the first option (red), the second (yellow), the

fourth (light blue) then the third option (green), before finally returning to the second option (yellow), which the subject then selected. At the moment of selection of the answer (a vertical line is shown), the subject was looking at precisely this answer, and according to the total time spent on the answers, the subject also looked at this option for the longest time. In this case it is possible to identify a very good level of decision-making processes – the person read each option (upon first glance) and did not return their gaze to the assignment. For comparison, the right part of Figure 3 illustrates a person who hesitated more (decided over a longer time) and returned their gaze repeatedly to the assignment.

Figure 2: Example of the distribution of the gaze into zones over time (Note: The individual variants of answer are presented in rows from the top down, the bottom row contains the assignment).



We found out that the subjects do not devote the same amount of attention to all the information, and use various strategies of selection and decision making. In order to determine the systematic or unsystematic nature of the approach to problem solving, we used the dispersion of the time devoted to the answers normalized by the number of characters of each of the answers. On the basis of a comprehensive analysis of primary data, we conclude that a systematic approach can be defined partially as thorough reading of the assignment from the beginning to the end, subsequent gaze at the variants of the answers, and final selection. It can also be defined on the basis of the number of gaze transitions, repeated gaze transitions to the assignment and to the chosen answer. By contrast, an unsystematic approach can be characterized in the case of a large number of short gazes, or overlooking of some of the variants of the answers.

Among other factors, the aim was to assess the behavior of the tested subjects, either as 'hesitant shooters' or in the form of stylization, when although they looked for the longest time at the variant they wished to choose, their choice was eventually of a 'socially acceptable' answer. On the basis of the first example, it is possible to state that the tested person in the first graph proceeds systematically in problem solving, is consistent, devotes a certain time to all the options (thus considers the

alternatives) and chooses the answer to which he/she devotes the most time. For comparison, the person in the second graph proceeds less systematically, even chaotically in problem solving, returning repeatedly to the different options, and is less effective in the work, since in total he/she spends more time on this task.

Parameters that resulted from those analyses were calculated in the following way:

The first two seconds of each task were removed from the vector of distribution into zones, because completely at the beginning the gaze is directed either at the last place of the previous task or at the calibration that is done always before the first task. Subsequently the following parameters were calculated from the distribution into zones:

- The number of gaze transitions between all areas of interest divided by total time.
- Whether the subject chooses the option he/she looks for the longest time (logical yes/no).
- Whether the subject chooses the option he/she is looking at when deciding (logical yes/no).
- Repeated assignment reading – the number of gaze transitions from answers to assignment.
- Repeated answers reading – the number of gaze transitions from all areas to the selected answer.
- Time devoted to the selected answers divided by time devoted to all answers.
- Time devoted to the assignment divided by total time.

For an analysis of the strategy of decision-making processes we used as our key parameters the total time, the selected path, the number of steps or the number of steps within the framework of total time, how many times and how long the tested persons looked at the assignment, and the individual variants of the answers, including observation of the time at which they decided in favor of the selection of their answer. To examine differences between the groups we used a t-test. For visualization we used boxplots.

### 3 Theory

The prisoner's dilemma is whether to co-operate or betray (Kuhn, 2003). It appears to be a good choice to remain silent and not confess, but nobody can predict how the other prisoner will behave. The aim of the test was a deeper and more detailed understanding of how the tested persons perceive problem situations, in particular moral problems and how they actually deal with them, thus whether their behavior, in this case the choice of answer, is genuinely in accordance with their thought and contemplation. The test serves for an evaluation and assessment of the strategy of selection and decision-making processes, and also of how the proband approaches problem solving. The task was partly based on Kohlberg's thesis that cognitive development, therefore the ability to think correctly/properly is a necessary condition for moral development. Cognitive ability codetermines the level of moral development that the individual achieves, but achievement of higher cognitive stages doesn't necessarily mean a higher moral level. (Kohlberg, 1984).

We are able to identify from the eye movements the ability to take unequivocal decisions and discrepancy between eye movements and the choice of answer. Structured behavior and consistency, i.e. selection of the variant at which the proband looks for the longest time, or systematic contemplation of all the alternatives. On the basis of an identification of these parameters it is possible to predict reliably a tendency toward socially unacceptable behavior. The analysis of the time spent in each zone (area of interest) reflects the significance and importance of the given information for the individual proband. The distribution of the decision-making process before selection during decision making and potentially also after the decision is an indicator of the applied strategy of behavior. Following on from conducted studies and current discussions (Glaholt & Reingold, 2009), (Franco-Watkins & Johnson, 2011) and (Schotter, Berry, McKenzie & Rayner, 2010) we outlined

hypotheses, the purpose of which was to contribute to further investigation and completion of observations relating to an insight into decision-making processes (how, when, what, the dynamic of observation, distribution of attention devoted to individual alternatives during selection, frequency of persistence of gaze, selection, time of decision making, measurement, duration of fixation).

### 3.1 Hypotheses

1. H1 selects the answer at which the proband looks for the longest time (frequency or persistence of gaze, or both are massively higher for the items which the subject eventually selects in decision making).
2. H2 selects the answer at which the proband looks when making the decision (moral decision making may be influenced by the fact of what we are focusing on at the moment of decision making (what the eye saw at the moment of answer)).
3. H3 selects another answer (i.e. the proband selects an answer other than that which he/she looked at for the longest time, or at the moment of decision making).

## 4 Results and discussion

To compare the results and therefore the behavior of the individual groups we established three key parameters based on the completed analysis. 1) the total time spent on carrying out the task (see Table 1, Figure 4), 2) the number of steps during the process of completing the task (see Table 2, Figure 5), 3) The number of steps divided by total time (see Table 3, Figure 6). Due to the fact that these parameters have a wider validity and at the same time they relate to the hypotheses, it was possible to formulate this conclusion: If the behavior of respective groups differs according to the parameters, subsequently it is possible to conduct the verification of the hypotheses.

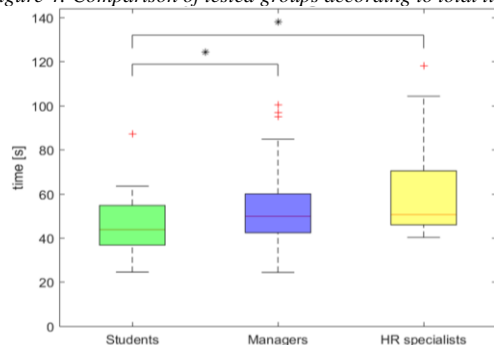
Table 1 : Comparison according to total time

| Total time     | MEAN    | STD     | p/ Students | p / Managers | p / HR specialists |
|----------------|---------|---------|-------------|--------------|--------------------|
| Students       | 45.6096 | 13.6401 | x           | 0.016963*    | 0.042717 *         |
| Managers       | 53.9031 | 16.7301 | 0.016963*   | x            | 0.28822987         |
| HR specialists | 61.0253 | 23.9799 | 0.042717 *  | 0.28822987   | x                  |

\*  $p < 0,05$

\*\* $p < 0,01$

Figure 4: Comparison of tested groups according to total time



Within the parameter - total time spent on conducting the task – a significant difference ( $p < 0,05$ ) showed in the behavior of the group Managers and HR specialists in comparison to the Students' group. The difference between the group HR specialists and the Managers didn't show as significant.

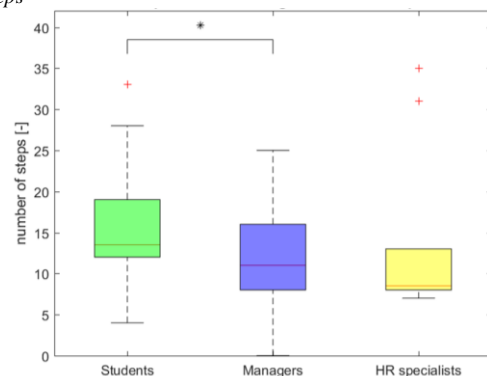
Table 2 : Comparison according to number of steps

| Number of steps | MEAN    | STD    | p/ Students | p / Managers | p / HR specialists |
|-----------------|---------|--------|-------------|--------------|--------------------|
| Students        | 15.9091 | 7.2303 | x           | 0.038469*    | 0.350429           |
| Managers        | 12.2581 | 5.3651 | 0.038469*   | x            | 0.759578086        |
| HR specialists  | 12.7143 | 8.8789 | 0.350429    | 0.759578086  | X                  |

\*  $p < 0,05$

\*\* $p < 0,01$

Figure 5: Comparison of tested groups according to number of steps



In the parameter Number of steps, the t-test helped to identify a significant difference ( $p < 0,05$ ) in the behavior of the Managers' group in comparison to the Students' group. The differences between the Students' group and HR specialists and then between the group Managers and HR specialists weren't shown as significant.

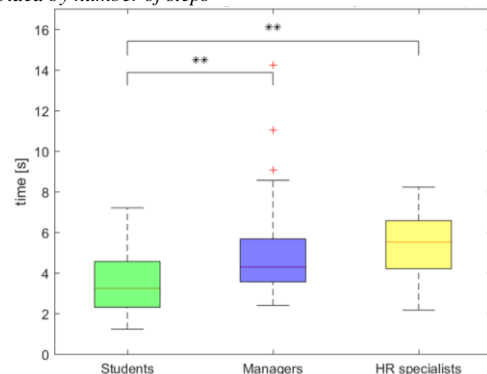
Table 3 Comparison according to time divided by number of steps

| Time divided by number of steps | MEAN   | STD    | p/ Students | p / Managers | p / HR specialists |
|---------------------------------|--------|--------|-------------|--------------|--------------------|
| Students                        | 3.4940 | 1.5914 | x           | 0.003292**   | 0.002702 **        |
| Managers                        | 4.8365 | 2.1211 | 0.003292**  | x            | 0.258759123        |
| HR specialists                  | 5.5435 | 1.6999 | 0.002702 ** | 0.258759123  | X                  |

\*  $p < 0,05$

\*\* $p < 0,01$

Figure 6: Comparison of tested groups according to time divided by number of steps

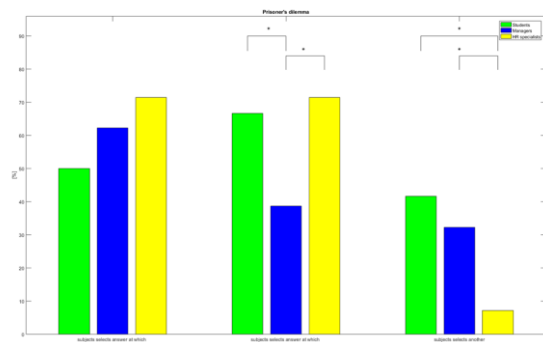


Regarding the number of steps divided by total time the t-test showed a very significant difference ( $p < 0,01$ ) in the behavior of the Managers' group and HR specialists in comparison with the Students' group. On the contrary the difference between the Manager's group and HR specialists group weren't shown as significant.

### 4.1 Verification of hypothesis

The students spent less time than the other groups on the solution of the task. The total time and the time when the subjects decided to answer was lower for the students. An interesting finding is that the students performed more steps than both other compared groups within a shorter time. This means that in comparison with the students the other groups spent longer on the individual answers and fixed their eyes. The students were quicker but skipped more with their eyes from the individual answers to others.

Figure 7: Verification of hypotheses – comparison of tested groups (Note.: Residual category selection of another answer is intended as a supplement (logical NOR) to the previous two options)



Our study confirms the findings relating to preferences of selection of the longest viewed variant, as concluded by e.g. (Bee, Prendinger, Nakasone, André & Ishizuka, 2006): On the basis of a comparison of the results of all sub-tests, we determined that this applies especially in the case of simpler dilemmas, therefore those in which we do not make a moral decision and at the same time we don't have to be thinking about the answer very long. (Kahneman, 2012), (Kahneman & Tversky, 1979, 1984). However, at the same time our research determined and demonstrated that the moment at which the probands decided had a decisive influence on decision making, and the selection of the answer. This conclusion is valid for all the sub-tests. This conclusion was confirmed as well by studies of scientists from the Department of Cognitive Science at University in Lund, University College London (Lund University, 2015) and California University in Merced (Pärnamets, Johansson, Hall, Balkenius, Spivey & Richardson, 2015), whose work, similarly to ours, demonstrates that our moral decisions can be influenced by what we are looking at, at the moment of decision making. The results show identically that human reactions are systematically influenced by what the eyes are looking at, at the moment of the decision. (S. Shimojo, Simion, E. Shimojo & Scheier, 2003).

The more complex the decision making in the dilemma, and the more moral behavior is required, the more often the probands choose a different answer (i.e. an answer other than the option at which they look for the longest time, and other than that at which they look at the moment of deciding). We drew this conclusion on the basis not only of the results of the 'Prisoner's dilemma' but also on the subtest 'Heinz's dilemma'. In both dilemmas, it was the group of students that most frequently did not choose either the answer they were looking at when deciding, or the answer they looked at for the longest time.

From the results in Prisoner's dilemma task shown on Figure 7 we draw the following conclusions:

- Half of all subjects choose the answer at which they look when making the decision even in case of complex and moral dilemma.
- The HR specialists were more transparent than both students' and managers' groups.
- The managers' group has most often chosen a different answer than the one they were looking for the longest time.

We are of the opinion that this is most probably caused by a greater application of tactics or stylization for the choice of more socially acceptable variants of the answers. It is also possible to infer a concealment of the truth, an endeavor to show oneself in a somewhat 'better light', which is detected by the 'lie score' in personality tests. With the aid of eye movements, it is therefore possible to identify not only competencies of decision-making or problem solving better, more accurately and more effectively, but also to detect tendencies toward lying or socially unacceptable or dishonorable behavior, similar to (Fehr &

Schmidt, 1999). If we assess the specific answers and behavior of the individual groups, then in all of them uncooperative behavior was the most frequently represented, i.e. answer no. 1 (top left): 'I'll remain silent and rely on my accomplice doing the same'. The managers, more often than the students, choose answer no. 2 (top right): 'I'll inform on my accomplice, because I think he'll also inform on me', while none of them chose answer no. 3 (bottom left): 'I'll inform on my accomplice, because I think he'll remain silent'. On the basis of the processed statistical models, it is possible to demonstrate the significance of individual parameters, on the basis of which we model competencies of decision making and problem solving. The presence/quality/degree of the given competency is demonstrated through a comparison of the individual proband with these models.

## 5 Conclusions

Overall, from the obtained results it is possible to state a finding that the set hypotheses were verified in the individual groups. The results of the study show that an analysis of eye movements may provide useful information about decision-making processes and the process of selection. Schemes of distribution of eye movements (their position, length, duration of fixation) may be used in order to obtain knowledge and information about patterns of thought.

For moral choice, what we fix our gaze on is significant. The processes that lead to a moral decision are reflected in our gaze. If the experimenter actively regulates what the individual sees, he can influence simple decisions with alternatives of almost the same valence. Eye Tracking can be used upon examining the individual differences in the process of decision making (working memory, selectivity of attention and choice), including determination of cognitive effort (Fehrenbacher & Djamassbi, 2017). It is possible to supplement the method of Eye Tracking appropriately with further physiological techniques such as electroencephalography or galvanic skin resistance. In addition to recording visual attention, EEG in connection with pupillometry enables measurement of cognitive effort from the electrical activities of the brain, whereas galvanic skin resistance measures excitement, exertion and stress through the change of moisture beneath the skin. A combination of these techniques may therefore provide a complete picture of the physiological activities of humans and thus offer detailed insights into decision-making processes. For example (Fulmer, 2014) made use of pupillometry in combination with advanced multimodal methods in a study on decision making concerning financial investments.

The method of eye tracking, as demonstrated by this study, can indisputably find its application in the identification or prediction of characteristics, aptitudes, abilities and competencies of humans. It can be used reliably for example in selections and evaluations of people, or during their development.

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**Primary Paper Section: A**

**Secondary Paper Section: AN, AH**

# LABOR MARKET AND TRANSFORMATION OF LABOR RELATIONS IN THE LIGHT OF THE MARXIST, LIBERTARIAN AND NEOINSTITUTIONAL PARADIGM

<sup>a</sup>MIHAIL N. DUDIN, <sup>b</sup>VALERY N. ALFEROV, <sup>c</sup>DENIS Y. TABUROV, <sup>d</sup>GALINA N. NIKOLAEVA

<sup>a</sup>Market Economy Institute of RAS, Moscow, Russia;  
Russian Presidential Academy of National Economy and Public Administration, Moscow, Russia

<sup>b</sup>Financial University under Government of the Russian Federation, Moscow, Russia

<sup>c</sup>Financial Research Institute of the Ministry of Finance of the Russian Federation, Moscow, Russia

<sup>d</sup>Moscow Automobile and Road Construction State Technical University, Moscow, Russia

<sup>e</sup>email: dudinmn@mail.ru

**Abstract:** The article is devoted to the study of theoretical, methodological, and practical issues related to the observed and global transformation of the socioeconomic and labor relations. Based on the Marxist, liberal libertarian, and neoinstitutional paradigm, the trends and patterns of the development of labor markets in the BRICS member states are explored in the article (periods for analysis are 2011 and 2018). The BRICS economies are ranked in comparison with the most developed economies in Western Europe using the economic, statistical, and cluster analysis. The obtained analytical data indicate the following: a) the BRICS economies are catching-up or outsiders by their development type and quality; b) the economies of China and Brazil migrated from the "following the leader" cluster to the "outsiders" cluster in 2018 compared with 2011; c) of all the BRICS member states, only India has used its resources relatively efficiently and rationally, which has allowed it to migrate from the "outsiders" cluster to the "catching-up economies" cluster in 2018. The authors have demonstrated by consistently revealing the concepts of the Marxist, liberal libertarian and neoinstitutional paradigm in the context of socioeconomic and labor relations that none of these standalone paradigms is able to either explain the transformations in the labor markets of the BRICS member states or provide reference points for solving the established problems. However, the integration of these paradigms in the framework of libertarian paternalism (the idea of R. Thaler and C. Sunstein) can solve the problem of inefficient labor markets in the BRICS member states. This will require deep and systemic institutional reforms aimed at creating developed labor markets in the BRICS member states. Simultaneous institutional improvement of labor markets and modernization of the economy can become factors that will make the BRICS member states real rather than nominal leaders in the global economy.

**Keywords:** labor, labor relations, social risks, BRICS, Marx, libertarianism, neoinstitutional theory.

## 1 Introduction

Russian, European, and North American media have regularly made statements over the past two to three years that millions of the employed in various countries can become unemployed due to the natural spread of automation and robotics technologies in the areas of human labor that are monotonous or do not require highly qualified, diversified knowledge. However, this is undoubted and alarming news for the media is perceived as a pattern and a predicted result of scientific and technological progress in the scientific world.

The importance of scientific and technological renewal (modernization) for technology and society was implicitly mentioned in the writings of representatives of classical political economy and explicitly mentioned in fundamental (at the time) studies "Theory of Economic Development" by J. Schumpeter and "Capital" by K. Marx. The processes of technical and technological renewal in the economy were regarded in both studies as necessary, immanent essences of economic growth and evaluated positively in general, from the subjective position of researchers, although it is known that J. Schumpeter [1, 2] was a critic of the Marxist socialist and communist concepts but believed that certain provisions of the Karl Marx' writings deserved close attention in terms of the study of the evolutionary mechanisms of socioeconomic development.

Russia historically accepted the writings of K. Marx as an axiom and elevated them to a high status. Eventually, it became the site of a global socioeconomic and political ideological experiment, the results of which were absolutely disappointing and contradicting to the Marxist concepts. However, the Marxist thesis that labor is a measure of the value of goods, works, services, and, therefore, the only source of wealth for most workers and employed, in the first place, has been undeniable

until recently, since neither K. Marx nor his followers and predecessors could foresee the global changes that took place in the economy in the 20th century [3, 4]. In addition, it must be emphasized that early economists believed that scientific and technological progress in the economy would bring intellectually intensive and highly professional labor to the lowest positions [5]. However, this did not happen either. As such, the following is the concept of today:

- firstly, ideology cannot create relative equality (justice) due to the fact that the ownership of factors of production and labor (labor force as a commodity) usually does not belong to the same person (exceptions are entrepreneurs, capitalists, investors, and self-employed, but such categories of economic agents freely exist only in conditions when politics does not interfere with the economy, which cannot happen in Marxist and similar ideological economies);
- secondly, professionalism, knowledge, and intellect are competitive and almost noncopied advantages in the labor market. Financial capitalism is giving way to intellectual capitalism [6]; and
- thirdly, scientific and technological progress is changing the structure of employment, self-employment, and entrepreneurship. In the case of employment, there is an objective trend to skill-biased technical change (SBTC) concept [7, 8].

Similar but not obvious trends can be noted in entrepreneurship (innovation, implementation, and venture capital firms) and self-employment (freelance designers and other services, which increasingly require large intellectual and mental costs). Therefore, the SBTC concept will be explored in this article in the light of three sometimes mutually exclusive scientific paradigms: Marxism, libertarianism, and neoinstitutionalism.

## 2 Methods

It must be noted that the libertarian concept is applied in a limited way (social liberalism plus parity of private property and individual freedom). Marxism is considered in a similar way – in the context of the labor theory of value, which was absolutized in the writings of V.I. Lenin and his comrades, for example, who considered added value (that is, that part of the theory mentioned, which is the result of the research work of K. Marx) both as a source of capitalist wealth and as a cause of socioeconomic injustice (inequality) [9]. At the same time, neoinstitutionalism will be applied from the position of methodological individualism, i.e., a principle that considers it possible to reduce the entire complex and diverse socioeconomic reality to the study of behavioral patterns of an individual person (an individual or a worker, in this case) [10].

It must also be clarified that, despite the fact that the scientific community definitely assigns K. Marx and his economic theory to the macroeconomic section, it is believed in some scientific studies [11] that K. Marx was the first to use the principle of methodological individualism to analyze the economic structure of the time (through the prism of social labor and socioeconomic relations, rather than in the context of "invisible hand", like it had been before him). Douglas North [12], not fully agreeing with the statements of J. Elster, nevertheless indicated that such an interpretation of the economic writings of K. Marx had the right to exist, since "Institutions, the state, and ideology all are part of his analysis. Marx makes clear that if our thinking is to go beyond surface manifestations of an economy, we must explore the integrated relationships of all its parts."

It must also be added that even the sophist Protagoras spoke about a human as the measure of all things – therefore, the Marxist concept of the theory of labor value, which is based on the fact that the economy is impossible without production

relations (even if it has factors of production), is relevant for the modern analysis of transformations on labor markets and in social labor (socioeconomic) relations. Following the foregoing, an employed worker is in the focus of this analysis. However, since employment in the modern sense is no longer a constant and long-term employee's employment at a particular enterprise with the need to "attend workplace" in accordance with the internal regulations [13, 14], it is considered appropriate to include both employed and self-employed (i.e., workers with short-term formal contracts or verbal agreements with the employer) in the focus of the analysis. A content analysis of scientific theoretical and journalistic sources on the subject of this article, as well as a comparative historical (comparative) analysis of trends and patterns in the development of social and labor relations in various economic systems were used as research methods.

### 3 Results

Due to the limited scope of the article, two groups of socioeconomic systems are compared: developed systems (Germany, France, the UK, Sweden, and Finland) and developing systems, which are also called "transitive socioeconomic systems" in some sources (the BRICS member states). A cluster analysis ("nearest neighbor principle") is used as an instrumental basis for the study to identify similarities and differences between these socioeconomic systems. The data from The Legatum Prosperity Index (for 2011 and 2018) were

used as an informational and statistical comparison base. In particular, two estimate components of this Index have been used:

- 1) estimate of the business environment (rank), which includes an estimate of the business infrastructure development, the availability of borrowed funds for entrepreneurship, the protection of the investors' interests, and the labor market development (including flexibility). In other words, it is an estimate of production factors; and
- 2) estimate of the quality of the economy (rank), which includes an estimate of the standards of living, quality and involvement of the labor force in the economy, as well as competitiveness and efficiency of the economy. In other words, it is an estimate of the results of using production factors as a result of socioeconomic and labor relations.

To formulate final conclusions and ensure the analysis objectivity, the "quality of the economy" component and the integrated rank of seven social components of the mentioned index were compared for the countries and their economies in order to estimate the influence of the state, formal and informal institutions, as well as political ideology on the economic progress and, accordingly, the welfare of the population in these countries, since, as has been shown above, labor is the only source of material well-being for the main part of the world population. The source data used in cluster analysis are presented in Table 1.

Table 1. Data for cluster analysis of the developed and developing economies by components of The Legatum Prosperity Index [15, 16].

| Rank<br>(line in<br>the<br>Index) | Germany | France | UK | Sweden | Finland | Russia | China | Brazil | India | South<br>Africa |
|-----------------------------------|---------|--------|----|--------|---------|--------|-------|--------|-------|-----------------|
| 2011                              |         |        |    |        |         |        |       |        |       |                 |
| Quality of the economy            | 8       | 16     | 21 | 6      | 15      | 72     | 10    | 32     | 53    | 86              |
| Business environment              | 16      | 20     | 4  | 2      | 3       | 50     | 59    | 48     | 90    | 43              |
| Public administration             | 17      | 18     | 8  | 4      | 7       | 96     | 63    | 52     | 41    | 43              |
| Education                         | 27      | 16     | 19 | 11     | 3       | 34     | 54    | 72     | 88    | 79              |
| Health                            | 6       | 17     | 17 | 12     | 13      | 42     | 67    | 50     | 95    | 94              |
| Safety and security               | 20      | 28     | 23 | 5      | 4       | 82     | 86    | 69     | 97    | 77              |
| Personal freedoms                 | 15      | 11     | 13 | 8      | 16      | 87     | 91    | 22     | 73    | 55              |
| Social capital                    | 15      | 36     | 12 | 7      | 6       | 48     | 26    | 59     | 104   | 65              |
| 2018                              |         |        |    |        |         |        |       |        |       |                 |
| Quality of the economy            | 11      | 30     | 16 | 5      | 12      | 63     | 27    | 77     | 58    | 125             |
| Business environment              | 12      | 17     | 4  | 13     | 6       | 60     | 43    | 114    | 51    | 53              |
| Public administration             | 10      | 21     | 11 | 16     | 1       | 124    | 118   | 75     | 40    | 41              |
| Education                         | 19      | 38     | 18 | 10     | 11      | 143    | 133   | 42     | 99    | 27              |
| Health                            | 16      | 34     | 8  | 22     | 14      | 114    | 132   | 81     | 102   | 31              |
| Safety and security               | 16      | 31     | 14 | 12     | 11      | 105    | 50    | 86     | 104   | 123             |
| Personal freedoms                 | 20      | 29     | 12 | 16     | 1       | 22     | 44    | 91     | 104   | 88              |
| Social capital                    | 24      | 15     | 26 | 7      | 25      | 90     | 54    | 73     | 109   | 118             |

The following formulas are used to transform the ranks of particular components of the Prosperity Index [suggested by the authors]:

$$R_i = 1 - \frac{r_{ci}}{100} \quad (1)$$

$$IR = \sqrt[n]{\prod R_i} \quad (2)$$

where:

$R_i$  is the coefficient of the unified component of the Prosperity Index;

$r_{ci}$  is the rank (line in the Index) of the unified component; and  
 $IR$  is the coefficient describing the conditions for social and economic progress.

Following the presentation of the results of the cluster analysis, it must be noted that three clusters are empirically distinguished: a leader, following the leader, and catching-up. The national economy may fall into any of these clusters depending on its quality and conditions for business (entrepreneurial, or corporate) activity. In practice, four clusters were obtained (Figure 1), i.e., a class of economic outsiders was also allocated. All the mentioned EU member states were included in the cluster of leaders (both in 2011 and 2018). The cluster "following the leader" included the economies of Brazil and China in 2011. The Brazilian economy migrated to a cluster of outsiders in 2018, while China's economy approached the cluster of leaders. At the same time, Russia, India, and South Africa were in the cluster of catching-up economies in 2011, but the South African economy migrated to the cluster of outsiders as soon as in 2018.

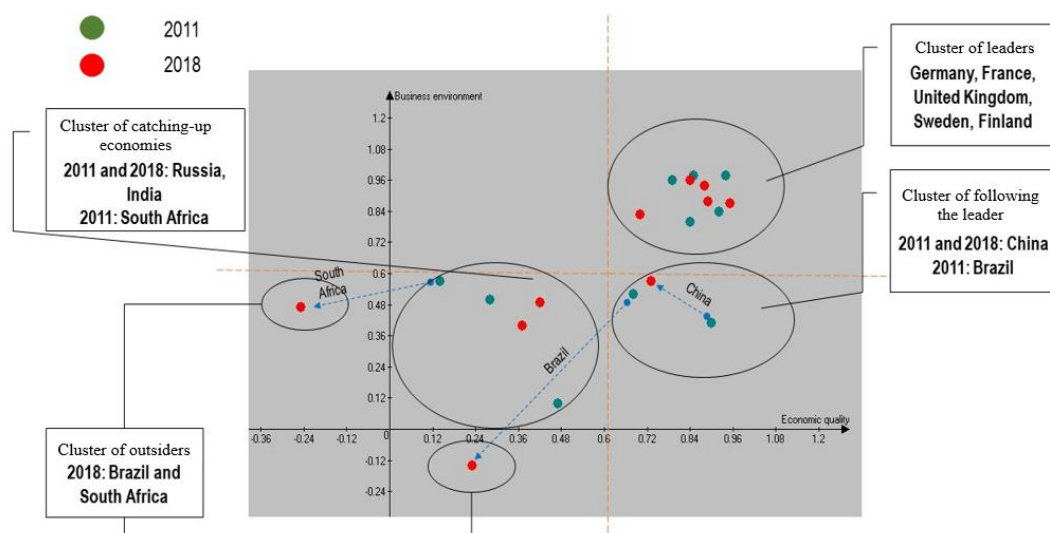


Figure 1. Clustering of developed and developing economies based on the ratio of the "business environment" (be) and "quality of the economy" (qe) components [compiled and calculated by the authors].

If the BRICS economies are analyzed (based on 2011 data) in terms of the most favorable conditions for economic and social progress (i.e., by the RI indicator), it can be seen that Brazil had the most favorable positions at the time, i.e., it possessed sufficient social, political, economic and technological potential

for advancing progress. Russia, China, and South Africa had medium potential, while India had virtually no growth reserves. However, the situation changed dramatically as soon as in late 2018, as can be seen from the data in Figure 2.



Figures 2. Dynamics of the indicator of social and economic progress (IR) in relation to the dynamics of assessing the quality of the economy (qe) in developed and developing economies [compiled and calculated by the authors].

Let us consider the results of clustering the economies next, taking data on social and economic progress into account (see Figure 3). For example, South Africa was part of the cluster of unconditional outsiders by early 2019 (in terms of the ratio of the quality of economic progress and the efficiency of taxation, as well as the subsequent use of sociopolitical and economic technological potential). Russia, India, and Brazil can formally

be included in the cluster of "following the leader", but in fact, Russia has been and remains in the cluster of catching-up economies, while Brazil migrates from the conditional cluster of "following the leader" to the cluster of outsiders. In contrast, India migrates to the catching-up cluster from the cluster of outsiders.

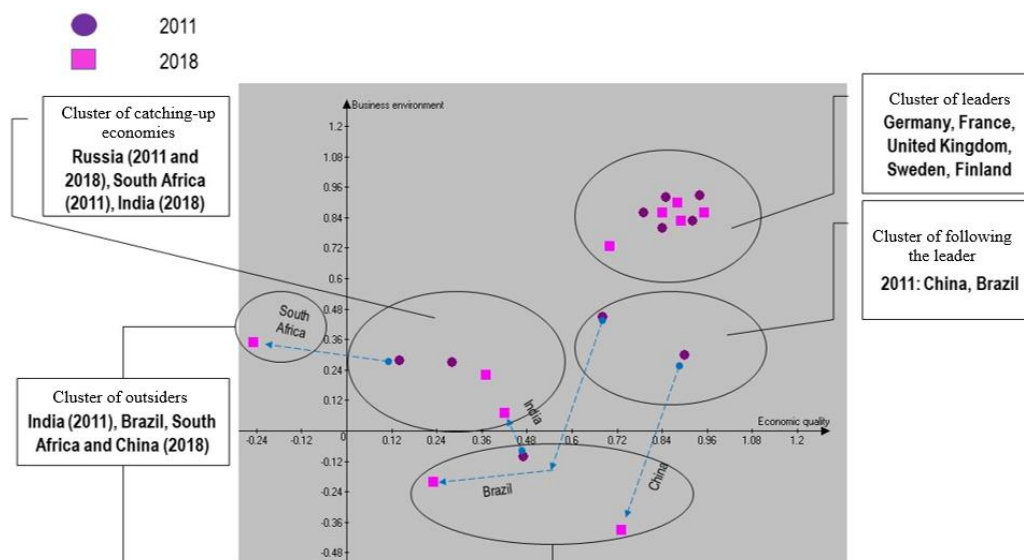


Figure 3. Clustering of developed and developing economies based on the ratio of the "business environment" (be) and "quality of the economy" (qe) components, taking the conditions for social and economic progress into account [compiled and calculated by the authors].

In this case, China should be considered an economic phenomenon, as it moved from the leaders to objective outsiders. Let us review the general development trends of the BRICS countries first:

- the Chinese economy demonstrated outstripping growth (9 – 10 % per year on average) in 2011, i.e., after the completion of the active phase of the global crisis, while the economies of other countries demonstrated dynamics of 3.5 – 5.5 % per year (minimum in South Africa, maximum in India). However, as soon as in 2012, the economies of Russia and Brazil entered a recession (depth of the fall was 2.5 – 3.5 % in 2015). The economy of South Africa stagnated and observed a steady depression from 2013 to the present. On the contrary, the economy of India has steadily grown since 2014, reaching a peak in 2016 and outstripping China's growth rates;
- the peak of investment attractiveness in Russia and China fell on 2014, but the reasons were objective in China (encouraging a policy of investment openness) and opportunistic in Russia (the Olympics in Sochi), which was also confirmed by the trends of 2018: an increase in investment in the Russian economy in light of the upcoming World Cup. For the rest, Russia and China demonstrated a decrease in investment attractiveness and an outflow of investments: for political reasons in Russia and due to a significant "overheating" of the economy in China. The outflow of investments was also observed in South Africa, but the reasons were different: a low level of national security and security of life. After a long recession, Brazil was able to increase its investment attractiveness, while each subsequent increase in investment in India was accompanied by a subsequent decline: there were problems with national security and security of life as well;
- the economic activity of the population for 2015 – 2016 was relatively high in China and Russia (71 % and 69 % of the population aged 18 to 72 – 80 were employed in economies, including individual entrepreneurship, self-employment, and other legitimate forms of economic stability). This figure did not exceed 62 – 65 % in Brazil, and the economic activity of the population was one of the lowest in South Africa in 2011 – 2013 (30 – 40 % on average), but there has been an average annual increase of 4 – 5 % per year since 2014; and
- the overall mortality rate and employable-age mortality rate are high in South Africa and even higher in Russia. On the contrary, China, Brazil, and India demonstrate steadily decreasing dynamics in this regard, which is associated

with an increase in healthcare costs and the prevention of morbidity (both infectious and non-infectious) in the first place. Healthcare spending has been steadily declining in Russia since 2011, while remaining steadily minimal in South Africa (basic medical care in this case depends on the activity of international humanitarian organizations).

In the light of general trends and in the context of social and labor relations, it can also be noted that labor productivity has been traditionally low in the BRICS member states (in the past 20 years), and labor has been traditionally extensive, accumulated in medium- and low-tech industries (the exception is that China has been actively developing a high-tech segment for the past decade and claims to be a world leader in this segment due to aggressive external expansion and price dumping). India and Brazil have stepped up foreign and domestic investment in high-tech manufacturing and services, due to which productivity in this field has been steadily growing in the last five to seven years in these countries, although the growth rate was lower than the world. Labor was predominantly low-tech in Russia and South Africa, due to the preservation and deepening of dependence on natural rent (production and export of hydrocarbons).

According to the statistics of the International Labor Organization [17], the following is observed against the background of socioeconomic changes in the BRICS member states in the field of social and labor relations:

- the reduction in the value of wage and self-employed labor in South Africa, China, Russia, and Brazil, which resulted in the reduction of labor costs. This trend has been particularly pronounced in South Africa since 2012 – 2013. On the contrary, there were prerequisites for an increase in the value and cost of labor in India, which was positively correlated with an estimate of the labor productivity growth; and
- the maximum intensification of social and economic inequality in South Africa and Russia was observed in 2012 and continues to the present (both within and between social classes). There was relative decrease in China and Brazil and low growth in India (which is natural against the background of rising value and cost of labor).

As such, the macroeconomic cluster and economic statistical analysis yields the following results:

- firstly, social and economic progress is determined not only by the business environment development, its market

economy, competitiveness and accessibility of high-quality labor resources, but also by institutional and scientific technical (technological) progress, and this is clearly demonstrated by the results of the cluster analysis of developed and developing economies;

- secondly, the socioeconomic dynamics are determined by the processes occurring in the labor markets and institutional segments engaged in the preparation of human resources for national economies (as evidenced by the statistics of the International Labor Organization). The value of labor determines the cost of labor force, and the latter determines the level of labor productivity (in conjunction with technological factors) and the level of economic activity of the population (employment, self-employment, and entrepreneurship); and
- thirdly, investment processes should be focused on the development of high-tech industries and the cultivation of highly productive intellectual workforce, which is impossible without the efficient democratized and noncorrupt public administration, without guarantees of protection of life and the environment (according to The Legatum Prosperity Index data).
- In addition, the so-called national socioeconomic and labor uniqueness of the BRICS member states should be taken into account [17-20]:
- firstly, there is a significant sector of the shadow economy in all BRICS member states (from 18 % in Brazil to 40 % in Russia and South Africa);
- secondly, there is a significant sector of informal employment and self-employment in all BRICS member states, which is about 15 – 25 % in Russia and Brazil, over 30 % in China, and over 50 % in South Africa and India;
- thirdly, there is a very high level of perception of corruption in the public sector in all BRICS member states: Russia scores only 28 points for this indicator, Brazil and China score 35 and 39 points, respectively, while India and South Africa score 41 and 43 points, respectively (the maximum score of low level of corruption in the public sector is 100 points);
- fourthly, the population in all BRICS member states perceives informal employment, the existence of the informal sector of the economy, and corruption in the public sector as phenomena inherent in socioeconomic development, which do not cause critical condemnation from the population – this contributes to the spread of informal destructive norms and rules in economics, politics, and society; and
- fifthly, formal institutions for social risk insurance for the employed and self-employed are rudimentary, fragmented, and declaratively aimed at full coverage of the population with social insurance in all BRICS member states, but in reality, only a part of the employed can feel relative social security.

It is likely that the Marxist, institutional, and liberal paradigms can explain the continuing lag of the BRICS member states from the countries of economic and social leaders under the current conditions. This issue will be explored further in more detail.

#### 4 Discussion

Thus, the results of the analysis once again confirm the general scientific thesis that labor is a source of human well-being in the modern society and at the same time the well-being of the very society (nation). The ability to work belongs to a human and is an integral part of their knowledge, skills, and other abilities. This part can become a commodity – a human can sell their labor (labor force) and get paid for it corresponding to their knowledge, skills, and abilities (receive wage). In this case, the Marxist economic paradigm proceeds from the fact that the value and cost of labor do not coincide in the capitalist structure, i.e.:

- a) the capitalist production requires employment, and this makes such labor valuable; and
- b) a capitalist seeks to minimize the cost of valuable labor and maximize the corresponding benefits – the cost of labor is

reduced, and the added value extracted by the capitalist is growing, because the employee "uses one part of the working day to cover their maintenance costs, and the other part of the day works for nothing, thus creating added value" [9].

The inconsistency of the statement that "the worker works for nothing the other part of the day" largely serves as a source of criticism of the Marxist economic paradigm and casts doubt on the labor theory of value, which is indeed controversial, on the one hand, but this theory has the right to existence in terms of added value, on the other hand. The significant difference is the following:

- a) the labor theory of value (in the classical political economy) and the theory of added value make an attempt to derive an objectively uniform economic law (the law of value: the exchange of goods and their value are equivalent to the cost of labor expended, and everything above is the exploitation of labor in the interests of added value for the owner of capital); and
- b) the added value, as an estimated and analytical indicator, only demonstrates the contribution of labor to the price of the goods (works, services). The higher the cost of labor and the higher its value are, the higher the price of the goods (works, services) is. This postulate is true both from objective and subjective points of view.

From an objective standpoint, complex (in production) and rare (inaccessible to a wide range of consumers) goods have a high added value, i.e., the value of labor that created such a complex and rare product is high, which means that the cost of such labor is also high. It must be noted that truly complex and rare products are not as widespread in the modern society as it might seem at first glance, since the overpriced branded products are often a result of "added impressions" rather than of added value [21], which could be considered as parasitic added value (from the standpoint of Marxism), if intellectual capital and the reputation of the creator (or copyright holder) of such a product were not invested in creating the "added impression".

Subjectively, the added value in a product is determined by supply and demand in the labor market. Labor supply may have an overestimated value (due to the subjectively recognized value of labor for each individual); demand for labor can offer an underestimated price; the final price is a moment of equilibrium, which is not static but dynamic and can shift up or down depending on volume and quality of labor supply. In this case, it is advisable to use the principle of methodological individualism, because the value of their own labor is subjectively high for each individual (i.e., a priori high quality with high cost). Consequently, from the standpoint of the neoinstitutional theory, the individual (employed or self-employed) will not demonstrate rational behavior but will seek to maximize subjective utility, without taking the needs of others into account, i.e., demonstrating opportunistic behavior (following one's own interests).

Therefore, from the standpoint of the neoinstitutional theory, the value of labor will be determined by the subjective perception of the complexity and cost intensity of a particular job. The complexity and cost will be subjectively higher for the employee than for the employer. The labor market (as an intersubjective institution formed by both formal and informal norms and rules determining the patterns of labor behavior) allows to find consensus and ensure parity of interests of employees and employers. However, this is only possible subject to the market, competitiveness, and integrity of the latter, as well as provided that the former has relevant, diversified and technologically advanced knowledge, skills, and abilities.

Otherwise, if a potential employee does not demonstrate unique characteristics of their labor force (mental or physical), the value and cost of their labor will always be unconditionally low, since such labor (as an offer) will be presented on the market in sufficient or excessive volume. This can already be observed in

the labor markets of the CIS, for example, – the excessive supply of unskilled or low-skilled labor (both internal and migrant) allows employers to dump the value of such labor and its cost, while potential employees quite agree with this situation, because there are no alternatives to highly paid employment (self-employment) for them [17, 18].

The formation of Marxist added value could be discussed in this situation, on the one hand, but there are high transaction costs of using unskilled labor, on the other hand, which may be associated with what is commonly called a "human factor" in humanistic concepts (unintentional damage to equipment, materials, unproductive expenses of working time, injuries, etc.), not to mention the fact that labor opportunism can occur in any category of employed and self-employed (including entrepreneurs and private investors). At the same time, it must be remembered that as an intersubjective institution, not only the labor market regulates the demand and supply of labor, but also demonstrates the development of productive forces and production relations (it must be noted that not only productive forces and production relations are the central concepts of the Marx's social economic theory, but also the common concept of the philosophy of history, which determines the sequence of changes in socioeconomic formations as part of scientific, technical, and technological progress).

Productive forces are labor (the worker being its owner) and means of labor (fixed assets, including tangible, intangible, and intellectual assets). As a rule, the employer owns the latter, while the right to manage and dispose of them can be delegated to the hired management. Productive forces and production relations arose probably with the transition from a nomadic to a settled agricultural lifestyle, and the most effective means of labor in modern terms were available only to medium and large businesses until the beginning of the 20th century, which ensured oligopolistic competition or a monopoly position for them. It must also be noted that some apologists for Marxism and conservative politicians of the 19th – 20th centuries noted the problem of reducing human labor to an appendage of the machine in the scientific and technological progress. However, K. Marx did not actually deny the importance of the scientific and technological progress, although he made it in relation to added value, which allowed him to create a concept of added labor, as much controversial and lacking rigorous scientific evidence as the concept of added value.

Scientific and technological progress in the economy is not a condition for the owners of the means of production to exploit the owners of labor – on the contrary, this is a condition of complication of labor rather than its simplification. Moreover, the availability of the means of production for many is a way of organizing self-employment today (not only in the intellectual fields of labor, but also in service, trade, and small innovative production), which is also the result of scientific and technological progress. Given that the complexity and manufacturability of labor are growing, while the specific cost of working time for the production of tangible and intangible goods is reduced, the following logical questions arise:

- a) How to use the releasing labor force? and
- b) Is social and economic equality possible in society?

The answer to the first question is obvious: the released labor force can either be relocated to other sectors of the economy or the nonprofit sector with the support of the state and society, or left to itself. In the latter case, an individual is free to choose between the type of employment, type of professional affiliation and lifestyle, provided that personal freedom and private property are an inalienable right of any person, and coercion to work is an attempt to violate these freedoms. This is a liberal libertarian concept, which was successfully implemented during the reaganomics period in the US but proved to be untenable later for evolutionary and biological reasons, in particular: a person, as a public animal, with an overly complex organization of higher nervous activity, cannot always rationally dispose of their rights and freedoms without violating the boundaries of

social and economic justice. As a result, society needs formal institutions, the state, and ideology to make the life of all people obey uniform and unified norms and rules, but be described by justice and inviolability of private property, on the one hand, as well as by freedom of choice while guaranteeing security and protection, on the other hand.

In other words, a consensus is required between public and private interests, which, for example, is proposed to be achieved through the concept of economic sociodynamics [22]. The entire complex essence of this concept is reduced to the fact that the category of "ward goods" is highlighted, and the state takes part in the process of their production, distribution, and consumption. However, the results of the cluster analysis indicate that economies with strong paternalistic positions of the state or other institutional philanthropists (South Africa, Russia, and Brazil) have fewer incentives to develop and grow, because the behavior of economic agents can be explained by "learned helplessness" [23], or by the "poverty trap" [24], despite the relatively wide possibilities of applying labor and intellectual activity to ensure individual well-being and social welfare.

Thus, there are an asset inseparable from its physical carrier – labor and several more assets, which can be either physical, tangible objects or intangible objects – means of labor. In order for production relations to arise (unconditionally based on free will and the right to terminate such relations at the initiative of either party), the owners (holders) of assets must be interested in interaction (cooperation and division of labor) in order to obtain a certain result that potentially can satisfy the interests/needs of each of the parties. At the same time, each party will always consider its own needs as priority, and this will generate opportunism, limited rationality of behavior, resulting from the asymmetry of information – both parties, lacking complete and reliable information about the motives, ultimate goals, and interests of the counterparty, will seek to maximize individual subjective usefulness in such a way that the subjectively perceived value of labor is equal to its cost. This should be considered as a special case of a game with a nonzero sum, when the establishment of an equilibrium price of labor does not mean an unconditional gain of one party or an unconditional loss of the other party.

As such, it can be seen that neither the Marxist nor the liberal libertarian nor the neoinstitutional concepts can specify the tools and methods that allow to encourage productivity and labor intensity and ensure the parity of values and labor costs in developing economies. Perhaps, the problem can be solved through the use of an interdisciplinary approach in this – in particular, the one proposed by R. Thaler and C. Sunstein [25] as libertarian paternalism for controlled choice, i.e., to rationalize the behavior of the employed and self-employed.

The idea of controlled choice in the context of the problem under study is to informally force the employed, self-employed, and employers to a behavior focused on an increase in labor intensity and productivity with a relatively fair parity of perception of the value and cost of labor for each of the parties. In turn, this means that the following conditions for a competitive supply of labor should exist in the labor market:

- a) highly skilled labor based on the differentiated and diversified use of knowledge (skills and other abilities) should have the highest value and the greatest cost, which means higher labor (business and reputation) responsibility; and
- b) low-skilled labor a priori will have low value and cost, since the supply of such labor is unlimited (unlike highly skilled labor), but at the same time labor (business, reputational, and other nonmaterial) liability will certainly be the lowest or absent.

Labor responsibility (including responsibility for the future) and reputation are a relatively new phenomenon for the Russian labor market, as well as for labor markets of other developing countries – for example, BRICS and the CIS. For developed

countries, such a personified responsibility for the results of labor, work reputation and the future (pension and health) is a norm that helps implement procedures to force the employed, self-employed, and employers make a right and most rational choice. The most correct and most rational choice is one that works both to satisfy the current and future needs of the worker without impairing the quality of life, while such a choice is relatively socially and economically fair (i.e., does not infringe on the rights and interests of others).

Methods of managing choice in terms of pension and health insurance for employees by building a special architecture of choice, in which workers making a particular choice for their present or future are placed, are provided as examples in the writings of R. Thaler and C. Sunstein. The architecture of choice is a tool of unobtrusive forcing to make a right and rational choice [25].

However, it must be noted that such "soft" choice management is possible only if the labor market is institutionally developed. An institutionally developed labor market is considered to have the following characteristics:

- a) the existence of formal norms and rules that ensure relative justice in social, economic, and labor relations (according to the methodology of the International Labor Organization: decent and honest labor);
- b) the existence of informal norms and rules that ensure the formation of personified responsibility among employees and employers for their reputation, results of labor or economic activity, and for the future (possible social risks);
- c) formal and informal representative organizations of employees and employers (professional and industry environments, self-regulatory organizations, legislative representation of interests, etc.);
- d) independent organizations for the resolution of social, labor, and economic disputes (state and self-regulatory organizations);
- e) a developed market for risk insurance, including risks arising from employment, self-employment, entrepreneurial, investing, and other labor and economic activities (it primarily relates to the following social risks: physical/mental disability by age and disability by health, i.e., pension guarantees and medical insurance); and
- f) developed cooperation of employers with research and educational organizations, venture, investment, and insurance state and nonstate funds.

At the same time, the data published by the International Labor Organization [17] and the Russian Center for Strategic Research [26] indicate the following:

- firstly, the SBTC trend is observed in all economies but is most pronounced in economies where guarantees of honest and conscientious labor are most significant, with consolidated responsibility for the future (insurance of social risks with the participation of the state, employers, and employees) and personified responsibility for reputation and labor results (Western European countries, Asian tiger countries, the US, and Canada have such economies); and
- secondly, the SBTC trend occurs in the economies where the conversion of the results of intellectual activity into a competitive commercial or noncommercial civilian product is most intense. Besides the aforementioned economies, the economies of China and India have become close to them in the past five to ten years. However, both China and India, as well as other BRICS countries, cannot be fully attributed to economies that guarantee honest and conscientious work or to economies with intensive conversion of the results of intellectual activity into the production of competitive tangible and intangible goods.

It is obvious that the current situation on the labor markets of the BRICS member states, including those originally built on the Marxist economic paradigm, requires institutional reforms and

liberalization. The models of labor markets that have developed in the BRICS member states cannot be considered sufficiently optimal – at least until the "national labor uniqueness", referred to in the "Results" section, is eliminated.

## 5 Conclusion

Thus, the conducted study allows building the following empirical dependence:

- firstly, economic growth and well-being of the population directly correlate with the development and quality of the labor market institutionalization;
- secondly, the high quality of labor market institutionalization lies with the guarantees of honest and sufficient labor and with the guarantees of protection against social risks;
- thirdly, developed and institutionally progressive labor markets most clearly demonstrate the SBTC change, while economies demonstrate balanced economic growth and a high level of personal well-being of the population;
- fourthly, the SBTC concept has limited implementation in economies where labor markets are not developed or do not guarantee honest, decent labor, and protection from social risks; and
- fifthly, with limited implementation of the SBTC concept, while maintaining an undeveloped institutional labor market, the economic growth and welfare growth will be unstable with downward trends (in particular, this is confirmed by the data on India and China over the past decade).

As such, with due consideration of "labor and economic national uniqueness" of the BRICS member states, it becomes obvious that the transition from a cohort of developing to a pool of developed (socially and economically sustainable) economies is possible only under the condition of consistent institutional reforms aimed at solving priority problems: corruption (formal institutions with limited functions), a significant shadow sector, an undeveloped segment of personal insurance, lack of incentives for personalized (reputation) liability of employees and employers for the results of labor and economic activity, and excessive state involvement in social and economic processes. Solving institutional problems will provide a stable basis for the implementation of the SBTC concept in the BRICS member states, though by using the tools of liberalization of labor markets and libertarian paternalism in managing labor behavior of the employed and self-employed and reducing social risks, rather than on the basis of the Marxist economic paradigm.

This means that these countries are likely to occupy positions not of nominal economic leaders in the medium term (as is happening now), but rather the positions of competitive economic leaders, the development stability of which is determined by the parity of the three driving forces of evolution: social, political, and technological.

The authors have explored the possibility of applying the Marxist, liberal libertarian, and neoinstitutional economic paradigm to study the trends and patterns of the labor market development in the countries belonging to economic leaders and to the BRICS in this article. The authors are going to supplement and develop approaches to assessing the speed and depth of substitution of low-skilled labor with highly qualified labor resources in their further studies (i.e., to develop methods for assessing the SBTC concept of labor markets).

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**Primary Paper Section: A**

**Secondary Paper Section: AH**

## FACTORS DETERMINING THE CHOICE OF TEACHING AS A CAREER

<sup>a</sup>LÍVIA FENYVESIOVÁ, <sup>b</sup>ALEXANDRA PAVLIČKOVÁ

Constantine the Philosopher University, Faculty of Education,  
Department of Pedagogy, Dražovská 4, 949 74 Nitra, Slovakia  
email: <sup>a</sup>lfenyvesiova@ukf.sk, <sup>b</sup>apavlickova@ukf.sk

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**Abstract:** Research was undertaken to identify factors that influence the choice of teaching as a profession. A sample of 168 respondents completed a questionnaire covering seven categories. According to the answers provided by the respondents, the commonest motive for selecting teaching and education was interest in working with children and adolescents, while family influence was the least expressed in the questionnaire. Concurrently, a statistically significant relationship was found between age and motivation based on childhood memories and such interest

**Keywords:** teaching profession, motivation to choose teaching as a career.

### Introduction

Teaching is one of the most visible careers today. For many, to be a teacher is the culmination of childhood dreams and desires. But many people who do not teach and even some professionals believe that teachers are born, reflecting knowledge about certain embodied psychic qualities such as mild extroversion, emotional and neuro-psychic stability, self-confidence, ambition and an integrated personality; innate dispositions that are a precondition for anyone pursuing teaching and education as a career.

### 1 Theoretical and Empirical Starting Points

Becoming an educator takes several years and is a very complex process. The motivation itself is often enough the key phenomenon that drives somebody to select teaching as their career and determines the subject they are going to teach. However, the motivational aspect in a personality has to be reinforced by high-quality undergraduate training that materialises the process of becoming a teacher. Likewise, it should be emphasised that learning how to be a teacher is an ongoing, lifelong process, which neither begins nor ends with undergraduate training. At the same time, it is also understood as professional development, a *'permanent process that encompasses all dimensions of the development of the teacher's personality and his/her competences as it creates personality prerequisites and an internal motivation for lifelong competence in utilising formal, informal and institutionalised opportunities for creative improvement in the quality of vocational performance and education of pupils.'* (Pavlov, I. 2007, p. 219)

The motivation to pursue teaching as a career sometimes has its roots deep in childhood. According to P. Gavora (2002), the decision can have been made in primary school. Yet it affects not just whether an individual really becomes an educator, but also what kind to become. This is because pupils attracted to teaching as a career perceive school life, the role a teacher plays in it and overall happenings in school more sensitively, which in turn has a formative influence on their own educational thinking.

The reasons behind the decision to choose the teaching profession tend to be varied. Among other things, it is often influenced by an excellent teacher encountered in school, a family environment (Porubská, G. 2004) where a member teaches or is involved in education, or an intense personal experience. Many studies have shown altruistic motives, past experiences, former teachers, personality characteristics, family and family members, love for children, peers, interest in the subject, and parenting to have played a major role in the choice of teaching as a career. But J. Čáp and J. Mareš (2001, p. 266) mention other, not quite so positive motivational factors such as uncertainties, strong dominance and an effort to excel. J. Průcha (2009, p. 204) presents a greater incentive imagined from a professional perspective, which is evident in those seeking to teach at lower-level primary schools, as well as in girls and young people from smaller towns. More specifically, B. Kasáčová's (2004, p. 27) investigation into what motivated

students in primary school teacher training found the desire from childhood to become a teacher dominant, followed by the influence of a parent who was a teacher, secondary education, a specific teacher's impact as a role model and other incentives, such as having switched to education from another subject or worked with children.

P. Gavora (2002, p. 240) chose a different approach to clarify the motivation to teach. After qualitatively analysing the life stories from a sample of 11 teachers, he mapped a wide range of factors that influenced their decisions. Certain tendencies toward extroversion in the need for self-presentation before other people, the early casting of a teacher in childhood role-playing games and excellent marks in school are considered significant determinants alongside personal qualities Gavora describes as diligence, responsibility and reliability, in addition to a family background that encourages a positive attitude towards other people, and to how teacher models interact in a school environment. An important role can also be played by a "key person", whom he referenced as *"anybody always interesting or humanly valuable"*. A watershed moment in a person's life that leaves a strong emotional experience can also incentivise someone when they are choosing a career to pursue. The research pointed out the interaction between external and internal factors both influencing the profession chosen and significantly correcting the formation of the professional self as a teacher. Subsequently, he (Ibid., p. 254) describes the various stages identifiable in the decision-making process that results in the selection of teaching and education careers. They are inspiration, a preconceived role of a teacher, identifying with the teacher's role, initial vision, fleshing it out under the influence of other events and finally the decision itself.

Most often, the motivations to seek a teaching career can be distinguished as internal, external or altruistic. R. Tomšík (2016, p. 396-400) classifies as internal motives interest in the profession, personal and professional predispositions and the belief people have in their own abilities. Experience in teaching and education may also be a decisive internal motive (Kasáčová, B., 1996). External factors include social status and the benefits of a career in this area (Tomšík, R., 2016) while, in the final group, Tomšík notes among altruistic motives a desire to improve the lives of others, for examples through pro-social behaviour and assistance to them. T. Svatoš (2012, p. 93) highlighted a shift over a ten-year period in the motives behind the selection of teaching as a career. While in 2000 the social importance of the teaching profession dominated, the applicants' own individual personal values prevailed in 2010.

Incentives motivating what career to choose are also of decisive importance in training for and further managing it. The motivation to become a teacher can be influenced during training even by undergraduate education based on reflexive self-consciousness (Kasáčová, B., 2001) and forming a self-concept in students and future educators. B. Pravdová (2014, p. 169-179) differentiates the latter process into three basic stages:

- *Becoming acquainted with the role of educator.* Young people arriving at university to become teachers when they graduate are already aware of the role they are going to be playing because they have already encountered it several times during their lives. Their awareness of what a career in education entails may be distorted, so their attention is directed toward the data not necessarily constituting a source for drawing conclusions about their own professional conception, but rather it may be subject to higher education coding and analysis. Based on interviews with students and analysis of their responses, Pravdová considers the first two years of undergraduate study to be decisive for becoming acquainted with the role that educators play. During this time, they can either discover their motivation for entering the education profession or lose it.

- *Confronting the real professional self against the ideal and desirable.* Students encounter this stage of professional self-perception during undergraduate teacher training, when they confront their own current professional self-concepts and the demands the role of educator places upon them. Giving them the opportunity to encounter the reality of teaching by practising it lets students acquire the necessary experience conducive to shaping their own professional self-comprehension. On the other hand, confrontation with the reality of practising how to teach can cause a loss of interest in the education profession even among those students whose primary motivation to become educators was positive (Jursová Zacharová, Z., Sokolová, L., 2015).
- *Transformation into the professional self.* Here the focus on the search for opportunities to further professional development and verifying it in teaching training.

The selection of a career in education is sometimes due to coincidence or to replace another career they had chosen, but were unable to pursue (Jursová Zacharová, Z., Sokolová, L., 2015). Průcha (2009, p. 205) noted that almost 60% of jobseekers for teaching positions had made last-minute decisions about embarking on this career. As a consequence, they may have already lacked the necessary enthusiasm and drive in the early stages of their studies and training to help them manage the workload that comes along with it, and this may have an adverse impact when they are later working in education themselves. The motivation to teach also plays an important role in perceived proficiency. P. Gavora (2012, p. 43) presented results from research conducted in Greece by M. Polou (2007) analysing the factors that positively influenced professional development in students training to become primary school teachers. She found the strongest self-development factor for them to be motivation. This implies the drive that leads to the selection of a career significantly influences what they study at faculties of education, the level and results.

## 2 Method and Methodology

In determining the motivation behind choosing education as a career, we were able to find differences relative, in particular, to the gender of the respondent, the field of study chosen and the environment whence he or she came.

Research objectives: Our research sought to ascertain individual motivations among students learning and training to become teachers and educators, while examining how age influenced the structure of their motives.

Research sample: The research sample was composed of 168 students (N) training for a career in education, of which 124 were full-time students and 44 were studying part time. The respondents' ages ranged from 21 to 36 years, with 24 the mean age (M).

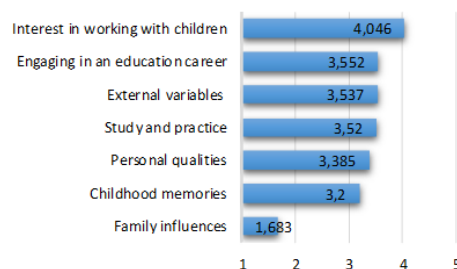
Research methods: A questionnaire was used to collect research data, comprised of 21 questions which were answered with a Likert five-step scale (1-5). There were seven areas of motivation used in the questionnaire: childhood memories, personal qualities, family influence and environment, interest in working with children, study and teaching practice, interest in the profession and external actors in the profession. Data was collected in two stages, one in 2018 and the other in 2019. Research data was processed using Microsoft Excel. Descriptive statistical methods were used for the research data, specifically frequency distribution and mean. Chi-squared distributions were used to determine the relationship between age and individual motivations.

## 3 Results and discussion

The object of our research was to determine the different motives for choosing education as a career. Answers according to the Likert scale (1- not at all, 5-very much) enabled scores to be calculated in the different motivational areas within the overall questionnaire. Based on the scores, each area was ranked from highest to lowest. Interest in working with children and

youth was the motivation that scored highest. Here altruism dominated among the motivations expressed by the respondents surveyed, characterised by a positive attitude toward children and a willingness to help others (average score of 4.046). Interest in working with children and the opportunity to influence youth development were also identified as the commonest motive for choosing to be educators in research conducted by N. Čopíková (2015), B. Paksi et al. (2015, p. 54), all of whom indicated this motive to be dominant among secondary school students when they were selecting a university and also among university students entering the labour market. Interest in a teaching career was identified as the second most common incentive in our survey (scoring an average of 3.552 points). This motive appeared in the questionnaire where, in terms of the content it provided, the focus was on the placement of graduates in good jobs and interest in studying education. The third most prevalent motivation was external factors in the profession, which included characteristics of the working environment and hours (3.537), followed by the specifics in the study itself (3.520). This particular area was covered in questions that focused on the actual content of undergraduate training. The lowest scoring incentives driving decisions to pursue a career in teaching were personal qualities (3.385), childhood memories (3.2) and family influence in last position (1.683). The results are illustrated below in Figure 1.

Figure 1: Ranking of individual motivations in the overall survey



Another goal was to determine how age influences different motivations. Chi-squared was used in this case to analyse the replies to the questions. Statistically significant differences were expected between the motives because of the age of the respondents. A statistically significant relationship between age and the different motivations behind their decisions was identified in two of the categories - childhood memories and interest in working with children. The choice to become an educator based on childhood memories appears to be determined by age (Table 1), where we found a positive relationship with teachers and school in childhood to be more dominant among older respondents. Our research showed part-time students older than 27 years of age tending to cite these reasons.

Table 1: Relationship between age and motivation based on childhood memories

| SUMMARY        |          | Alpha   |          | 0,05 |          |
|----------------|----------|---------|----------|------|----------|
| Count          | Rows     | Cols    | df       |      |          |
| 168            | 5        | 3       | 8        |      |          |
| CHI-SQUARE     |          |         |          |      |          |
|                | chi-sq   | p-value | x-crit   | sig  | Cramer V |
| Pearson's      | 15,97359 | 0,04276 | 15,50731 | yes  | 0,218038 |
| Max likelihood | 16,08114 | 0,04135 | 15,50731 | yes  | 0,217026 |

Age also has a significant influence statistically on decision-making that reflects interest in working with children and adolescents. Results from our research document altruistic motives, which include relationships with children and interest in helping others, likewise dominating among older respondents (Table 2).

Table 2: Relationship between age and altruistic motives

| SUMMARY        |          | Alpha    | 0,05     |     |          |
|----------------|----------|----------|----------|-----|----------|
| Count          | Rows     | Cols     | df       |     |          |
| 168            | 4        | 3        | 6        |     |          |
| CHI-SQUARE     |          |          |          |     |          |
|                | chi-sq   | p-value  | x-crit   | sig | Cramer V |
| Pearson's      | 15,91604 | 0,014212 | 12,59159 | yes | 0,217645 |
| Max likelihood | 16,02417 | 0,012231 | 12,59159 | yes | 0,219353 |

No statistically significant relationship was found in results between age and personal qualities, interest in pursuing an education career, external factors, family influence and the characteristics of undergraduate training, meaning the respondents were equally affected by their motivations, regardless of age.

#### 4 Conclusion

Interest in the teaching profession has long been the centre of attention among researchers. The absence in Slovak universities of any selection procedure for applicants has created diversity among students striving to become educators. Many of them arrive at university faculties of education primarily with the intention of acquiring teacher training and a pedagogical education; although for many of them teaching was their second choice after having failed to enter another field. Their motivation to seek teaching as a career is an important predictor of the professionalism they would exhibit once they become teachers (Kasáčová, 2004), while it remains critical to distinguish between interest in studying education and interest in the profession itself. Undergraduate training can raise interest in pursuing education and teaching as a profession, or it can cause students to lose interest in it. Our research indicates the respondents' choice of a career in education to be driven the most by their interest in working with children and adolescents, while they were least motivated by family influence and environment. Statistically significant differences were expected in how to structure motives reflecting the age of the respondents. A statistically significant influence of age on their motivation was observed when childhood memories and interest in working with children and adolescents formed the basis for decisions. They were more frequently identified among older students, most often those who were studying part time.

R. Tomšík (2016) noted an important predictor motivating the choice of teaching as a profession was the personal qualities of those students interested in becoming teachers. These qualities were likewise crucial in the profession itself and the development of a professional approach toward teaching.

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#### Primary Paper Section: A

#### Secondary Paper Section: AM

## FORUM THEATRE AS A MEANS OF RISK YOUTH RESOCIALIZATION

<sup>a</sup>LENKA GÁLISOVÁ, <sup>b</sup>DOMINIKA SONDOROVÁ

*Constantine the Philosopher University in Nitra, Faculty of Education, Department of Music, Dražovská cesta 4, 949 01 Nitra, Slovakia*

*email: <sup>a</sup>lenka.galisova@ukf.sk, <sup>b</sup>dominika.sondorova@ukf.sk*

**Abstract:** The study presents the Forum Theatre as the best known and most utilized technique of the Theatre of the Oppressed. It briefly describes its basic principles and rules. The study further explains the essence of musical and dramatic activities and points out the importance of their use, not only within the field of music education. Subsequently, it provides an insight into the possibilities of integrating musical and dramatic activities into preparation for the Forum Theatre. It also emphasizes the importance of using the music component in the Forum Theatre system and accentuates its added value in the process of resocialization of drug addicts and delinquent youth.

**Keywords:** socialization, risky behavior, resocialization, Forum Theatre, Augusto Boal, music

### 1 Introduction

The influence of the social environment is extremely impactful during the development of an individual. Living in an unsatisfactory or non-stimulating environment supports the development of inadequate ways of reacting as well as the development of unwanted personal characteristics. The family constitutes the most important social environment for the child, as it offers the basic and very first social experiences. It is the most important source of stimuli that influence the development of child's personality and socialization skills. The personal characteristics and behavior of parents become a model for the child. If the negative traits dominate in the parent, there is an increased tendency to use disproportionate means in interaction with the child. Under such conditions, the risk of developing socialization problems increases significantly. The lack of social support and weak social ties that make social learning impossible also have a negative impact on the child. The period of adolescence is a particularly critical time in terms of behavioral disorders. If the abovementioned behavior is not properly addressed at this age, there is a high probability of its continuation and escalation, which can culminate and lead to criminal activity. The increase in various forms of risky behavior is currently a highly discussed topic. The importance of this issue is also evidenced by a plethora of publications offering various theoretical viewpoints and suggestions for practical solutions. Concerns about the steady increase in socio-pathological phenomena among children and youth have led to efforts in finding ways to eliminate them. The resocialization process involves many methods and techniques based on psychology, pedagogy and sociology practices. Increasingly, however, there is a need to disseminate the resocialization models, in which the contact of individuals with art plays an important role and is used as a tool of resocialization. The choice of the Forum Theatre technique appears to be a suitable way for the purpose of resocialization, as this theater form was created as a method for solving social issues and strengthening social ties. Through the Forum Theatre, individuals can discover themselves and their abilities, thereby strengthening their self-confidence, getting rid of uncertainty and stage fright, examining different ways of communicating with each other, learning to feel, understand and tolerate others' feelings.

### 2 Youth socialization in the adolescence period

Socialization plays a vital role in adolescence. Around 14 to 15 years of age, most individuals end their compulsory education, which invokes a change in the environment. At the same time, relationships within the family and between peers are being re-organized, and partnership development occurs. In this period, the social environment has a very significant influence on the formation of personality and plays a considerable role in managing the training load and in the motivation to perform in sports.

Many authors (eg. Podpera, 2006; Arnett, 2007; Mužík, 2009; Sedlák and Váňová, 2013; Král, 2014 and others) agree that adolescents spend most of their free time listening to music and moreover, listen to music during everyday activities such as traveling and walking, eating, reading and studying, or preparing for school. Listening to music can be done privately (television, CD, internet), in a group (listening together, guitar sing-alongs), but also socially (concerts, disco parties). The youth mostly use a wide range of musical activities to meaningfully fill up their free time. This interest also stems from the need for socialization and relaxation. It is also proven that even in adolescence, music can lead to cognitive improvement. It turned out that the spatial-temporal understanding could develop even in the course of the later musical development. According to the nature of the adolescent, music can stimulate, activate, alarm, mobilize, energize and provide a sense of human dignity, help calm, relax, soothe, inspire and may, to some extent, replace missing human relationships in the absence of love or recognition, give sense of meaning of life and mental fulfillment, it can be a release valve of psychological overpressure, a source of refreshment, an escape from life hardships, an opportunity for social contact, self-expression and more.

The problem of social inequalities, the loss of identity and traditional values are gradually emerging in the process of socialization. Given these facts, there is a possibility of social action, which may, however, pose a certain threat and a risk arising from the need to cope with the increasingly difficult life challenges without support. A question arises in this period: How does one achieve a sense of personal identity? This is a difficult question to answer, especially for individuals who, due to family upbringing, have poor prerequisites to adapt to the demands of society. Sociologists also point out the increasing dependence of an individual on the fact whether they are accepted, recognized and understood by others. That is why they often choose the easier way and become a member of a problematic faction or group. In the system of democratization and humanization of social relations, the importance of interpersonal relations is increasing, especially in leisure and after-school time. The manner and quality of its spending are key factors in finding one's own identity. Therefore, it is important to use this time in two ways, the first one being support and development of creative, cultural and sporting activities, but on the other hand, the denial of consumer-extroverted activities that lead to risky behavior.<sup>1</sup>

The phenomenon of risky behavior is an extensive topic and requires an interdisciplinary perspective. An overview of several definitions of risk behavior shows that this area is dynamic and there is currently no general consensus on what the obligatory categories of this concept are. In one, however, many definitions coincide. Risky behavior is an inclusive concept, encompassing diverse forms of behavior ranging from unobtrusive signals to serious manifestations (truancy, escapes from home, theft, sexual deviation, auto-aggression and various types of addiction). Perhaps because of the ambiguity of this term, risky behavior is to some extent considered a normative part of an individual's development. This view is based on the fact that nearly half of adolescents engage in at least one form of risky behavior during adolescence. However, the overwhelming majority of risky behaviors resolve themselves when they reach adulthood. This is also confirmed by the research of Bongers et al. (2004), who found that the intensity of risky behavior actually decreased at the end of the adolescence period in both sexes. It also depends on the type of given behavior. A more stable behavior will be the one able to develop a habit that is not dependent on the social environment (drugs, gambling). On the other hand, aggressive or

<sup>1</sup> KUNÁK, S.: *Výbrané možnosti primárnej prevencie negatívnych vplyvov na deti a mládež*. Bratislava: IRIS, 2007. pp 23 – 27.

delinquent behavior disappears more easily if an individual changes jobs or moves to another school.<sup>2</sup>

However, the causes of risky behavior cannot be accurately determined. It also depends on the historical, cultural or ontogenetic context of the behavior. What is considered the norm for some cultures or ages may be perceived as risky in another society. The concept of risky behavior is therefore a social construct that describes this form of behavior as capable of endangering the individual and their surroundings in health, social or psychological terms.<sup>3</sup>

### 3 Resocialization

The concept of risky behavior is closely related to resocialization, which is dictionary-defined as "*reintegration into society (e.g. convicts after serving a sentence)*".<sup>4</sup>

Resocialization can be referred to when an individual is disaccustomed from violation of applicable standards in a given society. Matoušek (2003) defines resocialization as a return to socially acceptable behavior in individuals who have deviated. According to Labáth (2001), during resocialization, the individual acquires new social roles, values, knowledge, or re-learns from the ones that they originally acquired, but those have since become socially disadvantageous, obsolete or unsatisfactory new conditions of society. Perhaps the most accurate definition of resocialization is provided by Kapustová (2008), who communicates the meaning of the word resocialization as the reintegration of an individual into society and the related re-assumption of its values and norms. Thus, resocialization is a return to a socially acceptable behavior in individuals who have deviated from it. As such, it will not be possible without changing attitudes and value orientation.<sup>5</sup>

The resocialization of at-risk youth involves a wide range of professional practices and processes that should lead to the reintegration of the individual into society, to the continuation of their interrupted socialization or to the elimination of their damaged socialization.<sup>6</sup> In addition to the professional practices and strategies used in working with the at-risk youth, this concept should reflect the general objectives, values and etiological assumptions that should contribute to the shaping of specific resocialization activities.<sup>7</sup>

Resocialization most often occurs when the individual enters an environment that separates them from the outside world, severely restricts their freedom, and puts them under the pressure of new bans and commands. In the case of juveniles, such environments are most often etopedic facilities, psychiatric hospitals or prisons.

In recent years however, there has been a surge in development of various resocialization programs organized by either resocialization institutions or non-profit organizations. The resocialization approach in such programs or institutions is based on the idea that change in risky behavior can be achieved by altering the internal motivation and attitudes of individuals, without breaking the ties to the family and the closest social environment. Resocialization is achieved through social contact, specific requirements, instructions, rewards and punishments. Emphasis is placed on the development of positive qualities,

values, attitudes and interests. Therefore, the aim is to return to standard norms of the socialization process.<sup>8</sup>

Resocialization is also realized through the means of re-education. It involves a re-education process of an individual, the purpose of which is to eliminate various forms of risky behavior. The process of resocialization also depends on the approach of management and professional staff. It is essential to move away from the autocratic style of education and to give priority to individual work – communication with the client.<sup>9</sup>

The resulting effect of resocialization depends on many factors. Among the most important are:

- a) the problem representing the reason for initiation of the resocialisation activity
- b) the individual's decision to undergo resocialization
- c) the personality traits and personality characteristics
- d) upbringing
- e) the value orientation and faith of the individual
- f) social environment
- g) the methods and techniques employed by staff in the context of resocialisation
- h) support from the loved ones etc.<sup>10</sup>

#### 3.1 Methods of resocialization

The term "methods" encompasses procedures that set out to achieve the main goal of resocialization – the return of an individual to society. Educational methods used in the process of resocialization also stem from methods used in pedagogy. Methods of resocialization should be comprehensively conceived in both horizontal and vertical arrangement. They are also partly conditioned by the form of resocialization. Some methods are inherent in only one of the two forms of resocialization (outpatient and residential) and others are common to both forms (e.g. sociotherapy). However, each form puts a different emphasis on their use.

In the outpatient form, the most frequently used methods of work are regular individual and group counseling consultations, sociotherapy, co-dependent therapy, psychological intervention and polyvalent social work, which involves working with the individual, their family and wider social environment. It also includes the use of field social work methods, crisis intervention, first-contact and motivational counseling before placing an individual in a resocialization facility.

The residential (residential) form includes procedures such as sociotherapy and the therapeutic community system. Both procedures share the common use of the human community as a treatment method. However, their definition is not clear. Some authors even consider them identical.<sup>11</sup> Others, on the other hand, recognize characteristics that make them different.<sup>12</sup>

Methods of resocialization can also be divided on the basis of individual and group work with individuals. Individual work is a form in which the individual in need of professional intervention enters into a relationship (therapeutic, counseling etc.) and mutual cooperation with a professional engaged in resocialization. When working with adolescents, the relationship and also the corresponding level of communication compared to working with adults has an even more particular position, as all developmental individualities of the adolescent must be respected. The categories of individual work methods include psychotherapy, behavioral therapy, systematic approach, reality

<sup>2</sup> ČEREŠNÍK, M.: *Hraničná zóna: Rizikové správanie v dospievaní*. Nitra: Constantine the Philosopher University, 2016. p. 12.

<sup>3</sup> ŠIRŮČEK, J. – ŠIRŮČKOVÁ, M. – MACEK, P.: *Sociální opora rodičů a vrstevníků a její význam pro rozvoj problémového chování v adolescenci*. In: *Československá psychologie*, Volume. 51, no. 5, 2007. p. 477.

<sup>4</sup> MIKULÁŠ, R.: *Slovník cudzích slov*. Bratislava: Príroda, 2006. p. 471.

<sup>5</sup> SCHAVEL, M. et al.: *Sociálna prevencia – teória a prax*. Liptovský Ján: Prohu, 2016. p. 37.

<sup>6</sup> ZOUBKOVÁ, I.: *Kriminologický slovník*. Plzeň: Aleš Čeněk Publishing House, 2011. p. 201.

<sup>7</sup> WARD, T. – MANN, E. R. – GANNON, A. T.: *The good lives model of offender rehabilitation: Clinical implications*. *Aggression and Violent Behavior*. In: *Aggression and Violent Behavior*, Volume 12, Issue 1. Great Britain: Elsevier, 2007. pp 87 – 107.

<sup>8</sup> HYBSKÁ, G.: *Probační programy jako forma resocializace mladistvých delikventů*. Brno: Masaryk University, 2006. p. 33.

<sup>9</sup> PROCHÁZKOVÁ, J.: *Individuální a skupinové metody resocializace dětí a mládeže v diagnostickém ústavu*. Zlín: Tomáš Baťa University, 2017. pp 35 – 38.

<sup>10</sup> SCHAVEL, M. et al.: *Sociálna prevencia – teória a prax*. Liptovský Ján: Prohu, 2016. p. 37.

<sup>11</sup> According to Langmeier, the therapeutic potential of the children's collective exercised in the children's community environment is growing beyond the scope of psychotherapy. Through its focus on the reality of a wider social unit, the therapeutic community becomes a form of aid, which is rightly described as sociotherapy. LANGMEIER, J.: *Dětská psychoterapie*. Prague: Portál, 2000. p. 283.

<sup>12</sup> ONDREJKOVIČ, P.: *Sociálna patológia*. Bratislava: VEDA, 2009. p. 319, 320.

therapy and eclectic counseling. The group methods of resocialization are interpersonal, movement-interactive, creative, relaxation and auxiliary techniques. The main focus is on the group community, the discussion group, as well as the techniques on which special group sessions are built. These include the above-mentioned therapeutic community, group psychotherapy, active social learning, art therapy, psychodrama, drama therapy, music therapy, ergotherapy etc.<sup>13</sup>

#### 4 Forum Theatre

The resocialization process utilizes many methods and techniques based on psychology, pedagogy and sociology practices. One of the ways in which knowledge and emotion intertwine is Drama in Education.<sup>14</sup> Its individual aspects and benefits can also be exploited in an environment that incorporates individuals with risky behavior. Drama in Education can be used to achieve positive results in the area of education, adaptability and socialization of individuals. Furthermore, creative drama employs many theater techniques, methods and forms.

In this sense the application of the Forum Theatre technique seems appropriate, as far as it enables one to elaborate on the problem of social inclusion of individuals in society. Forum Theatre also extensively focuses on the individual and their personal mental set-up, blocks and issues, which helps them to overcome and strengthen their self-esteem and self-reflection in a non-violent way.

Although considered as one of the techniques of creative drama, Forum Theatre can also be used as part of the normal teaching process. Forum Theatre is based on the concept of the Theatre of the Oppressed, founded by August Boal in the 1960s. Boal perceived theatre as an instrument of social change, wherever various forms of oppression occur. This conception of the theatre was very close to the so-called "pedagogy of the oppressed" developed by Paulo Freire in the 20th century.<sup>15</sup>

The theatrical direction of August Boal was largely influenced by the work of the Actors Studio – an association founded in 1947. It consisted of professional actors, directors, screenwriters and it aimed to develop artistic means in a theatrical performance.<sup>16</sup> In the 1960s, by diverting away from social problems, he began to focus on personal problems of the individual. At the same time, he emphasized didactic moral lessons and pushed the values of society, such as stability, to the forefront.<sup>17</sup> He subsequently began to look for and conceive texts that would not thematically copy the European ones, but would rather draw inspiration from Brazilian reality and resonate with the local population.

Boal started to play with non-actors in public spaces, e.g. in churches, attempting to show people the true content of reality. During the staging process, he also incorporated the technique of discussion. He was inspired by the people of the villages and their stories and problems concerning everyday life. In one staging of a particular problem on stage, a discussion followed, led by Boal's theater group, together with the audience who proposed a solution to the problem. The theatre thus became a certain kind of a mirror, in which the community had the opportunity to analyze their problems and look for the ways to solve them. During a different staging, a female member of the audience did not identify with the problem-solving process on stage. Boal suggested her to try to solve the situation by

replacing the actress on stage. The spectator proposed an alternative solution to the staged problem. This led to the creation of the Forum Theatre, which blurs the line between the stage and the audience.

#### 4.1 The procedure and rules of the Forum Theatre

Forum Theatre is built on dramatizing the situation based on the principle of oppression, which aims to evoke an authentic emotional reaction from the viewer and provoke them to intervene in the storyline by implementing their ideas about storyline changes onto the stage.<sup>18</sup> The story of the performance consists of a conflict situation. Although it may be a fictional story, it is supported by a real life experience. When creating a story, it is likely that viewers in the audience have previously encountered the presented situations, and it is assumed that the story internally connects with the viewer. The way in which the story is interpreted and demonstrated creates a way to engage the viewer and allows their entrance into the play.<sup>19</sup>

The Forum Theatre system is governed by a set of certain rules. The presence of these rules not only determines the play's common goal but also commonizes the way of acting. This is the only way to confront opinions or analyze the situation. The character must be accurately characterized by text for the viewer to identify. In their way of solving of a conflict situation or a certain problem, the character must literally provoke the viewer to feel the need to intervene in the situation and help or propose a different solution. Political views, occupations or social climate must be clearly discernible from the actor's behavior.

There are three main characters within the Forum Theatre – the protagonist, the antagonist and the joker. The protagonist is a person who encounters oppression. They possess their own goal, but they do not recognize the possibilities that would help them achieve a positive result. This is the point when the impulse shifts to the audience, which should be personified with the main character and help them with their own intervention. The second character is the antagonist, that is, the oppressor, who greatly influences the plot and prevents the protagonist from achieving their goal. The antagonist does not have to be a real character, they can represent the emotional side of the protagonist, their experiences and memories. An integral part of the Forum Theatre is the character of joker, who directs the entire process. Though neutral, he can enter the story, stop it, move on the stage, communicate and engage the audience and actors at any time. Joker is a character that fulfills the task of facilitating contact between the actors and the audience. He informs the viewers about the rules and approximates the story. The joker has an essential role to play throughout the entire play, and is considered a guide to the performance. Furthermore, he must understand the story in depth, form it together with the actors and be aware of the external and internal characteristics of the characters.<sup>20</sup> The joker is an essential component that mediates the contact between viewers and actors. Though not directly involved in the performance, he is in charge of its progression, from tuning the audience through games, clarifying the rules and meaning of Forum Theatre, activating viewers and analyzing their ideas, to finally summarizing and starting the discussion that concludes the Forum Theatre process.<sup>21</sup>

In the first part, the scene is played as if it were a conventional theater. Subsequently, viewers are challenged to agree / disagree with the solution for the particular situation. The whole scene repeats itself again, while the viewers try to influence the outcome by suggesting another solution. In case they decide not to change the scene, it remains as it is. In order to resolve the situation gradually, the protagonist who proposes an

<sup>13</sup> PROCHÁZKOVÁ, J.: *Individuální a skupinové metody resocializace dětí a mládeže v diagnostickém ústavu*. Zlin: Tomáš Bata University, 2017. pp 35 – 38.

<sup>14</sup> A system of controlled, active socio-artistic learning of children or adults based on the use of basic principles and procedures of drama and theatre, limited primarily by educational or formative and secondary specific artistic requirements on the one hand and individual and social possibilities for further development of the personalities involved on the other.

<sup>15</sup> VALENTA, M.: *Dramaterapie*. Prague: Grada, 2007. p. 49.

<sup>16</sup> SANTOS, B. et al.: *Divadlem ke změně: vybrané texty k divadlu utlačovaných*. Prague: Antikomplex, 2016. p. 19.

<sup>17</sup> MACKOVÁ, R.: *DIVADLO FÓRUM. Postupy Divadla Fórum Augusta Boala v práci s dospívajícími u nás*. [Diploma thesis.] Brno: JAMU, 2002, p. 19.

<sup>18</sup> SULLIVAN, J. – BURNS, M. – PATERSON, D.: *Theatre of The Oppressed*, In: *Interactive and Improvisational Theatre: Applied Drama and Performance*, 2007, p. 3.

<sup>19</sup> HRUBÁ, V.: *Divadlo fórum jako metoda pro skupinovou práci s nezaměstnanými*. [Bachelor thesis.] Brno: Masaryk University, 2010, p. 24.

<sup>20</sup> KOPRIVOVÁ, B.: *Život jednoho z nás*. [Bachelor thesis.] Brno: Masaryk University, 2017, pp 15 – 17.

<sup>21</sup> SOCHA, J.: *Alternativa prevence sociálně patologických jevů na gymnáziích – divadlo fórum*, Brno: Masaryk University, 2007, p. 17.

inappropriate solution must always be replaced. The viewer calls "stop", the actors freeze, and the viewer replaces the protagonist. Additionally, they determine the location, gesture or movement that they would like to interfere with. The substituted actor remains on stage, supporting the viewer and course-correcting them if necessary. When the viewer becomes the protagonist and starts suggesting other solutions, they may encounter resistance. This implies how difficult it is to alter any situation or reality. There are several different counterparts: the viewer as opposed to the actor, the world as it should be as opposed to the world as it is. If the viewer surrenders and leaves the stage, the protagonist returns and the scene continues as before, unless someone else calls „stop“ trying to propose another change in the protagonist's actions.<sup>22</sup> The main prerequisite for creating the performance is to realize the current issue of the group for which the Forum Theatre is played. The creation itself should precede brainstorming and discussion. These elements analyze the current problem and select the focal points that will be crucial for the next work process.<sup>23</sup>

### 5 Application of the *Forum Theatre* technique in conditions of working with at-risk youth

In 2019, a research was conducted in collaboration with the Philippe Pinel Psychiatric Hospital in Pezinok at the Department of Drug Addiction and the Diagnostic Center for Youth in Záhorská Bystrica, where we targeted individuals with various social defects. At both workplaces, the productions of Forum Theatre were focused on the process of resocialization of substance dependent and delinquent youth. The research was conducted in parallel in three groups. Within six weeks, we met clients of both workplaces on eighteen occasions. In total, six incensation forms emerged revealing the problems of drug addiction and delinquency. The evaluation of results was based on input and output measurements. Both cases used a questionnaire aimed at identifying value orientations, attitudes to values and performance motivation (VO-AV-PM).

The work process with the first three groups at the Department of Drug Addiction took place between March and October 2019. Each group consisted of 6 patients (men) with different forms of drug addiction. We scheduled each meeting for the selected research groups. Within these meetings, the patients of the Department of Drug Addiction became acquainted with the theater technique of August Boal – the Forum Theatre. Before the research was carried out, however, it was essential to prepare the patients for the Forum Theatre technique experience. That is why during the first two meetings they initially became acquainted with musical and dramatic activities aimed at the development of personal and social competences. Through these activities, the clients also learned to perceive music while developing creativity, imagination and aesthetic feeling. In the last meeting, the patients were presented with a short story on the topic of drug addiction, in which the "protagonist" - the main character (the oppressed) seeks to fight the "antagonist" (the oppressor). The performance was performed by students of the Department of Music of Faculty of Education at Constantine the Philosopher University in Nitra, led by participating teachers and specialists in the field of psychiatry, psychology and sociology. The story of the Forum Theatre lasted between 10-15 minutes and was composed of five acts.

After the performance, with the joker's support, the patients analyzed the storyline, characters, relationships, and environment in which the story took place. Subsequently, they analyzed the individual acts, and in each of them the patients assigned a sticker to the characters based on their character and behavior (black – a negative figure, gray – neutral, green – positive). They also assigned a song to each act that best represented its atmosphere. They chose metal music for the first act, classical music for the second, hip-hop was assigned to the third, pop-punk songs for the fourth and in the last, fifth act, they

were able to select film music. During the second replay of the story, the patients interrupted the performance at certain moments and by calling "STOP" they entered the storyline suggesting a different solution to the situation, changing the development of events that resulted in a better conclusion.

We chose the same approach for clients from the Diagnostic Center for Youth in Záhorská Bystrica. Individual research groups consisted of six clients (men) aged 15 – 17. The reason for their placement in the diagnostic center was truancy, vagabondism, educational problems at school and at home, crime, theft, behavioral disorders and aggression. Similarly to the patients of the Department of Drug Addiction, the clients of the Diagnostic Center actively responded to all assigned activities. During the third meeting they got acquainted with the technique of Forum Theatre, which focused on delinquency issues. The performance also consisted of five acts and was attended by students of the Department of Music of Faculty of Education at Constantine the Philosopher University in Nitra, teachers and psychology specialists.

Thanks to the Forum Theatre, clients of both workplaces have verified their own opinions and ideas in practice and found out whether it is possible to achieve a positive result by their own reaction. The Forum Theatre gave them the opportunity to try their own actions in situations in which they had actually previously been in.

#### 5.1 The role of the music component in the Forum Theatre technique

Although the classical concept of Forum Theatre embodies the dramatic component, we have made a decision to apply music to it, which we consider a positive tool in the process of acclimatizing patients. By using music in the framework of musical-dramatic activities, we have managed to establish contact with patients, build trust, tried to reduce or even eliminate the initial shyness induced by participation in the new program and offer possibilities of self-realization and creation of their own voice.

The application of musical demonstrations in the implementation of dramatic activities has ignited greater interest in patients and encouraged their self-realization in performing individual activities. In the selection of musical compositions we aimed to draw from both classical music authors (Felix Mendelssohn-Bartholdy, Vítězslav Novák, Sergei Sergeyevich Prokofiev, Erik Satie, Camille Saint-Saëns, Antonio Vivaldi) and contemporary popular music artists (Eminem, Jason Derulo, Rag 'n' Bone Man, Ed Sheeran, Sum41 etc.). The first meeting discussion elaborated on musical taste and musical preferences. The fact is that adolescent patients were naturally inclined towards popular music genres such as hip-hop and rock.<sup>24</sup>

As the vast majority of the musical styles used in our project correlated with the musical tastes of the patients, they expressed a positive stance to a few demonstrations. Several groups even approached practicing and active musicians. As a result of approaching other music genres, patients had the opportunity to broaden their musical horizons and knowledge. In addition to having a therapeutic effect in the remedying process and becoming a means of communication and a tool of socialization in everyday life, music appears to be an appropriate link in the creative drama process and plays an essential role in specific groups, communities and resocializing environments.

### 6 Conclusion

Forum Theatre is a technique used worldwide and its roots date back to the 1960's. Apart from appearing as an important means of communication with the viewer, it also provides the

<sup>22</sup> HENDL, J. *Lidové divadlo Augusta Boala*, Karviná: OKS, 1986, p. 68, 69.

<sup>23</sup> SOCHA, J.: *Alternativa prevence sociálně patologických jevů na gymnáziích – divadlo fórum*. Brno: Masaryk University, 2007, p. 17.

<sup>24</sup> For closer look on the influence of hip-hop music and culture on the youth see ŠVIDERSKÁ, E. – ČIERNA, A.: *Street dance ako kultúrny a spoločenský fenomén*. In: Slovenská hudba: Revue pre hudobnú kultúru, Volume 45, no. 2. 2019. pp 132 – 153.

opportunity for self-realization. By allowing the viewer to enter into the situation and solve the problem, it forces the viewer to think critically and to a certain extent determines their values and attitudes.

As part of our research, we have also applied a musical component to the Forum Theatre technique that played a significant role in the final project. As we have found, it has become a means of completing storyline situations and enhancing the atmosphere. At the same time, it expanded the audience's diapason with several musical styles. The presence of music in the Forum Theatre technique allowed individuals to link the musical characteristics of the song or its content to a particular situation and storyline. As of now, we do not have any information of the Forum Theatre in Slovakia ever being used in conjunction with the music component and to such extent, especially when working with the at-risk youth.

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## ASSESSMENT OF CHANGES IN COUNTRY RISK CLUSTERING OF THE EU COUNTRIES

<sup>a</sup>JOZEF GLOVA, <sup>b</sup>WERNER BERNATÍK, <sup>c</sup>DARYA DANCAKOVÁ

<sup>a</sup>*Technical University of Košice, Faculty of Economics, Letná 9, 042 00 Košice, Slovak Republic*  
email: jozef.glova@tuke.sk

<sup>b</sup>*Silesian University in Opava, School of Business Administration, Univerzitní náměstí 3, 733 40 Karviná, Czech Republic*  
email: bernatik@opf.slu.cz

<sup>c</sup>*Technical University of Košice, Faculty of Economics, Letná 9, 042 00 Košice, Slovak Republic*  
email: darya.dancakova @tuke.sk

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**Abstract:** The paper describes country risk assessment from the investment perspective. We provide a detailed literature review of country risk, its definition and specific aspects. We also describe and test the significance of selected political and economic factors using panel data regression. We conclude the GDP per capita, inflation, unemployment, gross government debt, current account balance, international investment position and political control index of corruption and the rule of law are the main factors influencing country risk in our analysis. Using the clustering Ward method, we define groups of the similar EU countries from the perspective of risk and changes within them in the period of one decade. We also analyse whether these countries fulfil specific assumptions for investing.

**Keywords:** country risk, sovereign risk, political risk, economic risk, clustering, risk clusters.

### 1 Introduction

All business transactions involve some degree of risk. However, when trading transactions are carried out internationally, they pose additional risks that do not occur in domestic transactions. As mentioned by Meldrum (2000) these additional risks, called country risks, usually include risks arising from different economic structures, policies, socio-political institutions, geographies and currencies of individual countries.

Bouchet et al. (2003) extended that the concept of country risk originated in a period when decolonization occurred and newly created countries experimented with new political autonomy. More and more companies took up opportunities abroad and gradually increased their presence in foreign markets. According to Nath (2008) the increase in the flow of capital to developing countries has led to an increase in the risk exposure of creditors and investors. As discussed by Damodaran (2003), investors in developing countries expect to be rewarded with higher returns, but they are clearly exposed to the political and economic turmoil that often characterizes these markets or market landscape. Country risk analysis is therefore extremely important for international lenders and investors.

### 2 Literature review

The expansion of business across national borders requires the identification, assessment and analysis of the overall risk to which the economic subjects are exposed. Country risk analysis is the first step in the international portfolio building process. Asiri (2014) discusses that country risk is the result of political and economic factors, so it is very important to identify these factors. Hudakova and Dvorsky (2018), Dulova Spisakova et al. (2017) and Haviernikova and Kordos (2019) also discuss specific aspects of risk in general. Kosmidou et al. (2008) provide a detailed analysis of specific statistical approaches in use for country risk analysis, as well as variables affecting country risk.

In general country risk is largely influenced by political factors. But as discussed by Hoskisson et al. (2000), in a business context, country risk has a negative impact on the performance of a company due to unexpected changes in significant variables. They relate to any potential or actual change in the political

system, civil or external warfare. They are related to certain events, such as expropriation, devaluation, but also include any democratic development that may distort foreign trade. Such incidents have a wide range of negative impacts on businesses, ranging from loss of opportunity on the one hand to overall hedging of business assets on the other. At the empirical level, there is a long history of studies on individual risk factors (Leitner et al., 2015). Political risk measures the effects of political stability on attracting foreign companies, the level of democracy on losses in international businesses and the effects of bureaucracy on attracting international business activities. Authors, Leitner and Meissner (2016) perceive political risk as a result of government interference in business operations.

Miller (1992) argues that social insecurity may be a precursor to political insecurity. The risk of ruling policy covers any unexpected harmful measures for foreign companies taken by local authorities. These include expropriation respectively nationalization, breach of contract, foreign exchange controls, trade restrictions or trade agreements that might favour some foreign competitors over others. The literature suggests that country risk has a direct impact on costs, borrowing and borrowing, as it reflects the likelihood of non-payment of the country's claims.

Teixeira et al. (2008) discuss the country risk is a measure linked to the likelihood of a country's failure and is caused by events that may at least to some extent be under government control but are certainly not under the control of a private enterprise or individual. In quantitative terms, country risk is represented by the difference in return between risky and non-risky assets, which in turn depends on general liquidity conditions in international markets and the behaviour of international investors, the degree of risk aversion and the risks attributed to them by individual assets.

Cosset et al. (1992) defined the country's risk as the probability that a country would not be able to generate enough foreign exchange to pay its debt to foreign creditors. They stressed the need to define country risk in a broader context that more perfectly represents the multidimensional nature of country risk. According to Bouchet et al. (2003) country risk may be triggered by a number of country-specific factors or events. In fact, three types of events can cause country risk, namely political events, economic factors and social factors. Country risk is the revelation of the loss of cross-border credit as a result of events that are more or less under government control.

According to Teixeira et al. (2008) basically, country risk has two components: domestic and external. Domestic risk refers to specific country risk determinants that are related to economic bases, such as the fiscal and balance of payments situation, stocks of international reserves, real economic growth rates and inflation rates. External risk, on the other hand, encompasses all global factors, which in particular include the risk-free interest rate, the contagious effects of the financial crisis and the international risk aversion of investors.

Country risk refers to investing in a country where the risk is dependent on changes in macroeconomic and business environments. Also, increasing globalization has substantially increased investor exposure to events-related risks in different countries. This implies that international investment requires greater attention to risk analysis and risk hedging. The authors, Aboura and Chevallier (2015) have devoted themselves to this very issue. Their motivation was to propose an empirical methodology to create a cross-volatility index that would reflect the main sources of risk for the selected country. This approach, based on the DCC model, requires the inclusion of all sources of risk arising from the country's financial markets. The authors decided to apply the model to the US economy by creating an aggregate volatility index composed of implied volatility indices

that characterize the capital market, the foreign exchange market, the fixed income market and the commodity market.

The analysis consisted of incorporating each source of risk arising from the financial markets for the country and involved two steps. The first step was to analyse the main components that isolate the main components from a given series so that these components correspond to each other. In a second step, the authors considered a multidimensional DCC model to explore the main links between the individual components of the index. The model was applied to the US economy by creating a volatility index composed of an implied volatility index that characterizes the stock market, foreign exchange market, fixed income market and commodity market. It turned out that up to 75% of the aggregate value came from the commodity market, with an average cross-volatility index of around 22%. This new methodology is attractive to risk managers as it provides each investor with a unique volatility index to hedge against any country risk.

Castellanos et al. (2004) dealt with country risk and, in their paper, tried to determine whether countries with similar characteristics could be classified into homogeneous groups depending on variables considered to be most relevant in the perception of country risk. They also wanted to determine, by means of discriminatory analysis, whether the effects of variables relevant to discrimination between groups were the same or different. They used cluster analysis to integrate countries into homogeneous groups, involving 149 countries and the Euromoney-site's variables affecting country risk.

The outcome of the analysis clearly confirmed the existence of four groups to which homogeneous groups of countries within each group were linked, and also showed statistically significant differences between groups.

Based on the analysis, the most significant sets of variables used to differentiate the groups emerged were quite different. The first indicator, which distinguished the first group of countries from the others, was primarily access to bank loans and credit classifications. The first group came countries such as USA, Canada, Switzerland, Norway, or Slovenia. This group of countries was characterized by a low level of indebtedness, with very low but no political risk, high return on investment, and also had no problem in accessing financial markets. Egypt, Mexico, Argentina and for instance Thailand was the second group of countries with a homogeneous country risk. This group was characterized by an average value of economic performance and political risk. External debt indicators were a major problem for this group of countries because they had a relatively higher average value. Countries also had problems accessing international bank loans. In the third group were countries such as Romania, Venezuela, Zimbabwe or Vietnam. This group, based on rating agencies' ratings, had a lower rating compared to the countries in the previous groups. The level of late and unpaid interest was also high. In the fourth group came the other countries such as Iraq, Nicaragua, Cuba, or Albania. Countries belonging to the fourth group showed the worst level of economic indicators and political instability. The level of indebtedness of countries was also on the last place. The result points to the fact that external debt problems are a very bad sign when entering international financial markets for any country.

Political risk, as part of country risk, is commonly considered to be one of the main drivers of emerging stock markets. Earlier assumptions about the impact of political risk on returns on the stock markets were mainly unofficial, as it is difficult to quantify political risk. The authors, İlkizlerli and Ülkü (2010), in their scientific paper, analysed the impact of political risk on trading with foreign partners on the newly established and respected markets emerging stock market using quantified values of political risk using the VAR method. Another contribution of this document was to provide an analysis of the impact of political risk on the trade of foreigners in different sectors, as different sectors have different sensitivity to political risk.

Based on the analysis, they found that most of the changes in policy risks were valued within the current month, while the response to innovation was slower. The response of individual foreign investors to changes in political risk in the various industrial portfolios differs, in particular, from the sensitivity of industry to market factors. They perceive positively changes in policy risks in sectors such as that are sensitive to market factors. Foreign partners show uncompromising trading due to changes in political risk in the food and beverage sector. Given that returns in the food and beverage sector are positively related to political risk, the results of the analysis indicated that foreign investors are not following the crowd or pursuing a feedback strategy. The authors compared the reaction of domestic and foreign investors, finding that domestic investors are trading in the opposite direction with shocks in the area of political risks, in areas that are more sensitive to market risk. Simply said, domestic investors provide liquidity to foreign investors who trade on information. This suggests that there is a significant difference between foreign and domestic investors' response to political risk. The difference is noticeably important in the tourism sector, where foreigners respond strongly to political risk, while domestic investors are largely concerned with it.

Roggi et al. (2017) also dealt with country risk. The aim of their scientific paper was to propose new measures for effective exposure to companies operating in emerging markets. They proposed seven new approaches and a revised CAPM model for emerging markets. They tested historical exposure rates of companies in Latin American countries in emerging markets according to the Emerging Markets Latin America Index (MSCI) and the American multinationals listed in the Dow Jones Industrial Average.

The authors have developed seven new approaches to estimate the country's risk exposure: future, relative, industrial, retrospective, real lambda, companies with effective risk premiums and companies with real risk premiums. These seven methods are the implementation of a simplified approach to equity costs. They used twelve-month free cash flows, equity data for analysis, and were tested on 58 Latin American companies and 26 multinationals in the US. The results showed that, in 2013 and 2014, the additional return on investment by investors in emerging Latin American markets was on average higher than the country's risk premium from existing measures. On this basis, it has been shown that the use of new approaches to estimate an enterprise's exposure to country risk would, on average, lead to higher cost inequalities and lower company values. The results of the analysis conducted with US multinationals have shown that it would not be appropriate to add any risk to the valuation of multinationals listed in the US. As multinationals have production facilities in high-risk countries, investors perceive a higher risk and therefore require an additional mark-up, which must be taken into account when calculating equity costs. With the new measures, it was possible to obtain an estimate of the amount of premiums required by investors in the past, an estimate of the actual share required and of premiums related to future growth estimates. The big advantage of using the revised CAPM was that equity costs reflect the Company's effective exposure at country risk without over- or underestimation, as is the case with other existing approaches.

Interesting point of view from perspective of economic freedom brought Mura et al. (2017). They consider the level of the economic freedom in the country may have a significant influence on the economic security and the economic security of residents.

### 3 Methodology and data

The main aim of the paper is to find similar EU countries from the perspective of risk and changes within them. At the beginning, we specify and test the significance of individual political and economic factors on the country's risk using an econometric model. We analyse all EU countries, specifically Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark,

Estonia, Finland, France, Greece, Netherlands, Ireland, Lithuania, Latvia, Luxembourg, Hungary, Malta, Germany, Poland, Portugal, Austria, Romania, Slovakia, Slovenia, United Kingdom, Spain, Sweden and Italy. We use individual political and economic indicators for the period 2005 to 2017 with annual frequency, using datasets of the World Bank, the International Monetary Fund, OECD, WITS, Eurostat and The Global Economy. We use longitudinal or panel data for twenty-eight EU countries and seventeen annual periods. The appropriate approach applied for the data structure is panel regression. That enables us to determine and select significant political and economic variables we will use for further specification of similarities among EU countries. Using the clustering Ward method, we define groups of the similar EU countries from the perspective of risk and changes within them in the period of one decade.

The general model that we want to estimate takes the following form:

$$CR_{it} = \beta_0 + \beta_1 GDPpc_{it} + \beta_2 GDP_{it} + \beta_3 GNIpc_{it} + \beta_4 GFCF_{it} + \beta_5 CPI_{it} + \beta_6 UNEMPL_{it} + \beta_7 Debt_{it} + \beta_8 IntR_{it} + \beta_9 CuA_{it} + \beta_{10} IIP_{it} + \beta_{11} EX_{it} + \beta_{12} PSI_{it} + \beta_{13} GEI_{it} + \beta_{14} COC_{it} + \beta_{15} IFI_{it} + \beta_{16} WR_{it} + \beta_{17} RLI_{it} + \beta_{18} BFI_{it} + \mu_{it}$$

where *CR* stands for country risk expressed as a rating based on the ratings of the major rating agencies - Standard & Poor's, Fitch and Moody's. We have transformed the rating scale into numerical expression, assigning 20 to the best rating (highest quality) and 1 to the worst rating (very high probability of failure). There is a negative correlation between rating and country risk in the sense that when a country's risk decreases in the analysed country, it leads to a rating increase. This is important to avoid misinterpretations.

The explanatory variables in use are:

gross domestic product per capita expressed in dollars (*GDPpc*); growth of gross domestic product, year-on-year change in percentage (*GDP*); gross national income per capita expressed in dollars (*GNIpc*); gross capital formation, year-on-year change in percentage (*GFCF*); consumer price index on annual basis and expressed in percentage (*CPI*); unemployment rate as percentage of total workforce (*UNEMPL*); gross government debt expressed as percentage of GDP (*Debt*); international reserves (including gold) expressed in dollars (*IntR*); balance of payments current account expressed as percentage of GDP (*CuA*); international investment position expressed as percentage of GDP (*IIP*); *EX* export growth rate expressed on year-on-year basis in percentage (*EX*); political stability index (*PSI*); government efficiency index (*GEI*); corruption control index (*COC*); index of investment freedom (*IFI*); war risk index (*WR*); rule of law index (*RLI*); business freedom index (*BFI*); and random component.

The analysis will be based on an econometric model with the explanatory variables in the models being the same at the beginning, only the explained variable, the country's risk expressed by rating will be changed. In the first model (model M) Moody's rating as the country risk dependent variable is used. In the second (model SP) S&P is used and as the last initial model Fitch rating is used (model F)

Due to the presence of multicollinearity in the model, we had to reduce explanatory variables that were strongly correlated with each other. After editing the previous original model we get the following model:

$$CR_{it} = \beta_0 + \beta_1 GDPpc_{it} + \beta_2 GFCF_{it} + \beta_3 CPI_{it} + \beta_4 UNEMPL_{it} + \beta_5 Debt_{it} + \beta_6 CuA_{it} + \beta_7 IIP_{it} + \beta_8 EX_{it} + \beta_9 PSI_{it} + \beta_{10} COC_{it} + \beta_{11} IFI_{it} + \beta_{12} RLI_{it} + \mu_{it}$$

As we mentioned, we are working with cross-sectional data for EU countries, where we also see how they change over time. When using panel data, we can generally consider two types of models, namely the fixed effect model and the random effect model. We applied the Hausman test and decided which model suited our conditions.

The Hausman test results showed that the p-values in each considered model are less than the established significance level  $\alpha = 0.05$ , thus rejecting the null hypothesis and accepting an alternative hypothesis claiming that it is preferable to use the fixed effect model.

In all three variants of the model, all assumptions put on the panel data models, so we eliminated model deficiencies by applying the robust Allerano variation-variation matrix used in the fixed effect model. For the further evidence on Allerano matrix, see Croissant and Millo (2008).

Table 1 Significance of explanatory variables in model M

|                           | estim. $\beta$               | p-value              |
|---------------------------|------------------------------|----------------------|
| <b>GDPpc</b>              | <b>2.881e<sup>-05</sup></b>  | <b>0.039 *</b>       |
| <b>GFCF</b>               | <b>7.967e<sup>-03</sup></b>  | <b>0.144</b>         |
| <b>CPI</b>                | <b>-0.140</b>                | <b>0.020 *</b>       |
| <b>UNEMPL</b>             | <b>-0.102</b>                | <b>0.011 *</b>       |
| <b>DEBT</b>               | <b>-0.079</b>                | <b>&lt;0.001 ***</b> |
| <b>CuA</b>                | <b>0.041</b>                 | <b>0.078 .</b>       |
| <b>IIP</b>                | <b>0.013</b>                 | <b>0.010 **</b>      |
| <b>EX</b>                 | <b>-8.834e<sup>-03</sup></b> | <b>0.198</b>         |
| <b>PSI</b>                | <b>0.150</b>                 | <b>0.785</b>         |
| <b>COC</b>                | <b>-0.575</b>                | <b>0.043 *</b>       |
| <b>IFI</b>                | <b>0.011</b>                 | <b>0.322</b>         |
| <b>RLI</b>                | <b>4.347</b>                 | <b>&lt;0.001 ***</b> |
| <b>R<sup>2</sup></b>      | <b>0.782</b>                 |                      |
| <b>R<sup>2</sup> adj.</b> | <b>0.778</b>                 |                      |

Significance level: 0 '\*\*\*\*' 0,001 '\*\*\*' 0,01 '\*\*' 0,05 '\*' 0,1 '.' 1

Source: calculated in R program.

Among the three models as the most appropriate for assessing country risk follows the first model (model M) with the desired pointer credit rating by Moody's evaluation, by which we can explain about 78% of the total variability of the indicator. The other two models are able to explain the smaller percentage of the total variability of the indicator. They also show a smaller number of statistically significant variables compared to the first model. For this reason, only the first model (model M) is considered for the next analysis.

According to our investigation, the GDP per capita, inflation, unemployment, gross government debt, current account balance, international investment position and political control index of corruption and the rule of law are the main factors influencing country risk. The factors are these that will form the basis of the following part of the analysis. Our aim is to classify all the twenty and eight countries of the European Union into homogeneous groups with a certain degree of country risk, based on important political and economic factors. We also aim to compare the change over time, and we have chosen to use all of the variables mentioned for 2008 and 2017 for this purpose. Simply, we want to find out how the classification of the EU countries into individual risk groups has changed over the selected time period. We also want to map in which countries currently we have the best prerequisites to realize investment plans. To identify the position of the EU countries, we used the clustering, also called as cluster analysis.

In the paper we apply the hierarchical agglomerative method. In this method, the entities are in their own separate cluster. Two closest eventually the most similar clusters are then combined. This process is repeated until all subjects or objects are in one of the clusters. Finally, the optimal number of clusters is selected from all cluster solutions. From the hierarchical agglomerative method, we used Ward method. In this method, all possible cluster pairs are combined and the sum of the square distances in each cluster is calculated. Subsequently, the combination that gives the lowest sum of squares is selected. This method tends to produce clusters of approximately the same size. Ward method, as argue by Cornish (2007), is one of the most widely used and popular methods for using cluster analysis. We use dendrogram to visualize the results.

#### 4 Results and discussion

In this part of our paper we present results of our cluster analysis. The significant political and economic variables used by us as inputs are defined in different units of measurement, e.g. GDP per capita is expressed in dollars, while unemployment and others are defined as a year-on-year percentage change. Therefore, we first standardized these variables to eliminate their impact. If we did not standardize the variables, they would be reflected in our analysis with varying importance, and this would result in an overall distortion of the results. Subsequently, we used a hierarchical clustering method, namely the Ward method, to determine the number of clusters with respect to the country and country risk for 2008 and 2017. Using R programming, we created 5 clusters, or so called 5 homogeneous risk groups based on significant economic and political variables for 2008 as well as for 2017. Clusters are shown in the following output from the R program (Figure 1 and 2). In addition, in the description of the figure, there are individual clusters with the assigned EU countries. The dendrograms show that there were changes in individual homogenous risk groups between the monitored period, e.g. from the V4 countries in 2008 Hungary, Slovakia, Poland belonged to cluster number 3, while the Czech Republic to cluster number 4. However, in 2017, all V4 countries are in cluster 2. However, in order to draw conclusions from the analysis in the next section we take a closer look at the characteristics of each cluster.

After the integration of EU countries into individual homogeneous groups in terms of country risk (see Figure 1), we calculated the average, minimum and maximum values of significant economic and political indicators. Based on them we did a breakdown of the clusters and the corresponding average values of these clusters for 2008, when the financial crisis occurred. Using Ward method for clustering we specify five groups of countries in the specific clusters. Belonging of a country to the specific group is following Cluster 1 = Belgium, France, Malta, Germany, United Kingdom; Cluster 2 = Bulgaria, Estonia, Greece, Lithuania, Latvia, Romania; Cluster 3 = Croatia, Hungary, Poland, Portugal, Slovakia, Italy, Spain; Cluster 4 = Cyprus, Czech Republic, Ireland, Slovenia; Cluster 5 = Denmark, Finland, Netherlands, Luxembourg, Austria, Sweden

Cluster 1 has low level of landscape risk. For this cluster is a specific high level of GDP per capita (\$ 41630.84). This cluster is characterized by the second lowest level of inflation at 3.54%. This group of countries is characterized by a relatively high unemployment rate and the current account deficit is negative, but only to a small extent compared to clusters no. 2, 3, 4. Of all the clusters, this cluster shows a positive international investment position, ie foreign financial assets outweigh the liabilities and countries belonging to this cluster act as net lenders to foreign countries. In terms of the Corruption Perceptions Index, countries show a low level of corruption and a high level of rule of law. Cluster 2 has the highest level of country risk. Countries belonging to the cluster have the lowest GDP per capita, also the highest inflation, and the highest deficit of the current account. From the perspective of the political factors, they dispose with the highest level of corruption. In addition, the lowest level of development of the justice system is specific for this cluster. From the analysed countries, this cluster includes countries with the highest level of investor failure.

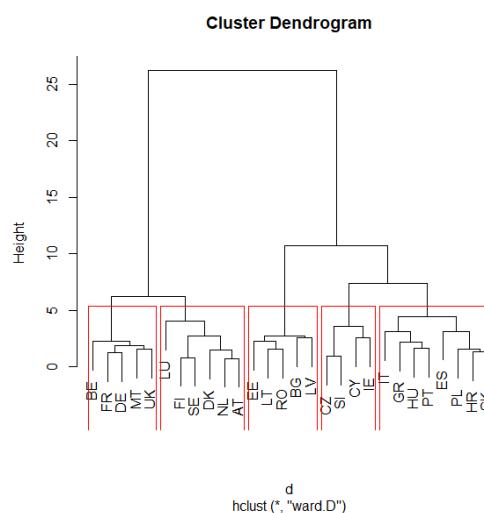


Figure 1 Cluster dendrogram for year 2008. Source: created in R program.

Cluster 3 might be evaluated as a cluster with a medium level of country risk. As countries testify to a high level of corruption, the rule of law index also points to the underdeveloped legal system of countries. Indicators of public debt and international investment position point to a high level of indebtedness of the country. There is also a current account deficit in countries belonging to this cluster. Countries belonging to cluster 4 show the country's medium level of risk. Economic as well as political indicators get moderate or better to say average values among analysed countries. Cluster 5 groups together countries with moderately low country risk. GDP per capita is at the highest level of all clusters, as well as low inflation and unemployment. As regards the indebtedness of countries, they show a very small percentage of indebtedness of total GDP, and have surplus of the balance of payments account. Corruption in the country is minimal and the legal system of countries is relatively high.

Subsequently, we specified EU countries into individual homogeneous groups with a certain degree of country risk for 2017: Cluster = Belgium, Finland, Austria, United Kingdom, Sweden; Cluster 2 = Bulgaria, Czech Republic, Estonia, Lithuania, Latvia, Hungary, Poland, Romania, Slovakia; Cluster 3 = Croatia, Cyprus, France, Ireland, Portugal, Slovenia, Spain, Italy; Cluster 4 = Denmark, Netherlands, Luxembourg, Malta, Germany; Cluster No.5 = Greece.

Cluster 1 has moderate country risk level. This cluster brings together countries that have the second highest GDP per capita. As for the inflation rate, as in other clusters, it is close to 2%. That is because the EU countries have to meet the ECB's inflation target. These countries are characterized by a current account surplus; countries in international trade act as net lenders and show low levels of corruption. Countries in the cluster 2 have medium level of country risk. This cluster contains countries with relatively stable values of economic and political variables. Cluster 3 disposes with the medium level of country risk. Countries belonging to this cluster have relatively low GDP per capita, inflation above 2%, and relatively high indebtedness. They act as net debtors in international trade. On the contrary, they show a current account surplus. Based on political indicators, these countries also have shortcomings, particularly in the area of corruption. Cluster 4 is the one with the lowest level of country risk. From the point of view of investment intentions, these countries fulfil all conditions. They have the highest GDP per capita, low inflation and unemployment rates. They have the highest balance of payments surplus and financial assets outweigh the liabilities. In terms of the political environment, they are also attractive to investors, mainly due to the high level of corruption control and the effective functioning of the rule of law. At the end cluster 5 has high level of landscape risk. This cluster is the opposite of cluster 4, namely

the highest unemployment of all clusters, the highest level of public debt. As the only cluster has a current account deficit, financial assets also highly outweigh the liabilities; it means that the countries are net debtors. The political background of the countries is unsatisfactory due to the high corruption and low level of development of the legal regime.

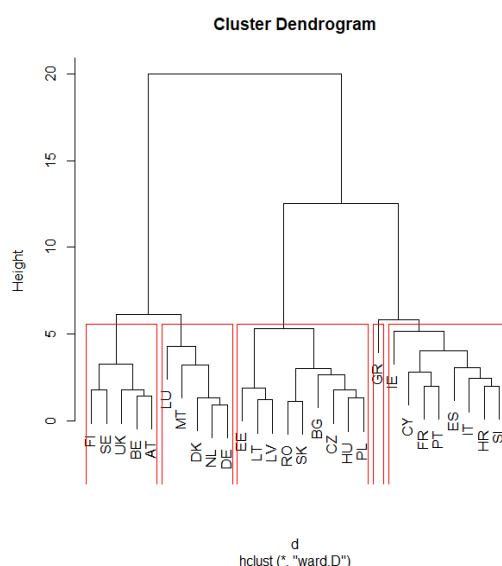


Figure 2 Cluster dendrogram for year 2017. Source: *created in R program*.

Based on the average values, we estimated the corresponding level of country risk in each cluster for 2008 and 2017. Subsequently, we also illustrated the clustering result using scatterplot, where the individual axes are made up of two main components. Component 1 of Figure 3 and 4, which describes economic factors such as per capita GDP, inflation, unemployment, gross public debt, current account balance and international investment position. The component 2 in Figure 3 and 4 corresponds to the political factors of the corruption control variables and the rule of law index. Scatterplot is divided into 4 quadrants, with clusters with the highest level of country risk in the lower left quadrant due to the economic and political instability of the countries. In 2008, this category included countries such as Romania, Bulgaria and the Baltic States.

However, based on our analysis, only Greece currently belongs to the country with the highest level of country risk. In the theoretical part, we mentioned that Greece, when joining the Eurozone, published misleading information regarding compliance with the Maastricht criteria, namely the size of the reported sovereign debt. At present, the country still has a high level of indebtedness, therefore, based on the analysis carried out, investors should consider carrying out their investment activity in that country.

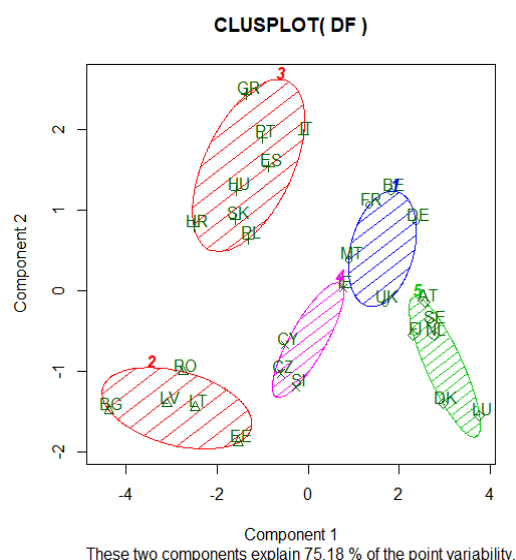


Figure 3 Scatterplot for the particular clusters - year 2008  
Description: Cluster 1 = low level of landscape risk; Cluster 2 = high level of landscape risk; Cluster 3 = medium level of country risk; Cluster 4 = the median level of country risk; Cluster 5 = moderate country risk level.  
Source: *created in R program*.

In the upper right quadrant of the scatterplot in Figure 3 are clusters inserted, there are countries that show the best rating in terms of country risk. In 2008, this cluster was represented by countries such as Germany, Belgium, France, Malta, the United Kingdom. Countries such as Germany, Malta and Netherlands, Luxembourg and Denmark have maintained this position. For investors, these countries are best placed to realize their investment plans.

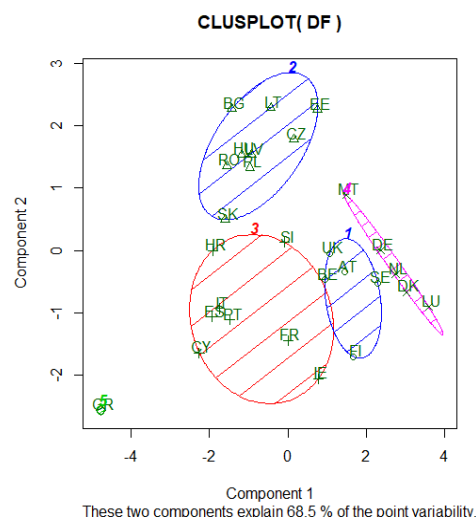


Figure 4 Scatterplot for the particular clusters - year 2017  
Description: Cluster 1 = moderate country risk level; Cluster 2 = the median level of country risk; Cluster 3 = medium level of country risk; Cluster 4 = low level of country risk; Cluster 5 = high level of country risk.  
Source: *created in R program*.

Based on our analysis regarding the V4 countries, Slovakia, Poland and Hungary in 2008 belonged to a cluster with a medium level of risk, while the Czech Republic belonged to a cluster with medium level of country risk. Currently, all V4 countries belong to a mid-range burst with countries such as Romania, Bulgaria and the Baltic States. It can be stated that relatively optimal conditions for investment intentions are created in these areas. Although the level of corruption in these

countries is higher, we have found, based on previous analysis, that there is a negative dependence between country risk and corruption. However, in addition to political and economic factors, it is necessary to examine the investment market in the country and to map the competitiveness of the business.

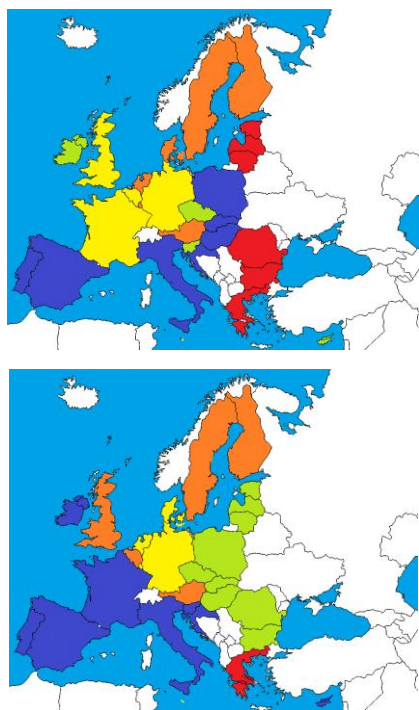


Figure 5 Geographical breakdown of countries by risk. Year 2008 (upper part) and 2017 (lower part). Source: *created in R program*.

In the second part of the analysis, our aim was to group all European Union countries (28) into homogeneous groups with some degree of country risk, using cluster analysis based on significant political and economic factors. We also wanted to compare the change over time, using all of these variables for 2008 and 2017 for these purposes. Figure 5 shows the individual investment areas with the appropriate level of country risk. Red indicates a high level, purple a medium high, green a medium high, orange a medium low, and yellow a low country risk. The first map shows the distribution of countries for 2008 (upper part of Figure 5) and the second map for 2017 (lower part of Figure 5). The maps show some differences between the reporting period. Based on our analysis during the Financial crisis in 2008, the most risky investment areas were reported by the Baltic States, Bulgaria and Greece. By contrast, countries such as Germany, the United Kingdom, Belgium and France were not affected by the major economic crisis, nor were investors affected by the adverse effects of the crisis.

At present, based on cluster analysis using economic and political factors affecting country risk, we have included EU countries in five investment areas with the appropriate level of country risk. We have identified which countries are best placed to realize investment plans. Based on the 2017 map (lower part in Figure 5), we can conclude that it is best for investors and creditors to place their capital or start their business in countries like Malta, Germany, Luxembourg, the Netherlands and Denmark. These countries showed the best economic and political conditions in all EU countries. If investors start their business in these countries, they can expect profitable and profitable investments. The Baltic States, the V4 countries, together with Bulgaria and Romania, represent a medium level of country risk. Thus, if investors decide to place their capital in these countries, they should carry out additional market and competitiveness research in the country so that they can make a rational decision whether or not to enter the market. Conversely,

the country of Greece, which is based on our analysis identified as the most risky area for carrying out investment plans, investors and creditors should be very cautious and not enter the country's market because of the high probability of default and unpredictable situation in the country.

## 5 Conclusion

We provide a detailed literature review of country risk, its definition and specific aspects. We also describe and test the significance of selected political and economic factors using panel data regression. We conclude the GDP per capita, inflation, unemployment, gross government debt, current account balance, international investment position and political control index of corruption and the rule of law are the main factors influencing country risk in our analysis.

Using the clustering Ward method, we define groups of the similar EU countries from the perspective of risk and changes within them in the period of one decade. Based on cluster analysis, we have included EU countries into five homogeneous groups with appropriate country risk levels for 2008 and 2017, using significant variables identified by regression analysis of panel data. Our goal was to identify change over time and identify which countries are optimal for carrying out risk-safe investment plans.

Based on our analysis, we conclude that the countries of Germany, Luxembourg, the Netherlands and Denmark have the safest environment for the allocation of capital. By contrast, Greece shows the worst economic and political indicators of all EU countries, so creditors and investors should consider entering that country because of the high probability of default and loss.

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## FINANCIAL FACTORS OF FORMING A FAVORABLE INVESTMENT CLIMATE IN THE REPUBLIC OF KAZAKHSTAN

<sup>a</sup>GULMIRA AKHMETOVA, <sup>b</sup>AINUR KANATOVA,  
<sup>c</sup>ALMAGUL OTESHOVA, <sup>d</sup>GULSHAT NURPEIIS, <sup>e</sup>MAIRA  
 DARISKALIYEVA, <sup>f</sup>LIUBOV EGOROVA

<sup>a-b,e,f</sup>*Kh. Dosmukhamedov Atyrau State University, 060011, 212  
 Studencheskiy Ave., Atyrau, Kazakhstan*

<sup>c</sup>*Kazakh-Russian International University, 030000, 52 Aiteke bi  
 Str., Aktobe, Kazakhstan*

<sup>d</sup>*Atyrau Institute of Engineering and Humanities, 5A Khudina  
 Str., Atyrau, Kazakhstan*  
 email: <sup>e</sup>esentmir@mail.ru

**Abstract:** An important place in investment processes is the identification of real factors that contribute to or hinder their implementation. The course of investment processes occurs under the influence of a combination of multidirectional and heterogeneous factors and conditions. Moreover, in addition to general approaches and factors determining the investment climate, there are also specific features of the territory, industry, and types of economic activity.

**Keywords:** Investment climate, investment potential, economic growth, financial factors, investment policy.

### 1 Introduction

Currently, the impact of individual factors of investment processes has changed, and unregulated external and internal transformation factors have appeared including the impact of globalization. This necessitates the government agencies' influence on rapidly changing factors of investment activity, and the formation of the country's investment potential.

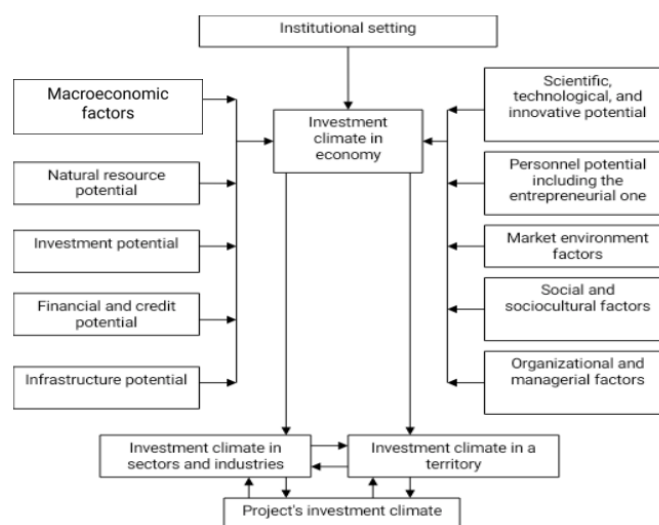


Figure 1. Factors which Impact on the Investment Climate

Source: V.A. Samarina. (1)

Given the economic situation, it is necessary to focus primarily on the mobilization model of increasing investment potential, not excluding more liberal financial and tax measures to

stimulate investment. The main directions of state policy in the field of managing the country's investment potential are presented in Figure 2.

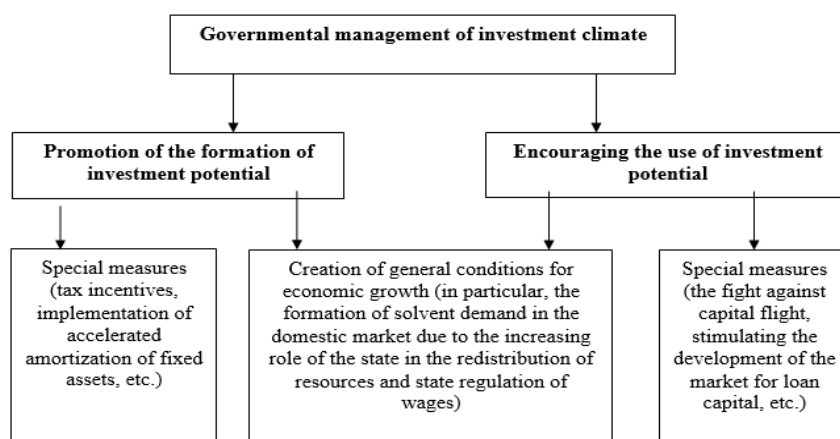


Figure 2. Principal Governmental Policies regarding Investment Potential Management of the Country

Source: V.A. Samarina. (1)

In the context of the modern economy of Kazakhstan, investments are the most important means of structural transformation of social and production potential. Since in the system of relations of expanded reproduction, investments fulfill the most important structure-forming function, the future structure of the economy depends on the fact in what sectors of the national economy funds are invested. Over a long period, the economy has developed rapidly, which contributed to the successful development of the investment climate of the Republic of Kazakhstan. A favorable investment climate in the country is a criterion for the maturity of market reforms, the confidence of the world community in the stability of property rights, and the situation in the country as a whole. (2)

Since 2005, the investment component of the state budget has been increasing, which is reflected as a change in the share of state budget expenditures on development programs. In the medium term, this trend will continue, and the share of the development budget will be in the range of 34.7 - 36% of total spending. (3-5)

The formation of the budget investment policy in 2020 will be carried out as part of the Medium-term plan and in accordance with the List of priority budgetary investment projects (programs) approved for the medium-term period. (6)

One of the instruments of state influence on the development of strategic sectors of the economy is the acquisition of financial assets, i.e. the acquisition of ownership interests and blocks of shares of juridical persons.

In the medium term, state policy in the field of state asset management will be aimed at regulating the development of strategically important sectors of the economy including by restoring and strengthening the system of control over the targeted and efficient use of state property and optimizing the structure of state property.

## 2 Materials and Methods

The acquisition of financial assets is one of the tools to establish proper state control over strategic sectors of the economy, aimed at ensuring the economic security of the country, as well as at their effective development. (7-8)

In 2007 - 2008, an increase in the authorized capital of state holdings and companies was aimed at forming their financial base for the further implementation of the tasks of modernization and diversification of the economy, increasing the number of science-intensive and innovative industries with high added value, and developing effective infrastructure. (9)

The increase in the authorized capital of KazAgro National Holding JSC is aimed at implementing a number of projects for

- The creation of feedlots with a developed export infrastructure;
- The construction of plants for the production of biodiesel and bioethanol;
- The construction of a wholesale marketplace for agricultural products in Astana, etc.

The increase in the authorized capital of Samgau National Scientific and Technological Holding JSC contributes to

- The increasing financing of projects related to priority, risky and proactive research and development with a comprehensive examination;
- The direction of additional funds for the formation and development of electronic services of government agencies within the framework of the State program for the formation of "electronic government".

The share of expenses on the acquisition of financial assets in the total expenditures of the national budget for development programs was 20.3% in 2008, 19.2% in 2009, and 18% in 2010. (10-11)

The following measures will contribute to improving the investment climate:

- The formation of a clearly defined state concept and, on its basis, the implementation mechanism. In order to stimulate the investment process, the state must protect foreign and domestic investors from risks;

- The creation of a modern industry infrastructure;
- Subsidizing interest rates on loans for industrial enterprises participating in the industry development program;
- The abolition of duties on the import of equipment and raw materials for enterprises of the real sector;
- The formation of a competitive business and technical infrastructure;
- The implementation of advanced technologies and effective innovative development of all industrial sub-sectors;
- The preferential treatment for banks investing in the development of manufacturing sector by providing for a system of state guarantees, investment insurance and the settlement of investment disputes.

A favorable investment climate can reduce uncertainty and risk; stimulate entrepreneurs to invest in the national economy, thereby contributing to the strengthening of economic potential. In order to ensure sustainable economic growth, an active

investment, industrial, structural, scientific, and technical policy is necessary.

In order to organize the investment and financial market, it is necessary to

- Develop domestic investment opportunities;
- Reduce the systemic and specific risk of investments;
- Increase the efficiency of the stock market;
- Modernize the risk management system for the implementation of investment policies;
- Increase government support for updating industrial infrastructure facilities;

- Develop national stock market institutions;
- Increase the efficiency of the economy as a whole, remove the property and structural imbalance in the development of regions and industries;
- Approve new procedures for the application of investment policy instruments, which reduce the analysis time of projects and increase the collegiality of their consideration.

The process of managing the formation of a favorable investment climate should be systematic and consistent (Figure 3).

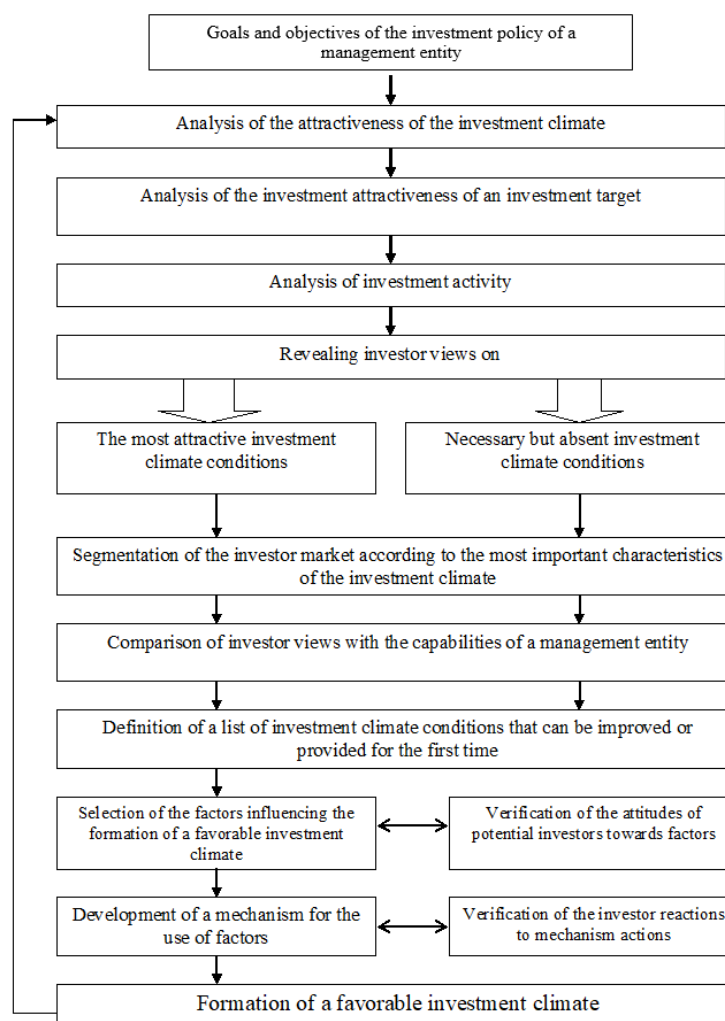


Figure 3. Stages of the Monitoring Process for a Favorable Investment Climate  
Source: V.A. Samarina. (1)

If we analyze the factors of economic growth, it is obvious that the critical ones are determined by the favorable conjuncture of the commodity market. Economic growth in Kazakhstan is mainly associated with the rapid development of the commodity sector. It was oil exports that provided the bulk of foreign exchange earnings and contributed to the development of the entire industrial potential of the country. The government has focused investment activities on this achievement. (12-13)

### 3 Results and Discussion

Therefore, today in the Republic of Kazakhstan there is a certain uneven distribution of investments in the territorial, regional and sectoral context. Despite the development, the modern features

of the oil-producing regions have an insufficient socio-economic orientation of territorial development, primarily in terms of how they affect the level and quality of life of the population. The high industrial potential is combined with low indicators of living standards and the underdeveloped social sector.

In order to solve these problems, the Government has set a course for the development of the manufacturing sector of the economy. A number of measures have been outlined in this direction to develop private business, create “growth poles” and support small businesses.

If earlier the main task for Kazakhstan was to stabilize the economy through the targeted attraction of investments in the oil

and gas and mining sectors of the economy, today the priorities of economic policy have changed.

Today, Kazakhstan is still in the initial stages of accumulating competitiveness potential when the latter is ensured by basic factors (natural resources and cheap labor). (14) But now the objective need for clusters arises at other higher levels (modern infrastructure, highly qualified and educated personnel, scientific potential, and innovations), so there is a need to find ways to strengthen these very factors. Recently, a search has begun in the country for possible "points" for the appearance of clusters. A silicon cluster and a cotton cluster in Southern Kazakhstan have been outlined; an information technology park is being created in Alatau town near Almaty.

In order to develop the transport and logistics cluster, a highway should be built across Kazakhstan to connect Western Europe with Western China. It is also necessary to continue the implementation of the program to create a medical cluster in Astana on the basis of the newly implemented world-class national scientific innovative medical centers.

Today, the city of Almaty has the most favorable investment climate, which, despite the loss of its capital status, remains the undisputed leader in this potential. The city has the most powerful labor, consumer, and infrastructure potential, and is the financial capital of Kazakhstan. However, the excellent financial indicators of Almaty is largely based on the fact that the central offices and representative offices of the largest companies are located here. Real financial resources are invested in the regions where production is located. It is necessary to develop the integration of regional financial markets around the financial center in Almaty, to create commodity markets in the region based on modern technologies of international trade. In addition, the two most industrially developed regions have the investment attractiveness. These are Karaganda and East Kazakhstan regions, which are resource-providing and the most industrially developed. However, despite the attractiveness of these areas, the main disadvantage is the state of the environment, which needs to be improved. The Kostanay region, which has similar investment potential, has a high resource and raw material potential. It produces 100% of Kazakhstan's bauxite and 83% of iron ore, a great potential for the development of mechanical engineering.

Today, the issue of creating and developing a network of socio-entrepreneurial corporations (SEC) is particularly pressing. This activity involves the implementation of investment and innovation projects in the agrarian, transport, logistics and other sectors, taking into account the already established Saryarka SEC. Now the Government transfers the necessary state property and assets to the SEC and resolves issues of corporate development with the participation of entrepreneurs. Now the large business is concentrated mainly in large cities (Astana and Almaty). Therefore, these cities are most prosperous because large companies pay taxes to the local budget, create jobs, attract many small companies as contractors, and their highly paid employees spend money in these cities and again create opportunities for small businesses. Now large business represented by the SEC needs to be created in the regions so that the standard of living and development in different cities is leveled. The government should prepare specific proposals for the placement of industrial enterprises and industrial zones in these centers, taking into account plans for the development of industry, trade and high technology.

There is a direct link between the growth of investment resources and trade competitiveness. As Kazakhstan opens to the global economy, restructuring, rationalization and modernization of the existing industrial base must be constantly carried out so that Kazakh enterprises can, on the one hand, import and, on the other hand, expand further into export markets. If Kazakhstan wants to increase its trade competitiveness, then new investments are needed in projects with an effective extent and technology.

Changes in investment volume indicators show a clear improvement in the macroeconomic situation, increased business activity and increased confidence in Kazakhstan on the part of foreign and domestic investors. (15) The establishment of the Kazyna Fund played a role in improving the situation with the implementation of breakthrough investment projects. Kazyna JSC establishes a single transparent procedure for considering investment and innovation projects and makes financial decisions with the participation of state bodies and business associations. With its help, it is necessary to form a flexible and effective system for managing financial flows, which will allow directing resources to the most promising types of activities.

There is a very wide range of problems but the most important of them should be resolved as soon as possible. An absolute priority is the final streamlining of current tax legislation. Foreign companies do not attach particular importance to tax benefits when making decisions on investments and choosing a place for investment projects, as investors do not need privileged conditions and lower tax rates than international ones, but a reasonable, transparent and predictable tax system.

One of the top priorities is to streamline the work of customs authorities, in which, as many investors believe, arbitrariness and corruption reign. A necessary solution is a modernization of automated control systems in customs bodies, which contributes to Kazakhstan reaching the level of the advanced countries of the world and slowing down the development of the shadow economy.

The second wave of the financial crisis significantly slowed down the global economy and, as a result, reduced global demand for goods and services. This required the adoption of new additional measures to stabilize and improve the domestic economy. In this regard, in November 2008, the Government, the National Bank, and the Agency of the Republic of Kazakhstan on regulation and supervision of the financial market and financial organizations adopted a plan of joint actions for the stabilization of the economy and financial system for 2009-2010 aimed at mitigating the negative effects of the global crisis on the socio-economic situation in Kazakhstan and providing the necessary basis for future quality economic growth. (11)

In October 2008, President of the Republic of Kazakhstan N. Nazarbayev signed a decree on the merger of the two largest funds, the Kazyna Sustainable Development Fund and the Samruk Kazakhstan State Asset Management Holding, into the Samruk-Kazyna National Welfare Fund. State-owned blocks of shares of Kazatomprom, ENRC, Kazakhmys, Kazakhstan Mortgage Company, Kazakhstan Mortgage Guarantee Fund, and Zhilstroybank will have to be transferred to the new holding. In order for the new holding to actively carry out work in the regions, 7 social and entrepreneurial corporations were transferred to it.

It is necessary to create conditions as soon as possible to stimulate the influx of investments for the development of promising areas of the economy of the Republic of Kazakhstan. The use of promising areas for the development of the investment climate in the Republic of Kazakhstan will help us solve current economic problems and will accelerate the creation of qualitatively new conditions for the development of a favorable investment climate in the country.

Recently, corporate raids have become an urgent problem. Corporate raids are a chain of operations in order to gain access to the management or disposal of an enterprise's property by initiating a business conflict, usually involving forces of public order. Corporate raids significantly reduce investment attractiveness and harm the country's economy, hinder the development of medium-sized businesses and blocks the development of competition. Recent economic events show that this problem is pressing.

It should be noted that the problem of corporate raids in Kazakhstan has been little studied and in-depth analytical studies

have not been conducted. For example, the existing legislative acts of the Republic of Kazakhstan did not define corporate raids. Therefore, in the criminal law sense, corporate raids in Kazakhstan are absent and cannot be qualified as an independent type of crime. Measures aimed at suppressing and preventing corporate raids should be comprehensive and address issues of responsibility, both of the private sector and the state.

Investment experts agree that the costs of protecting trade usually outweigh trade benefits in terms of investment growth. While trade protection plays the role of an incentive for domestic-oriented investors, fiscal incentives are mainly aimed at export-oriented investors. The effect of protection on investment in a country depends on the type of investment. The protection stimulates supplies to domestic markets but reduces incentives for exports. Therefore, it favors investment seeking the domestic market but prevents investment in preparing an export platform. However, the impact of protection on investment is only part of the picture. Protection costs can be divided into static (resource allocation) and dynamic (productivity, investment, and growth effects). In order to assess the impact of lowering trade barriers on the incentive to invest in projects focused on the domestic market compared with export-oriented projects, it will be useful to re-examine the structure of the incentive system in Kazakhstan.

A prerequisite for a favorable investment climate is the availability of skilled labor. Quality of work is an important attractive factor. For this indicator, Kazakhstan still has a relative advantage. The workforce is not only professional but also considered easy to learn. However, there are concerns about the quality of the workforce in Kazakhstan in the future; in connection with this, there is a need to develop a training system in the country in accordance with international standards for the quality of training of specialists.

#### 4 Conclusion

In order for Kazakhstani enterprises to be able to effectively operate both now and in the WTO membership regime, it is necessary to create equal conditions for domestic and foreign manufacturers, i.e. the conditions for the availability of financial and other types of resources and fair competition. (16-17) For this, first of all, it is necessary to carry out a number of targeted measures, which include

- Reduction of bureaucratic barriers, the fight against corruption and the creation of an equally favorable and competitive environment for enterprises and companies in order to stimulate innovation and entrepreneurship;
- Ensuring greater openness to foreign trade and investment in order to increase competition and increase the competitiveness of enterprises;
- Improving corporate governance of enterprises in order to improve their access to long-term loans and capital markets;
- Attracting private investment in infrastructure sectors in order to overcome problems in this sector and narrow the gap between regions in the quality levels of infrastructure services.

It is with the implementation of the above measures that it is necessary to begin at this stage the formation of a favorable investment climate in the Republic of Kazakhstan.

The investment climate determines the degree of attractiveness of a country for investment. The formation of a favorable investment climate is influenced by many factors, the main of which are political, economic and social. An important factor in improving the investment climate are legal mechanisms. The current legislation governing investment activities should create a solid legal basis for investment. It should be adequate to the level of economic reforms in the country. In addition, the legislative framework should contain mechanisms for protecting investors. World practice has developed various forms of legal cooperation between the host country and foreign investors.

Provisions and conventions on the avoidance of double taxation facilitate the creation of a favorable investment climate for the further attraction of foreign loans and borrowings. Therefore, Kazakhstan has signed relevant documents with France, Germany, Turkey, Switzerland, Canada, and other countries.

At the moment, huge efforts are being directed by the government of the country to create conditions that would consolidate the image of Kazakhstan as an attractive country for investment, with minimal risk for its promotion.

In the modern environment, for investors, for objective reasons, it is sometimes difficult to accumulate financial resources in the volumes necessary for the technical reconstruction of industry. The success of the planned reforms will largely depend on the creation of a mechanism of economic interest for investment participants. For their practical implementation, in our opinion, the following should be provided:

- A significant reduction in the tax burden on investors carrying out their activities in strategic projects, and the implementation of an accelerated amortization and revaluation of fixed assets for them;

- Expanding the practice of state guarantee and investment insurance (based on the state's available and additionally liquid assets involved in the economy). This would help to attract domestic and foreign financial and credit institutions to the real sector of the economy;
- The implementation, together with private capital, of investment programs for restructuring depressed sectors of the economy and the creation of favorable conditions for attracting domestic and foreign capital into these sectors;
- Pursuing a reasonable protectionist policy in articulation with the stages and programs of investment development of industries (mainly process manufacturing);
- The creation of an effective regulatory framework, organizational, and economic conditions for the activation of investment processes);
- The implementation of continuous monitoring of the factors of changes in investment conditions and their prompt adjustment by state regulation.

A clear action program is needed to attract foreign investment, and on the basis of this program it is necessary to create leverage to attract and stimulate external investment. This opinion is shared by many economists. It should not be missed that when creating a favorable investment climate, one should take into account not only internal but also external factors that can influence it, the general condition of the world capital market, and the fact that foreign investors expanding the scope of their activities prefer to deal with countries with stable political situation and similar socio-economic conditions.

Kazakhstan seeks to create a favorable social, financial, economic, and legal regime for the activities of foreign investors and an investment climate appropriate to their interests, at the same time solve its problems and achieve its goals.

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## DETERMINING THE PRICE OF THE BUSINESS SHARE OF A BUSINESS IN A GROUP

<sup>a</sup>SIMONA HAŠKOVÁ, <sup>b</sup>PETR ŠULEŘ, <sup>c</sup>VERONIKA MACHOVÁ, <sup>d</sup>TOMÁŠ KRULICKÝ

*Institute of Technology and Business, School of Expertness and Valuation, Okružní 517/10, 37001 České Budějovice, Czech Republic*

*email: <sup>a</sup>haskova@mail.vstecb.cz, <sup>b</sup>petr.suler@cez.cz,*

*<sup>c</sup>machova@mail.vstecb.cz, <sup>d</sup>krulicky@mail.vstecb.cz*

**Abstract:** The aim of this contribution is to focus on the issue of business enterprise valuation. This is the most demanding discipline within valuation, and the value of the business in question, which is determined by the valuation, may not always be the only correct and objective one. It is appropriate to use at least 2 valuation methods when valuating a business. These methods are divided into 3 main groups: Earnings methods, Market value methods and Assets methods. These three main groups are subdivided into several subgroups. For the creation of a financial plan, it is appropriate to process the financial and situational analysis of the business, preceding the valuation itself. The aim of the contribution is to describe individual methods, which are supported by specific examples and results. These include, for example, the methods: "Financial Analysis" = it is necessary to carry out a financial analysis first and determine the financial condition of the business. Financial analysis is one of the basic prerequisites for valuating a business. The objective of the financial analysis is to examine the financial health of the business or to better diagnose the financial side of the business and to establish the basis for the financial plan from which the yield value is derived. Another method is "Business Valuation" = the method expresses the instant value of a business as of the valuation date and is based on the principle of simplicity and comprehensibility. The method recognizes the business' market value and past liabilities prior to the valuation date. The last method is then the "Discounted Cash Flow Method" which is the primary earnings method for valuating a business. The following are the results of the examples using these methods. Further examples of these methods are given in these results. The results are supported by graphs and tables composed from own sources. Finally, the strengths and weaknesses of the company are summarized. The aim of this contribution was fulfilled.

**Keywords:** valuation, business, value, earnings, market, assets, methods, judgment, analysis, indicators.

### 1 Introduction

Expert practice often brings very interesting situations. Of course, the law and legal standards and standard procedures are trying to offer a methodology for determining the value of a business that can be used in most of the cases that an expert encounters in his practice. However, in isolated cases there will be situations where it is necessary to take into account the unique situation of the business, the stakeholder or even the evaluator. In this case, standardized methodologies would lead to a result that would distort reality. A typical case is a situation where we evaluate businesses in a group. Very often, one business helps another to some extent achieve its goals. Ideally, both businesses then benefit from a synergy effect. Such a synergy is, for example, achieved when it comes to businesses that are part of a single supply chain, and when they share a link between each other. However the synergy effect is also achieved through other legal relationships. It can be so that businesses in a group rent real estate to each other, or they can arrange for other services. The aim of this paper is to evaluate its suitability in practice and to reveal its weaknesses and strengths (Honkova 2012).

The issue of business valuation is the most demanding discipline within the valuation, and the value of the business that is determined by the valuation may not always be the only correct and objective one. The resulting value of a business is always influenced by the accuracy of the choice of the valuation method, where this choice depends on the purpose of the valuation, the status and nature of the business, and the availability of information to the expert. Mařík (2011) states that it is appropriate to use at least two valuation methods to assess a business. Vochozka (2012) states that value is a certain belief in future benefits. The equity-flow method is used to measure transactions for which the debt amortizes according to a fixed time schedule, which requires a formula that combines the leverage effect with the time-varying stock discount rate (Cooper, 2013). We investigate the market valuation of annual changes in the APIC, which is a bookkeeping account that captures the persistent differences between tax differences in stock remuneration (Brushwood, 2014). Methods and

approaches to valuating businesses today are many. The choice of a particular method always depends on the objective of valuation, data availability, etc. Mařík (2011) divides the valuation method into three categories:

#### Earnings methods

- Discounted cash flow method.
- Capitalized net earnings method.
- Combined earnings methods.
- Method of economic value added.

#### Market value methods

- Valuation on the basis of market capitalization.
- Valuation based on comparable businesses.
- Valuation based on data of businesses listed on the stock exchange.
- Valuation based on comparable transactions.
- Valuation based on sectoral multipliers.

#### Assets methods

- Book value of equity on the basis of historical prices.
- Substance value on the principle of reproduction prices.
- Substance value on the principle of cost savings.
- Liquidity value.
- Assets valuation on the principle of market values.

For the creation of a financial plan, it is appropriate to process the financial and situational analysis of the business, preceding the valuation itself. The basic financial analysis of the valuated business was made as part of the valuation as well as the financial plan. Due to the low risk of the subject business, where business risk is largely eliminated by long-term lease agreements, a strategic financial analysis will not be prepared.

The aim of this paper is to determine the value of a 100% business share in a specific business and then to evaluate how the procedure had to be distinguished from conventional methodologies.

### 2 Data and methods

#### 2.1 Data

The basic data was drawn from the file of the District Court for Prague – West and already processed expert opinions. This business is named NC XXX, s.r.o.<sup>1</sup> The specific task was to determine the value of a 100% stake in NC XXX, s.r.o., as of October 27, 2012, but at today's prices.

#### *Description of the valuated business*

The business was registered in the Business Registry (hereinafter "BR") on 9 August 2004. The evaluators have no data available until 31 October 2007. The business' registered capital amounted to CZK 1 million.

NC XXX, s.r.o. (hereinafter also referred to as "valuated business") was, as of the valuation date, owned by Mr. MJ with a share of 20% and by KM, a.s. with a share of 80%, and the ownership structure of the valuated business is not the subject of review. On 13 November 2007, NC XXX, s.r.o. purchased an older house in Prague in the cadastral area of Nusle for the price of CZK 10,561,780 from KM, a.s.<sup>2</sup> The sale contract was signed by Mr. MJ on behalf of both parties as Chairman of the Board of Directors of KM, a.s. on the one hand (the seller) and as the managing director of NC XXX, s.r.o. on the other hand (the

<sup>1</sup> For the purpose of this contribution, the name of the business was changed, as well as the names of individuals and other legal entities associated with the valuated business. Any similarity with other people and companies is purely accidental.

<sup>2</sup> Hereinafter referred to as building, premise or house No. 55/15.

buyer). Later, on 10 January 2008, the valuated business signed with KM, a.s. a contract for construction work and building modifications of a previously purchased house with the amount of CZK 69,691,825 and the completion and delivery of the finished reconstruction by December 20, 2009 at the latest (even in the case of this contract, Mr. MJ signs on behalf of both sides). Subsequently, on 21 December 2009, a lease contract was signed for a part of the reconstructed building No. 55/15 between NC XXX, s.r.o. and KM, a.s. with an agreed lease of fifteen years from 1 January 2010 to 31 December 2025. Subsequently, during the period between 2010-2011, NC XXX, s.r.o. also rented other parts of non-residential premises of house No. 55/15 to KM technology, s.r.o., KM energy, s.r.o. and SB, s.r.o. According to the signed lease contracts, the lessor was the recipient of rent and advances on energy and services. The amount of rent from all concluded and valuated rental contracts amounted to CZK 9.03 million per calendar year. In accordance with the lease, the landlord owned 5% of the cost of services and energy as a commission for the mediation of these supplies.

Subsequently, on February 27, 2012, a new lease contract (hereinafter referred to as the "lease agreement") was signed, which most likely aggregated most of the previously signed lease agreements. All non-residential premises in the reconstructed house No. 55/15, including 20 parking spaces, were leased under one rental contract of KM, a.s. The lease was signed for a fixed term from 1 March 2012 for a period of 23 years, until 28 February 2034. The lease agreement divided the lease period into two sub-stages. The first stage of the lease agreement was to be between March 1, 2012 and December 31, 2029, with a rent of CZK 6.3 million (the rent included a component for non-residential premises and a parking space). The second stage of the lease agreement was between January 1, 2030 and February 28, 2034, with a rent of CZK 3 million (the rent again included a component for non-residential premises and a parking space). The lease agreement was, according to available information, valid at the time of valuation, and the rent resulting from it was the most significant part of income for NC XXX, s.r.o. The models used to calculate post-valuation adjustments for crisis aftermath, market risk, and capital measures for derivatives are subject to risk of liquidity due to a significant lack of available information to obtain model market parameters (Sourabh, 2013).

#### *Description of the economic activity of the valuated business*

The most significant asset of the valuated business was the house No. 55/15, which was an instrument of rental income as of the date of valuation. The property was leased on a long-term basis as of the valuation date and the company had a stable and long-term income from renting the property. A certain pitfall in the lease agreement of 27 February 2012 may be the fact that it does not contain any mechanism to increase the agreed-upon rent, thus, assuming a generally expected increase in inflation affecting the growth of market value of rent from leased office space, the actual value of the rent would fall in the future, although the nominal value would be maintained. Another weak aspect of the lease agreement is the fact that by the end of the lease term – in 2030, the rent will fall by more than 50%. Other performance of the valuated business was related to the lease of property, e.g. as collateral and mediation of related services, but the available contracts failed to ascertain the expected development and range of services in the future, where the extent of these performances is partly observable from economic data and from the announcement of the managing director of the successor company RD, s.r.o.

For the sake of completeness, it should be noted that related to house No. 55/15, the business was the contractor in relation to a contract of work dated 26 April 2010, in which the client was KM, a.s. The valuated business committed to providing a complex service for the operation of a set of technical equipment of the building (TZB), cleaning services, landscaping and plant watering services in the interior of house No. 55/15. Given that there is no contract of work available and the price data from the contract are not known, the evaluator works further with the

assumption that the costs of providing the services are the same as revenue resulting from the performance of the contract and therefore, overall, the contract has no impact on the value of the business. The evaluator will work only with proven expected earnings in future years – rent, in the business valuation.

#### *Property description*

The building No. 55/15 underwent extensive construction in 2009, during which the historic building was reconstructed and a new smaller building was built inside the courtyard. The buildings are used for administrative purposes.

#### *Data sources*

For the purposes of the valuation report, the data used will mainly be from the balance sheet and profit and loss statements for the years 2009-2013, the lease agreements concluded between NC XXX s.r.o. and KM, a.s. from 27 February 2012, the work contract S 406/10 from 30 April 2010 and the already prepared expert opinion report (the report was prepared by ABC Consulting, s.r.o. on 19 November 2012).

Other data used in this contribution are obtained from publicly available sources (Internet) such as the server justice.cz, business and self-employment register, collection of documents, VAT payers register, etc.

## **2.2 Methods**

#### *Financial analysis*

Before the business can be valuated, it is first necessary to conduct a financial analysis of it and determine the financial condition of the business. Financial analysis is one of the basic prerequisites for valuating a business. The aim of the financial analysis is to check the financial health of the company or to better diagnose the financial side of the company and to establish the basis for the financial plan from which the yield value is derived (Mařík, 2011). The absolute indicators of the financial statements will be assessed, as well as the ratio indicators, focusing on the profitability and liquidity of the company. Financial analysis, such as valuation, solvency and capital adequacy, play a key role in bankruptcy (Simkovic, 2010).

#### *Business valuation*

The assets method expresses the business' immediate value as of the date of valuation and is based on the principle of simplicity and comprehensibility. The method recognizes the business' market value and revises its past liabilities prior to the valuation date.

As of the valuation date, the business performed economic activity (rental based on a long-term lease agreement, see above), therefore, the evaluator accepts the assumption of the future operation of the business in an unaltered state, i.e. continue to lease the property. If the economic potential of the business is high enough then the value determined by the earnings methods is usually higher than the assets value.

It is considered to be a market valuation of the value of the business share of an economically active entity, with the assumption of continuing the current activity in the future. Valuation based on an assets analysis suppresses the actual earnings potential of a business as a set of all tangible and intangible assets and merely notes the difference between the book value of the liabilities and the market value of the assets. We can see that there is a conflict between two concepts and values such as accounting and market value.

It was more appropriate to use earnings or market valuation methods for high earnings potential and the assumption of the continuation of economic activity. Market value methods, in particular methods based on comparison of comparable

businesses and transactions are not possible in this case due to the lack of available information and data.

It follows from the above that the most appropriate is the use of earnings valuation methods, however an asset method was also used, which expresses the value of the business as of the valuation date, but without taking into account the future earnings potential of the company.

In this respect, it is appropriate to recall the difference between the market value and the book value. The market value of a business is the estimated amount that measures the total value of the business from the perspective of the market - from the point of view of potential investors or buyers. The market value is defined as the estimated amount for which the property could be exchanged as of the valuation date between a willing buyer and a willing seller in an independent transaction in which both parties enter the market knowledgeable, consciously, deliberately and voluntarily. It is determined based on the value of all its assets. It depends on the results of its business activity and on the development of these results. Growth in the market value of a business is one of the fundamental objectives of financial management. Today, the general goal of a business is to maximize its market value.

Book value is the value of the assets reported in the financial statements, so it can be easily determined from the balance sheet of the business. This value is often used as a scale of valuation. The book value of a business is the value of its assets minus its liabilities valued at historical prices and often deviates significantly from their current price. The book value of a business is only a guide to determining market value. Therefore, the book value of a business differs from the market (actual) value in practice.

#### *Discounted cash flow method*

The method of discounted cash flow is the basic earnings method for valuating a business (Mařík, 2011). Cash flows are a real income and therefore a real expression of the benefit of the business in question. The principle of the method consists of discounting the future cash flow time series. Theory distinguishes three basic DCF calculation techniques:

- „entity“ method; (entity = business as a whole),
- „equity“ method; (equity),
- „APV“ method; (adjusted present value).

The basic entity method expresses the free cash flows of the business as a whole that can be withdrawn from the business without jeopardizing its further operation. The result obtained with the DCF entity method can be interpreted as the amount of money that can be withdrawn from the business in question, provided it continues indefinitely, when the business' own and foreign resources (or liabilities) are not distinguished. Thus, the entity method excludes interest expense for interest-bearing capital from the expenses of the financial plan, expressing free cash flows to firm (FCFF) and therefore the valuation as well. Interest expense is not regarded as the standard costs associated with the operation of a business but as the remuneration of creditors for the provision of funds. The wide expert community, dealing with the problem of business debt, settles it by deducting the value of the liabilities (without interest) from the withdrawable monetary funds of the business. Given the considerable debt of the business in question, not including the interest paid in the calculation, in order to value the business share, we consider this method not very suitable for valuation.

The equity method, on the other hand, analytically distinguishes the sources of business financing and devotes itself to cash flows to equity (FCFE) rather than to creditors. The free cash flows to firm (FCFF) is first to be reduced by paid interest, subtracted by the so-called tax shield. It captures the tax savings stemming from a reduction in the tax base on interest expense, which in fact reduces the amount of monetary expenditure. The second

step is to include repayments or, on the contrary, increase loans, which also has an effect on cash-flow.

In comparison, the entity method is very widespread and popular among the expert community and Czech literature is devoted to it more thoroughly. On the other hand, the equity method is little widespread among the experts, and unexplored in Czech literature.

Finally, the APV method is done in two steps, just like the entity method only with a zero debt assumption, and the value of the tax savings on interest (application of the tax shield); in the second step, the foreign capital is subtracted.

In order to determine the value of the business share, the earnings method of valuation, discounted cash flow will be used in the equity variant with the subsequent distinction of future business development into two periods. For each year of the first period, it is necessary to set a financial plan, and then to quantify the free cash flows to equity FCFE, in the second period the free cash flows are determined by a perpetuity model. The relevant literature recommends setting the length of the first period between 3-8 years for which it is relevant to prepare a financial plan. Due to the long-term lease agreement, the financial plan can be created with relative precision for the entire contract period, ie 2012-2034, and then, from 2035, to choose a perpetuity model of calculation.

Below is the calculation formula to measure the business share of the valued business:

$$H = \sum_{t=1}^T \frac{FCFE_t}{(1 + n_{VK(z)i})^t} + \frac{FCFE_{T+1}}{n_{VK(z)T+i} - g} \cdot \frac{1}{(1 + n_{VK(z)i})^T} \quad (1)$$

Where:

|                       |  |
|-----------------------|--|
| H –                   | Business value.                                |
| FCFE <sub>t</sub> –   | Free cash flow to equity in the year t.        |
| N <sub>VK(z)i</sub> – | Cost of equity for a specific debt in the year |
| T –                   | Number of years in the first period.           |
| g –                   | Growth rate in the second period.              |

### **3 Results**

#### *Financial analysis*

The evaluator had accounting statements (Balance Sheet and Profit and Loss Statements of the Valuated business) available for the period of 2009-2013, for reasons of matching the timing of the valuation date, as a baseline for the valuation, the data from the financial statements were always drawn as of the last day of the accounting period (business accounting period = 1 calendar year) and from financial statements compiled as of 15 October 2012. Statements prepared as of 15 October 2012 were probably prepared for the purpose of processing the valuation by ABC Consulting, s.r.o., which valued a business share of 20% as of October 15, 2012. Because of the unavailability of the financial statements as of the date of valuation, i.e. on October 27, 2012, the data had to be taken over from the last known period, which was the above-mentioned date. The evaluator agreed that, within 12 calendar days, events could not have occurred in the valued business that would have a significant impact on the value of the business. This opinion is confirmed by the known structure of the results of the valued business as of 31 December 2012, which does not show any significant and unjustifiable changes compared to the previous year (but the results do not enter the calculation). Additionally, the earnings valuation used in the present opinion is based on the prediction of the business' development and its earnings in the long-term future.

### Analysis of financial statements

#### Balance sheet

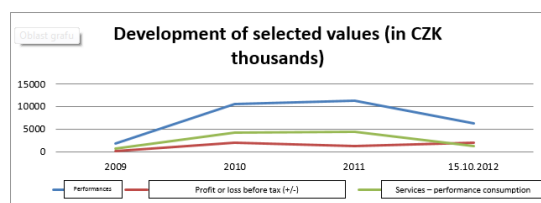
From the accounting statements available to the evaluator, it is clear that the largest part of the business assets are fixed tangible assets. This is to a certain extent determined by the business purpose itself, where the company owns the house No. 55/15 and rented the premises in this house. Thus, the book value of the building and the land constitutes more than 95% of all business assets. Another significant asset item is receivables. The reason for the decreasing value of assets over the reference period can be seen as a result of the depreciation of the building.

Analyzing the liabilities side of the balance sheet, it can be ascertained that the valuated business uses mainly foreign sources to finance its activity (98% in 2009 to 87% in 2012). The largest foreign source of financing appears to be a bank loan, apparently drawn for the purpose of reconstructing the house in the amount of CZK 38 million in 2012 with a decreasing trend, a gradual amortization of the liability. Another significant liability was CZK 16.8 million, recorded under the line "Other liabilities". The third significant liability is Payables to stakeholders, board members and associates in the amount of more than CZK 10 million in 2012.

#### Profit and Loss statement

The development of selected values over time is shown in figure 1.

Figure 1: Development of selected business data



Source: Authors.

From the graph shown above, it is possible to first observe a dramatic increase in outputs likely to be related to the start of the rental of a property, and consequently their decline apparently related to the modification of the lease agreement and the decline in rents from the rented premises. It is possible to further observe the decrease in the performance consumption - probably related to the adjustment of the costs of renting and using the house. In the original lease agreement, the lessor provided energy and services to the tenant, the cost of these energies and services was subsequently charged to the tenant with a certain margin, but the new lease agreement stated that the services and energy were provided directly by the tenant. This inconsistency can be partly explained by other activities that have been implemented in the past by the valuated business. The drop in performance consumption - services, is countered by the positive result of the profit or loss before tax, which is almost inversely proportional with the decreasing consumption. It can be seen from the chart that during the monitored period, the business achieved positive economic results and therefore, in the long run, in regard of the signed lease agreement, has the assumption of continuing in this trend.

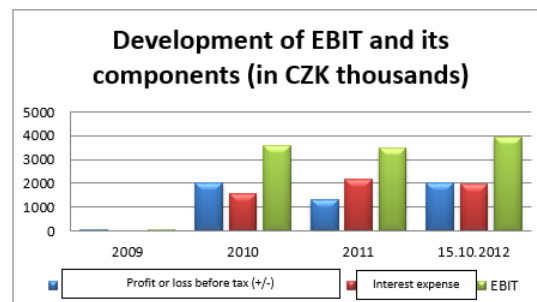
### Analysis of ratio indicators

#### Quantification of selected indicators

One of the most important indicators of business analysis is EBIT (Earnings Before Interest and Taxes). This is profit before tax and interest expense, which allows a long-term comparison of the business development as such, irrespective of the tax rate and the interest rate. Estimates of EBIT can be made by summing the valuated business' profit and loss account as the sum of the profit before tax and N - interest expense. Taking into account the amount of foreign sources of financing, it is assumed that the interest expense has a significant effect on the profit and

therefore EBIT is a better starting point. Figure 2 shows the evolution of EBIT and its components over the reporting period.

Figure 2: Development of EBIT of the subject business



Source: Authors.

The figure above shows the assumed decline in profit before tax and growth of EBIT.

#### Profitability indicators

Profitability indicators are often referred to as revenue indicators. Authors Váchal and Vochozka (2013) report ROA (Return on Assets) as the most widespread indicator in this area, which can be obtained as a ratio of EBIT and assets. Using asset profits, we are able to assess the effectiveness of using assets to generate earnings before tax and interest (EBIT). When applying a balance sheet rule that states assets are equal to liabilities, you can look at ROA from a finance source point of view. And that is to determine the rate of appreciation of all the resources of the enterprise.

The ROA final value should be higher than the interest rate on long-term foreign capital (loans and debts) and can be calculated from the following formula:

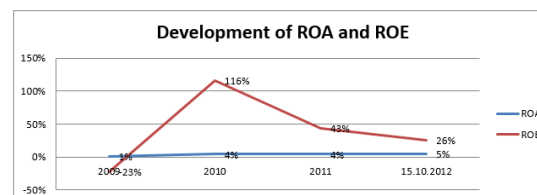
$$\text{Return on Assets (ROA)} = \frac{\text{EBIT}}{\text{assets}} \quad (2)$$

Another significant indicator is Return of Equity (ROE). Using ROE, we can determine how many percent of net profit a single unit of equity has earned. The ROE should be higher than the interest rate of risk-free securities – guaranteed by the state. A low ROE rate could motivate the owners of the business to withdraw their capital from the business and invest it in other more profitable activities. The usual ROE is different for each industry and each market. However, ROE should be higher than ROA.

$$\text{Return on Equity (ROE)} = \frac{\text{Profit after tax}}{\text{Equity}} \quad (3)$$

Figure 3 shows ROA and ROE developments between 2009-2013.

Figure 3: development of ROA and ROE



Source: Authors.

The figure shows that ROA was higher than ROE in 2009. The authors believe that the cause of this phenomenon was the cumulative loss of the business until 2009 from the past few years, when the business did not actually develop many

activities, and reconstructed the house, which was later leased and became the main asset of the business. It can be said that the assets of the business generated a profit at a tempo of 4%-6% in the monitored period, generally this value is considered lower. If we adhere to the balance sheet rule and equality of assets and liabilities, then we obtain a measure of appreciation of all resources. According to available data, this appreciation is higher than the interest rates of foreign capital.

Return on Equity (ROE) means the efficiency of using equity. It is possible to observe initially a period of considerable fluctuations, which is again attributed to the commencement of the economic activity (rental) of the valuated business in 2010. The apparent decrease in ROE in time is attributed to accumulation of undistributed profits of previous years, and thus the increase of equity.

#### Liquidity indicators

According to Vochozka (2011), liquidity is important from the point of view of the long-term functioning of the business, but in direct conflict with profitability. Liquidity of a business is related to funds in current assets, inventories, receivables and bank accounts. Liquidity can divide current assets into three levels that predict the liquidity level: current financial assets, short-term receivables and inventory.

Basic liquidity indicators include the current ratio, quick ratio and cash ratio.

The current liquidity indicator measures how many current assets cover short-term liabilities, i.e., if current assets turn to cash, and monitor how many times a business would be able to satisfy its creditors. The recommended current liquidity value should range from 1.6 to 2.5 but should never fall below 1.

$$\text{Current liquidity ratio} = \frac{\text{Current assets}}{\text{Current liabilities}} \quad (4)$$

The quick liquidity indicator is a more accurate statement of whether a business is able to meet its short-term liabilities because the inventory item, which is the least liquid, is not included in the equation. The recommended value should be in the range of 0.7-1.0, if the value equal to 1, the business is able to cover its liabilities.

$$\text{Quick liquidity ratio} = \frac{\text{Current assets} - \text{inventory}}{\text{Current liabilities}} \quad (5)$$

Cash liquidity assesses whether a business is able to repay its short-term liabilities at a given moment, the recommended value of this indicator should be around 0.2.

$$\text{Cash liquidity ratio} = \frac{\text{Cash funds}}{\text{Current liabilities}} \quad (6)$$

The specific liquidity levels of NC XXX, s.r.o. in the monitored years is offered by Table 1.

Tab. 1: Liquidity

|                         | 2009 | 2010 | 2011 | 15.10.2012 |
|-------------------------|------|------|------|------------|
| Current liquidity ratio | 0.05 | 0.23 | 0.20 | 0.06       |
| Quick liquidity ratio   | 0.05 | 0.23 | 0.20 | 0.06       |
| Cash liquidity ratio    | 0.03 | 0.03 | 0.05 | 0.04       |

Source: Authors.

The table above includes indicators of current, quick and cash liquidity in the period 2009-15 October 2012. Liquidity assesses the ability of a business to cover its liabilities. However, even a relatively low level of liquidity does not mean that the company does not pay its liabilities. It rather expresses a certain risk of insolvency. The valuated business is, in the case of liquidity, inclined to rather risky financing (it does not generate sufficient

quick funds to cover its liabilities, on the other hand such a state can be very effective).

#### Own risk analysis

As noted above, the main earnings of the valuated business stem from the long-term lease of the Property (see lease agreement signed until 28 February 2034). For the duration of this contract, the business has a guaranteed income of at least the amount of the rent. Due to the attractive location of the property (near the center of Prague), it is safe to assume that in the event of termination of the lease agreement with the current tenant, it will not be too complicated for the business to find a new tenant for the premises, which leads to the assumption that the activity of the valuated business can continue in the future. The low risk of renting property is also testified by the fact that, according to the Czech legal code, the rental of premises has almost no special conditions, so de facto everyone can be a tenant. The argument for this claim can be found, for example, in the income tax act, where the rental of space for flat rate calculations has its own specific category than other types of business.

On the other hand, the valuated business worked with a significant amount of foreign funding as of the valuation date and could be endangered by the unforeseen requirement to repay its liabilities. The evaluators did not have access to the complete documentation on foreign sources despite the request for submission of documents. The valuated business had payables to its manager, Mr. Martin Jelínek, as well as several liabilities to KM, a.s. and a liability to Česká spořitelna a.s. Because in several cases there were loans and borrowings between related parties, and the bank loan was bound by the contractually agreed repayment schedule, the evaluator assumes that the likelihood of an unexpected liability repayment requirement is minimal.

#### Business valuation

##### Assets method

The most recent known data from the balance sheet of NC XXX, as of 15 October 2012, where actual values of assets and liabilities were obtained, was used for valuation using the assets method. The evaluator had to work with the assumption that the values stated in the statements as of 15 October 2012 do not differ significantly from the values that were subsequently applied as of the valuation date, i.e. on 27 October 2012 (financial statements as of the valuation date are not available). The value of the property (land and buildings) was re-valued by market prices. The book value does not have to faithfully correspond to the market value of the assets and liabilities, i.e. the value at which the type of asset could be transformed to a more liquid type, preferably to monetary funds. The market value is given by the market, supply and demand for the assets in question and expresses the value for which the type of asset could be exchanged for cash as of the valuation date. For this reason, the property is regarded as a certain amount of money that could be obtained through its sale.

The evaluator identified himself in this case with the procedure of the ABC Consulting Expert Institute, s.r.o. and the resulting market value set out in the expert opinion report of 19 November 2012. The evaluator did not determine the market value of the property by its own procedure because he did not know the status of the assessed property at the valuation date. Therefore, he only proceeded with a review of a previously prepared report, which had dealt with the subject in the past.

##### Assets valuation

As of 15 October 2012, the valuated business does not own long-term intangible assets. Tangible fixed assets were re-valued at market prices, which represent the actual value of the assets for which the assets could be sold on the market. NC XXX, s.r.o. owned land as of the date of valuation, which includes house No. 55, all in the cadastral area of Nusle. The value of fixed assets is expressed by Table 2.

Tab. 2: Tangible Fixed Assets (in CZK thousands)

| Item   | Sum    |
|--|--------|
| Land and buildings                                 | 62,712 |
| Separate movable assets and sets of movable assets | 0      |
| Grow units of perennial crops                      | 0      |
| Basic herd and labor animals                       | 0      |
| Other tangible fixed assets                        | 0      |
| Tangible fixed assets under construction           | 0      |
| Advances granted for tangible fixed assets         | 0      |
| Valuation difference to acquired property          | 0      |
| Tangible fixed assets                              | 62,712 |

Source: Authors.

The valuated business did not own any fixed financial assets as of October 15, 2012. It did not have any inventory items as of 15 October 2012. The valuated business had no records of long-term receivables as of October 15, 2012.

Short-term receivables of NC XXX, s.r.o. were retained at their book value as of October 15, 2012 in the amount of CZK 251,000 because more detailed information on this account was not available (see Table 3 below).

Tab. 3: Short-term receivables (in CZK thousands)

| Item  | Sum |
|---|-----|
| Trade receivables   | 551 |
| Receivables from controlled and managed persons               | 0   |
| Receivables from accounting units with significant influence  | 0   |
| Receivables from partners, cooperative members and associates | 0   |
| Social security and health insurance                          | 0   |
| State – tax receivables                                       | 0   |
| Short-term prepayments  | 0   |
| Accrued assets accounts                                       | 0   |
| Other receivables   | 0   |
| Short-term receivables  | 551 |

Source: Authors.

The value of current financial assets is the subject of Table 4.

Tab. 4: Current financial assets (in CZK thousands)

| Item                                 | Sum |
|--------------------------------------|-----|
| Cash                                 | 0   |
| Bank accounts                        | 561 |
| Short-term securities and interests  | 0   |
| Acquisition current financial assets | 0   |
| Current financial assets             | 561 |

Source: Authors.

The valuated business does not record time difference on the asset side as of 15 October 2012.

#### Payables valuation

Liabilities were valued for the purposes of the present valuation at book value. Wherever possible, the validity of the payables was verified on the basis of the contracts submitted.

The company recorded no reserves as of 15 October 2012. The value of the long-term liabilities is the subject of Table 5.

Tab. 5: Long-term payables (in CZK thousands)

| Item  | Sum |
|---|-----|
| Trade payables  | 0   |
| Payables to controlled and managed Persons                  | 0   |
| Liabilities to accounting units under substantial influence | 0   |
| Payables to partners, cooperative members and associates    | 0   |
| Long-term advances received                                 | 0   |
| Issued bonds  | 0   |
| Long-term bills for payment                                 | 0   |

|                              |        |
|------------------------------|--------|
| Accrued liabilities accounts | 0      |
| Other payables               | 16,929 |
| Deferred tax liability       | 0      |
| Long-term payables           | 16,929 |

Source: Authors.

The value of each item of short-term liabilities is presented in Table 6.

Tab. 6: Short-term payables (in CZK thousands)

| Item  | Sum    |
|---|--------|
| Trade payables  | 148    |
| Payables to controlled and managed Persons                  | 3,173  |
| Liabilities to accounting units under substantial influence | 0      |
| Payables to partners, cooperative members and associates    | 10,287 |
| Payables to employees                                       | 0      |
| Payables to social security and health insurance            | 0      |
| State – tax liabilities and subsidies                       | 15     |
| Short-term advances received                                | 5      |
| Issued bonds  | 0      |
| Accrued liabilities accounts                                | 0      |
| Other payables  | 0      |
| Short-term liabilities                                      | 13,628 |

Source: Authors.

Bank loans and assistance are quoted in Table 7.

Tab. 7: Bank Loans and Assistance (in CZK thousands)

| Item                            | Sum    |
|---------------------------------|--------|
| Long-term bank loans            | 39,995 |
| Short-term bank loans           | 0      |
| Short-term financial assistance | 0      |
| Bank loans and assistance       | 39,995 |

Source: Authors.

K As of 15 October 2012, the valuated business does not record any accruals and deferrals on the liabilities side.

#### Recapitulation

The value of the business determined using the assets method is shown in Table 8.

Tab. 8: Valuation recapitulation (in CZK thousands)

| Item              | Sum    |
|-------------------|--------|
| Assets value      | 63,524 |
| Liabilities value | 70,552 |
| Net Asset Value   | -7,028 |

Source: Authors.

The value of net assets of NC XXX, s.r.o., calculated by the assets method, is as of 27 October 2012: -7,028,000 CZK.

#### Discounted cash flow method

The evaluator assumes the operational necessity of all assets and liabilities included in the financial statements and will not make a correction for operationally unnecessary items. Free cash flows to equity are called FCFEs. The FCFE calculation is based on the adjusted operating income (see Table 9 below).

Tab. 9: FCFE Calculation

| Mathematical operation | Item  |
|------------------------|---|
|                        | Adjusted operating profit or loss before tax                                    |
| -                      | Interest expense  |
| =                      | Adjusted operating income before tax  |
| -                      | Adjusted tax on adjusted operating income                                       |
| =                      | Adjusted operating profit after tax (i.e. adjusted operating income for owners) |
| +                      | Depreciation  |
| +                      | Other costs that are not expenditures in a                                      |

|   |   |
|---|---|
|   | given period  |
| - | Investment (in necessary operating capital, fixed assets) |
| - | Payments of interest-bearing foreign capital              |
| + | Acceptance of new interest-bearing foreign capital        |
| = | Free Cash Flow to Equity (FCFE)                           |

Source: Edited according to Mařík (2011).

Adjusted Operating Income (AOI) is one of the basic variables in DCF business valuation. To the operating income of a business, one-off expenditure unrelated to operating assets, financial investment income and interest income arising from operating assets are added at this stage. It is therefore necessary to set the adjusted operating income in each year of the first phase, and in the first year of the second phase, as seen in the attached financial plan. The calculation of AOI is given in Table 10. In addition to participating in stocks investments, most of the products with variable annuities in today's market offer different types of investment guarantees that protect policyholders from the risk of their investment (Feng, 2010). Interest is focused on the valuation of stocks and consequently on the distribution of the future economic benefits of the merged business to each owner (Toll, 2011).

Tab. 10: Calculation of AOI

| Mathematical operation | Item   |
|------------------------|--|
|                        | Operating income   |
| -                      | Operating revenues which are one-off and unrelated to operating assets                               |
| +                      | Operating costs which are one-off and unrelated to operating assets                                  |
| +                      | Revenue from financial investments and interest income, if they come from necessary operating assets |
| -                      | Financial costs related to the necessary operation assets  |
| =                      | AOI before tax   |

Source: Edited according to Mařík (2011).

In the case of interest expense, this is the sum of all interest expense attributable to the period.

Adjusted tax is the corporate income tax, the table below shows the development of this tax in the Czech Republic in the years preceding the valuation. In the last three years, the tax rate is noticeably stable and no change is expected, so the tax rate of 19% will also be considered for all future periods.

Tab. 11: Development of the Corporate Tax Rate in the Czech Republic

|                        | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------------------------|------|------|------|------|------|------|------|------|
| Corporate tax rate (%) | 26   | 26   | 24   | 21   | 20*  | 19   | 19   | 19   |

Source: Edited according to the Tax Advisors Portal.

Depreciation is the accumulated depreciation in the given year. For the first year of the first part of the valuation, i.e. 2012, depreciation will be determined as an aliquot part of the total annual depreciation for 2012 attributable to the period from October 27, 2012-31. 12. 2012, i.e. 2 months. Depreciation accounting is not carried out on a daily basis, but at a lower frequency, therefore, only part of the depreciation for part of the year will be used. The depreciation amount was taken from the internal depreciation plan of the building and the chairs of the valuated business, which was available to the evaluator.

In the established financial plan, no other costs are considered, which are not expenditures in the given period.

Investments in the submitted expert's report are understood to mean funds that are collected in the valuated business to create a repayment fund. A certain form of investment also involves the loan repayment, which is a time-shifted investment, where the

loan temporarily approximates the possibility of investing in real estate, as opposed to creating a repayment fund. Generally speaking, the opinion is based on the assumption that the extent of the real estate property will be stable in the following period and will only be maintained at the appropriate qualitative level which will ensure its economic use in the form of a tenancy relationship over a longer period of time (the dependence between the constructional and technical property status and rental rates is established). It can be stated that as of the date of valuation, house no. 55 owned by the valuated business is in a very good technical condition (in December 2009 a complex and extensive reconstruction of the building was completed worth about CZK 70 million), which implies the minimum investment intensity in the building in the future. The valuated business addressed the financial coverage of larger investment projects (extensive reconstruction) in the form of a loan. From the logic of the matter, it is possible to classify this process as a retrofit of the repairs fund, and thus also as a re-investment of funds into real estate. In the case of the valuated business, the evaluator foresees the above-mentioned investment scheme also in the future. For the calculation, a methodology has been set up, which foresees investments up to the end of 2034 at the amount of CZK 0 (the same year in which the lease contract ends). Repayments of loans, which, according to the above, represent some form of investment, are covered in this period. The evaluator is of the opinion that due to the extensive reconstruction carried out in 2009, it will not be necessary to carry out any major and economically expensive modifications to the subject of the lease by 2034. In the years leading up to 2034, a repayment fund would be created where the annual considered investment is based on the reproduction cost of the building at the end of its lifespan of the majority of the constructions and the number of years remaining until the end of the lifespan of the majority of the constructions.

The reproduction price of the building at the end of the lifespan of the majority of the constructions was determined from the reproduction price of the building in 2012 (CZK 58,923,964 – the price was determined by the administrative procedure in the Expert Report No. 2087-177 / 12 of 19 November 2012 and the evaluator agrees with this price), which was increased by hypothetical inflation until 2112. The chosen year is set with respect to the expected lifetime of the entire construction and at a stable annual inflation rate the building would be valued at about CZK 426.9 million. It is possible to assume at the same time that it would be necessary to invest in 80% of the construction elements in that year. From the point of view of the planning of annual investments from 2035, it is necessary to take into account the necessary amount for a comprehensive reconstruction and the period for which the funds can be stockpiled. The annual investment from 2035 can be calculated from the following relationship:

$$\text{Annual investment from 2035} = \frac{\text{Reproduction cost of the construction in 2112} \cdot 80\%}{2034 - 2112} \quad (7)$$

The annual investment from 2035 amounts to CZK 4,378,462. However, as it is a plan that is not able to take into account the current investment needs in future years, it can be stated that the calculated amount may also represent the repayment of loans drawn on adjustments to the lease agreement. In this respect, there is a significant link between the investment and the repayment of the loans as mentioned above.

Table 12 lists the investment and depreciation plan, except for 2012, it is always an annual total. In 2012, it is depreciation in November and December 2012.

Tab. 12: Investment and depreciation plan (in CZK)

|         | 2012*   | 2013      | 2014      | 2015      | 2016      | 2017      | 2018      | 2019      |
|---------|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Invest. | 0       | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Deprec. | 272,820 | 1,526,195 | 1,516,128 | 1,516,128 | 1,516,128 | 1,516,128 | 1,516,128 | 1,636,928 |

|         | 2020      | 2021      | 2022      | 2023      | 2024      | 2025      | 2026      | 2027      |
|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Invest. | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Deprec. | 1,516,128 | 1,516,128 | 1,516,128 | 1,516,128 | 1,636,928 | 1,516,128 | 1,516,128 | 1,516,128 |

|         | 2028      | 2029      | 2030      | 2031      | 2032      | 2033      | 2034      | 2035      |
|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Invest. | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Deprec. | 1,516,128 | 1,516,128 | 1,516,128 | 1,516,128 | 1,636,928 | 1,516,128 | 1,516,128 | 1,516,128 |

\*October-December 2012.

Source: Authors.

Because the evaluator does not have complete credit and liability contracts to determine this value, the information on interest-bearing foreign capital is taken from ABC Consulting, s.r.o. prepared on 19 November 2012. The authors of the report state that they have internal data and internal financial plans. The evaluator only accepts the values without being able to verify them. For a list of liabilities and a repayment schedule, see below.

The growth rate of the business during the second phase, assuming the activity continues, is expressed as *g*. The expansion of the business' economic activities is not foreseen, and only the continuation of the rental of the property is expected. Therefore, the business performance will grow and cash flows will depend in particular on the growth of the market for renting office spaces in Prague, and therefore the amount of rent. The minimum rental growth rate in the second phase should be equal to the Czech National Bank's target inflation rate (2%). If the nominal rent would grow more slowly than inflation, the actual value of the rent would decrease. However, given the specificity of Prague and the local demand for the lease of office space, this can not be assumed. Therefore, the annual growth rate, due to caution, is selected at 2%. This is also true for other calculation items where nominal inflation is projected to increase.

Equity means capital belonging to the owners of the business and is generally considered to be the main carrier of business risk. Its participation in total capital is therefore seen as an indicator of the financial independence of the valuated business. Another major source of financing for most enterprises is foreign capital, without which the valuated business would not function. Foreign capital is, in fact, the debt of a company that must be repaid at a specified time. Depending on this time period, it can be divided into short-term foreign capital (up to one year) and long-term foreign capital (longer than one year).

Every capital costs something, or has its own costs. The cost of equity is the owner's desired return. Of course, even foreign capital is not provided for free. The cost of using the foreign capital is the interest and other expenses associated with its acquisition. In general, foreign capital is usually cheaper than equity. However, certain facts stand against the above statement. Utilizing a higher rate of foreign capital increases the indebtedness of the valuated business and thus reduces its financial stability. A high proportion of foreign capital increases the risk of corporate bankruptcy. Each added debt is more expensive and is more difficult to obtain, as potential creditors are worried about their capital in case of liquidation of a highly indebted business. A large range of foreign capital also limits management behavior.

The cost of equity is individual and results from alternative options for capital use by the investor. This is the expected interest that will be paid to the investor - the owner as a reward for equity. The evaluator does not evaluate the main activity of the company (rental of real estate) as a significant risk. In the investor's portfolio, therefore, it would rather occupy a conservative position with lower returns.

The evaluator set the percentage of the cost of equity equal to the sum of the risk-free rate and the business risk premium. The risk-free rate was set by the Ministry of Industry and Trade for the 1st-3rd quarter of 2012 for CZ NACE group L "Real estate activities" at 2.55%. The risk premium for business risk was set by the same body for the same period and the same group at 4.03% for businesses under domestic control. The total cost of equity is 6.58%.

#### FCFF Calculation

As mentioned above, the first valuation step is the quantification of the adjusted operating income.

The evaluator considered the first phase of the valuation only with the earnings guaranteed by the Lease agreement. The signed Lease agreement set the rental income until February 28, 2034, and the lease is expected to be released in the amount of future market rental value. Market growth is expected to grow at a rate of growth of 2% (in line with inflation) and also during the years of set rent.

As the first step of the second phase, 2035 is considered as the first full calendar year with an income in the amount of market rent value. For reasons of caution and risk, finding the right tenant, the evaluator considers the loss of future market rent at 15% from March 2034.

Table 13 presents a projection of the expected development of annual market rent value of the rented property.

Tab. 13: Expected growth of market rent value (in CZK)

|                   | 2012      | 2013      | 2014      | 2015      | 2016      | 2017      | 2018      | 2019      |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Market rent value | 6,300,000 | 6,426,000 | 6,554,520 | 6,685,610 | 6,819,323 | 6,955,709 | 7,094,823 | 7,236,720 |

|                   | 2020      | 2021      | 2022      | 2023      | 2024      | 2025      | 2026      | 2027      |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Market rent value | 7,381,454 | 7,529,083 | 7,679,665 | 7,833,258 | 7,989,923 | 8,149,722 | 8,312,716 | 8,478,971 |

|                   | 2028      | 2029      | 2030      | 2031      | 2032      | 2033      | 2034      | 2035      |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Market rent value | 8,648,550 | 8,821,521 | 8,997,951 | 9,177,910 | 9,361,469 | 9,548,698 | 9,739,672 | 9,934,465 |

Source: Authors.

The table in attachment 1 reflects the projection of the operating result. As a result of the CNB's inflation target, the 2% growth rate of items of performance consumption, taxes and fees, other operating costs, is considered due to inflation.

Performance consumption is made from items of services and material and energy consumption. The annual material and energy consumption was set at CZK 50,000 based on available data from the profit and loss statement. Expenditure services have been determined on the basis of historical data and the assumption that further contracts between the lessee and the lessor are not available to the evaluator, see above. Value added expresses the difference between business performance and performance consumption.

The taxes and fees item is based on data from past years.

Depreciation of intangible and tangible fixed assets (hereafter IFA, TFA) are taken from internal depreciation plans available to the evaluator.

Other operating expenses are based on the data included in the financial statements for the previous accounting period.

In the following years, there are no one-off operating costs that are unrelated to operating assets or financial investment income and interest income if they stem from necessary operating assets. On the other hand, the financial expenses associated with the assets needed for operation are estimated, the amount is determined from the past, and it does not end with the repayment of liabilities, even after the foreign funds have been paid, the business will have some expenses, e.g. for bank account management, etc. The financial costs are expected to increase again by 2%, same as inflation. AOI before tax is shown in Table 14.

Tab. 14: Adjusted operating income before tax (in CZK)

|                    | 2012*   | 2013      | 2014      | 2015      | 2016      | 2017      | 2018      | 2019      |
|--------------------|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Financial expenses | 3,125   | 15,300    | 15,606    | 15,918    | 16,236    | 16,561    | 16,892    | 17,230    |
| AOI before tax     | 692,847 | 4,267,505 | 4,267,446 | 4,257,117 | 4,246,582 | 4,235,837 | 4,224,876 | 4,213,696 |

|                    | 2020      | 2021      | 2022      | 2023      | 2024      | 2025      | 2026      | 2027      |
|--------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Financial expenses | 17,575    | 17,926    | 18,285    | 18,651    | 19,024    | 19,404    | 19,792    | 20,188    |
| AOI before tax     | 4,202,292 | 4,190,661 | 4,178,797 | 4,166,695 | 4,154,352 | 4,141,761 | 4,128,919 | 4,115,820 |

|                    | 2028      | 2029      | 2030    | 2031    | 2032    | 2033    | 2034      | 2035      |
|--------------------|-----------|-----------|---------|---------|---------|---------|-----------|-----------|
| Financial expenses | 20,592    | 21,004    | 21,424  | 21,852  | 22,289  | 22,735  | 23,190    | 23,653    |
| AOI before tax     | 4,102,459 | 4,088,831 | 774,930 | 760,751 | 746,289 | 731,537 | 5,115,424 | 6,145,438 |

\*October-December 2012.

Source: Authors.

Interest expense and interest-bearing foreign capital payments are shown in the tables in Attachment 2 (values are taken from the report of 19 November 2012).

The value of the first phase of the company was calculated at CZK 4,777,418.29, the value of the second phase (from 2035 to infinity) was calculated to the amount of CZK 10,007,471.92.

The calculated value of the valuated company using the Discounted Cash Flow - Equity method was CZK 14,784,890 as of the valuation date.

#### 4 Recapitulation

The value of the business determined using the assets method came to CZK -7,028,000. Using the method of discounted cash flows in the equity variant, CZK 14,784,890 was the final sum of calculation. If we include the impact of inflation, we will obtain the value of the business share of NC XXX, s.r.o. increased by inflation and after the rounding at CZK 15,135,000. Table 15 shows the actual development of yearly inflation.

Tab. 15: Development of inflation in the Czech Republic

|           | 2013 | 2014 | 2015 | 2016* |
|-----------|------|------|------|-------|
| Inflation | 1.4% | 0.4% | 0.3% | 0.3%  |

\*As of June 2016.

Source: Authors.

#### 5 Conclusion

The aim of the contribution was to determine the value of a 100% business share in a specific business and then to evaluate how the procedure has to be distinguished from conventional methodologies.

The evaluator first analyzed the business performance for the years prior to the valuation day and, using financial analysis tools, concluded that the valuated business had the preconditions for continuing its economic activity and thus the income potential for its owners as of the valuation date. The weakness of the business is a high share of foreign capital (more than 90%), which brings some uncertainty and financial instability. While preserving the assumption of going concern, the business will repay its liabilities by 2034 and will then operate at a minimal cost. In addition, leased real estate will not have to be burdened with legal defects - collateral. It can be said that in the long run, real estate is an asset that provides protection against inflation. In the long run, it can be expected that the value of the property owned by the valuated business will continue to grow. In assessing the business, however, it is necessary to look not only at this fact and the long-term trend of real estate prices, but also on the aforementioned risks attached to the valuated business.

For the valuation, two methods were selected and processed, namely assets and earnings methods. By the assets method, the negative value of the business was CZK -7 028 000. This method works by comparing the market value of assets and the book value of liabilities as of a certain date, but is unable to take into account the earnings potential of the business. The negative value found confirmed, in conjunction with the financial analysis carried out, the need to further continue the activities of the valuated business in order to repay past liabilities. Based on the results of the assets method and the financial analysis, the earnings method was applied. The earnings method quantified the business revenue potential for its owners and confirmed the ability of the business to repay its liabilities and to provide a reasonable profit to the owners.

The value of the 100% business share in NC XXX, s.r.o., as of October 27, 2012 at today's prices, amounts to 15,135,000 CZK.

The valuation of the business, which has been firmly linked to another company, namely KM, a.s., is fundamentally different from a standard valuation, and it differs in two specific points. First of all, the discounted cash flow method had to be used in the equity variant. A number of experts use the entity variant (for example, ABC Consulting, s.r.o.). Unfortunately, they do not realize that they set the value of the business not only for the owners but for all the investors (i.e. those that provide foreign capital). The result is then relatively highly disturbed when it comes to valuating the business share. Secondly, it was necessary to process a share of foreign capital as if it were equity (i.e., a loan from KM, a.s.). If this were not the case, KM itself (as the majority owner of the valuated business) would have to file a bankruptcy petition for the valuated business (as a majority owner of the valuated business). In addition, KM, a.s. was the main and perhaps the only customer of the valuated business. Thus a relationship was set up, which corresponded exclusively to the ownership relationships, not to the relationship between the creditor and the borrower. These deviations to determine the value of NC XXX, s.r.o. had a significant influence. However, it was necessary to process them in order to determine the true value of the business.

The aim of the contribution was therefore fulfilled.

The main conclusion of the contribution can be formulated as follows: In the case of the valuation to determine the value of a business share, it is most important to determine the actual value of the share, not to comply with the standardized methodology. What is more important is the principle of realistic representation of reality rather than the consistent application of standards.

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## Primary Paper Section: A

## Secondary Paper Section: AH

## Attachments

## Attachment 1: Projection of Operating Income (in CZK)

|                          | 2012*     | 2013      | 2014      | 2015      | 2016      | 2017      | 2018      |
|--------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Performances             | 1,050,000 | 6,300,000 | 6,300,000 | 6,300,000 | 6,300,000 | 6,300,000 | 6,300,000 |
| Perf. consumption        | 68,500    | 411,000   | 419,220   | 427,604   | 436,156   | 444,880   | 453,777   |
| Value added              | 981,500   | 5,889,000 | 5,880,780 | 5,872,396 | 5,863,844 | 5,855,120 | 5,846,223 |
| Taxes and fees           | 6,667     | 40,000    | 40,800    | 41,616    | 42,448    | 43,297    | 44,163    |
| IFA and TFA depreciation | 272,820   | 1,526,195 | 1,516,128 | 1,516,128 | 1,516,128 | 1,516,128 | 1,516,128 |
| Other oper. costs        | 6,667     | 40,000    | 40,800    | 41,616    | 42,448    | 43,297    | 44,163    |
| Operating Income         | 695,347   | 4,282,805 | 4,283,052 | 4,273,036 | 4,262,819 | 4,252,398 | 4,241,768 |

|                          | 2019      | 2020      | 2021      | 2022      | 2023      | 2024      | 2025      |
|--------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Performances             | 6,300,000 | 6,300,000 | 6,300,000 | 6,300,000 | 6,300,000 | 6,300,000 | 6,300,000 |
| Perf. consumption        | 462,853   | 472,110   | 481,552   | 491,183   | 501,007   | 511,027   | 521,247   |
| Value added              | 5,837,147 | 5,827,890 | 5,818,448 | 5,808,817 | 5,798,993 | 5,788,973 | 5,778,753 |
| Taxes and fees           | 45,046    | 45,947    | 46,866    | 47,804    | 48,760    | 49,735    | 50,730    |
| IFA and TFA depreciation | 1,516,128 | 1,516,128 | 1,516,128 | 1,516,128 | 1,516,128 | 1,516,128 | 1,516,128 |
| Other oper. costs        | 45,046    | 45,947    | 46,866    | 47,804    | 48,760    | 49,735    | 50,730    |
| Operating Income         | 4,230,926 | 4,219,867 | 4,208,587 | 4,197,082 | 4,185,346 | 4,173,375 | 4,161,165 |

|                          | 2026      | 2027      | 2028      | 2029      | 2030      | 2031      | 2032      |
|--------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Performances             | 6,300,000 | 6,300,000 | 6,300,000 | 6,300,000 | 6,300,000 | 6,300,000 | 6,300,000 |
| Perf. consumption        | 531,672   | 542,306   | 553,152   | 564,215   | 575,499   | 587,009   | 598,749   |
| Value added              | 5,768,328 | 5,757,694 | 5,746,848 | 5,735,785 | 5,724,501 | 5,713,991 | 5,704,251 |
| Taxes and fees           | 51,744    | 52,779    | 53,835    | 54,911    | 56,010    | 57,130    | 58,272    |
| IFA and TFA depreciation | 1,516,128 | 1,516,128 | 1,516,128 | 1,516,128 | 1,516,128 | 1,516,128 | 1,516,128 |
| Other oper. costs        | 51,744    | 52,779    | 53,835    | 54,911    | 56,010    | 57,130    | 58,272    |
| Operating Income         | 4,148,711 | 4,136,008 | 4,123,051 | 4,109,834 | 4,096,353 | 4,082,603 | 4,068,578 |

|                          | 2033      | 2034      | 2035      |
|--------------------------|-----------|-----------|-----------|
| Performances             | 3,000,000 | 7,398,934 | 8,941,019 |
| Perf. consumption        | 610,724   | 622,939   | 635,398   |
| Value added              | 2,389,276 | 7,181,815 | 7,808,898 |
| Taxes and fees           | 59,438    | 60,627    | 61,839    |
| IFA and TFA depreciation | 1,516,128 | 1,516,128 | 1,516,128 |
| Other oper. costs        | 59,438    | 60,627    | 61,839    |
| Operating Income         | 754,272   | 5,138,614 | 6,169,092 |

\*October-December 2012.

Source: Authors.

## Attachment 2: Interest expense and Interest-bearing foreign capital repayments

## Plan for financing by a loan from Česká spořitelna a.s. (in CZK thousands)

|                    | 2012*  | 2013   | 2014   | 2015   | 2016   | 2017   | 2018   | 2019  | 2020  |
|--------------------|--------|--------|--------|--------|--------|--------|--------|-------|-------|
| Interest rate      | 3.76%  | 3.76%  | 3.76%  | 3.76%  | 3.76%  | 3.76%  | 3.76%  | 3.76% | 3.76% |
| State as of 1.1.   | 39,995 | 39,019 | 33,499 | 27,979 | 22,459 | 16,939 | 11,419 | 5,899 | 379   |
| Interest paid      | 206    | 1,363  | 1,156  | 948    | 741    | 533    | 326    | 118   | 7     |
| Payment            | 976    | 5,520  | 5,520  | 5,520  | 5,520  | 5,520  | 5,520  | 5,520 | 379   |
| State as of 31.12. | 39,019 | 33,499 | 27,979 | 22,459 | 16,939 | 11,419 | 5,899  | 379   | 0     |

\*October-December 2012.

Source: Edited according to expert report dated 19 November 2012.

## Plan for financing by a loan from Milan Jelínek (in CZK thousands)

|                    | 2012*  | 2013   | 2014   | 2015   | 2016   | 2017   | 2018   | 2019   | 2020   |
|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Interest rate      | 3.76%  | 3.76%  | 3.76%  | 3.76%  | 3.76%  | 3.76%  | 3.76%  | 3.76%  | 3.76%  |
| State as of 1.1.   | 10,287 | 10,287 | 10,287 | 10,287 | 10,287 | 10,287 | 10,287 | 10,287 | 10,287 |
| Payment            | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 989    |
| Interest paid      | 0      | 386    | 386    | 386    | 386    | 386    | 386    | 386    | 386    |
| State as of 31.12. | 10,287 | 10,287 | 10,287 | 10,287 | 10,287 | 10,287 | 10,287 | 10,287 | 9,298  |

|                    | 2021  | 2022  | 2023  | 2024  | 2025  | 2026  | 2027  |
|--------------------|-------|-------|-------|-------|-------|-------|-------|
| Interest rate      | 3.76% | 3.76% | 3.76% | 3.76% | 3.76% | 3.76% | 3.76% |
| State as of 1.1.   | 9,298 | 8,218 | 7,138 | 5,958 | 4,658 | 3,238 | 1,688 |
| Payment            | 1,080 | 1,080 | 1,180 | 1,300 | 1,420 | 1,550 | 1,688 |
| Interest paid      | 349   | 308   | 268   | 224   | 175   | 121   | 63    |
| State as of 31.12. | 8,218 | 7,138 | 5,958 | 4,658 | 3,238 | 1,688 | 0     |

\*October-December 2012.

Source: Authors.

## Plan for financing by a loan from KM, a.s. (in CZK thousands)

|                    | 2012*  | 2013   | 2014   | 2015   | 2016   | 2017   | 2018   | 2019   | 2020   |
|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Interest rate      | 3.76%  | 3.76%  | 3.76%  | 3.76%  | 3.76%  | 3.76%  | 3.76%  | 3.76%  | 3.76%  |
| State as of 1.1.   | 16,929 | 23,829 | 23,829 | 23,829 | 23,829 | 23,829 | 23,829 | 23,829 | 23,829 |
| Withdrawal         | 6,900  | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| Payment            | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 3,240  |
| Interest paid      | 165    | 896    | 896    | 896    | 896    | 896    | 896    | 896    | 840    |
| State as of 31.12. | 23,829 | 23,829 | 23,829 | 23,829 | 23,829 | 23,829 | 23,829 | 23,829 | 20,589 |

|                    | 2021   | 2022   | 2023   | 2024   | 2025   | 2026  | 2027  |
|--------------------|--------|--------|--------|--------|--------|-------|-------|
| Interest rate      | 3.76%  | 3.76%  | 3.76%  | 3.76%  | 3.76%  | 3.76% | 3.76% |
| State as of 1.1.   | 23,829 | 20,589 | 17,349 | 14,109 | 10,869 | 7,629 | 4,389 |
| Withdrawal         | 0      | 0      | 0      | 0      | 0      | 0     | 0     |
| Payment            | 3,240  | 3,240  | 3,240  | 3,240  | 3,240  | 3,240 | 1,149 |
| Interest paid      | 718    | 596    | 475    | 352    | 231    | 109   | 9     |
| State as of 31.12. | 17,349 | 14,109 | 10,869 | 7,629  | 4,389  | 1,149 | 0     |

\*October-December 2012.

Source: Edited according to expert report dated 19 November 2012.

## Plan for financing by a loan from KM, a.s. (in CZK thousands)

|                    | 2012* | 2013  | 2014  | 2015  | 2016  | 2017  | 2018   | 2019   | 2020   |
|--------------------|-------|-------|-------|-------|-------|-------|--------|--------|--------|
| Interest rate      | 3.76% | 3.76% | 3.76% | 3.76% | 3.76% | 3.76% | 3.76%  | 3.76%  | 3.76%  |
| State as of 1.1.   | 0     | 0     | 1,020 | 3,040 | 4,970 | 6,800 | 8,540  | 10,180 | 11,710 |
| Withdrawal         | 0     | 1,020 | 2,020 | 1,930 | 1,830 | 1,740 | 1,640  | 1,530  | 160    |
| Payment            | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      |
| Interest paid      | 0     | 6     | 99    | 139   | 210   | 278   | 342    | 402    | 443    |
| State as of 31.12. | 0     | 1,020 | 3,040 | 4,970 | 6,800 | 8,540 | 10,180 | 11,710 | 11,870 |

|                    | 2021   | 2022   | 2023   | 2024   | 2025   | 2026   | 2027   | 2027  | 2029  |
|--------------------|--------|--------|--------|--------|--------|--------|--------|-------|-------|
| Interest rate      | 3.76%  | 3.76%  | 3.76%  | 3.76%  | 3.76%  | 3.76%  | 3.76%  | 3.76% | 3.76% |
| State as of 1.1.   | 11,870 | 12,000 | 12,020 | 12,020 | 12,020 | 12,020 | 12,020 | 8,920 | 3,870 |
| Withdrawal         | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0     | 0     |
| Payment            | 130    | 20     | 0      | 0      | 0      | 0      | 0      | 3,100 | 3,870 |
| Interest paid      | 448    | 452    | 452    | 452    | 452    | 452    | 408    | 242   | 55    |
| State as of 31.12. | 12,000 | 12,020 | 12,020 | 12,020 | 12,020 | 12,020 | 8,920  | 3,870 | 0     |

\*October-December 2012.

Source: Edited according to expert report dated 19 November 2012.

#### Plan for financing by a loan (in CZK thousands)

|                    | 2012* | 2013  | 2014  | 2015  | 2016  | 2017  | 2018  | 2019  | 2020  |
|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Interest rate      | 0.00% | 3.76% | 3.76% | 3.76% | 3.76% | 3.76% | 3.76% | 3.76% | 3.76% |
| State as of 1.1.   | 0     | 0     | 750   | 750   | 850   | 1,250 | 1,650 | 2,250 | 2,700 |
| Withdrawal         | 0     | 750   | 0     | 100   | 400   | 400   | 600   | 450   | 850   |
| Payment            | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| Interest paid      | 0     | 14    | 28    | 30    | 39    | 55    | 73    | 93    | 118   |
| State as of 31.12. | 0     | 750   | 750   | 850   | 1,250 | 1,650 | 2,250 | 2,700 | 3,550 |

|                    | 2021  | 2022  | 2023  | 2024  | 2025  | 2026  | 2027  | 2027  | 2029  |
|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Interest rate      | 3.76% | 3.76% | 3.76% | 3.76% | 3.76% | 3.76% | 3.76% | 3.76% | 3.76% |
| State as of 1.1.   | 3,550 | 4,050 | 4,500 | 4,920 | 5,420 | 5,920 | 6,420 | 7,970 | 8,570 |
| Withdrawal         | 500   | 450   | 420   | 500   | 500   | 500   | 1,550 | 600   | 0     |
| Payment            | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 800   |
| Interest paid      | 143   | 161   | 177   | 194   | 213   | 232   | 271   | 311   | 307   |
| State as of 31.12. | 4,050 | 4,500 | 4,920 | 5,420 | 5,920 | 6,420 | 7,970 | 8,570 | 7,770 |

|                    | 2030  | 2031  | 2032  | 2033  |
|--------------------|-------|-------|-------|-------|
| Interest rate      | 3.76% | 3.76% | 3.76% | 3.76% |
| State as of 1.1.   | 7,770 | 2,920 | 6,020 | 1,020 |
| Withdrawal         | 0     | 3100  | 0     | 0     |
| Payment            | 4,850 | 0     | 5,000 | 1,020 |
| Interest paid      | 201   | 168   | 132   | 19    |
| State as of 31.12. | 2,920 | 6,020 | 1,020 | 0     |

\*October-December 2012.

Source: Edited according to expert report dated 19 November 2012.

#### Adjusted Operating Income before tax (in CZK)

|                               | 2012*     | 2013      | 2014      | 2015      | 2016      | 2017      | 2018      | 2019      |
|-------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| AOI before tax                | 692,847   | 4,267,505 | 4,267,446 | 4,257,117 | 4,246,583 | 4,235,837 | 4,224,876 | 4,213,696 |
| Interest expense              | 372,083   | 2,665,791 | 2,565,791 | 2,399,791 | 2,272,791 | 2,148,791 | 2,023,791 | 1,895,791 |
| Adjusted Income before tax    | 320,763   | 1,601,714 | 1,701,655 | 1,857,326 | 1,973,791 | 2,087,045 | 2,201,083 | 2,317,905 |
| Adjusted tax                  | 60,945    | 304,326   | 323,314   | 352,892   | 375,020   | 396,539   | 418,206   | 440,402   |
| Adjusted Income after tax     | 259,818   | 1,297,388 | 1,378,340 | 1,504,434 | 1,598,771 | 1,690,507 | 1,782,879 | 1,877,503 |
| Depreciation                  | 272,820   | 1,526,195 | 1,516,128 | 1,516,128 | 1,516,128 | 1,516,128 | 1,516,128 | 1,516,128 |
| Other expenses                | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Investments                   | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Foreign capital payments      | 976,000   | 5,520,000 | 5,520,000 | 5,520,000 | 5,520,000 | 5,520,000 | 5,520,000 | 5,520,000 |
| Acceptance of foreign capital | 6,900,000 | 1,770,000 | 2,020,000 | 2,030,000 | 2,230,000 | 2,140,000 | 2,240,000 | 1,980,000 |
| FCFE                          | 6,456,638 | -926,417  | -605,532  | -469,438  | -175,101  | -173,365  | 19,007    | -146,369  |

|                               | 2020      | 2021      | 2022      | 2023      | 2024      | 2025      | 2026      | 2027      |
|-------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| AOI before tax                | 4,202,292 | 4,190,661 | 4,178,797 | 4,166,695 | 4,154,352 | 4,141,761 | 4,128,919 | 4,115,820 |
| Interest expense              | 1,787,798 | 1,658,605 | 1,517,997 | 1,372,389 | 1,222,021 | 1,071,141 | 914,749   | 751,469   |
| Adjusted Income before tax    | 2,414,494 | 2,532,056 | 2,660,800 | 2,794,306 | 2,932,331 | 3,070,620 | 3,214,170 | 3,364,351 |
| Adjusted tax                  | 458,754   | 481,091   | 505,552   | 530,918   | 557,143   | 583,418   | 610,692   | 639,227   |
| Adjusted Income after tax     | 1,955,740 | 2,050,965 | 2,155,248 | 2,263,388 | 2,375,188 | 2,487,203 | 2,603,478 | 2,725,124 |
| Depreciation                  | 1,516,128 | 1,516,128 | 1,516,128 | 1,516,128 | 1,516,128 | 1,516,128 | 1,516,128 | 1,516,128 |
| Other expenses                | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Investments                   | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0         |
| Foreign capital payments      | 4,608,000 | 4,320,000 | 4,320,000 | 4,420,000 | 4,540,000 | 4,660,000 | 4,790,000 | 5,937,000 |
| Acceptance of foreign capital | 1,010,000 | 630,000   | 470,000   | 420,000   | 500,000   | 500,000   | 500,000   | 1,550,000 |
| FCFE                          | -126,132  | -122,907  | -178,624  | -220,484  | -148,684  | -156,669  | -170,394  | -145,748  |

|                               | 2028      | 2029      | 2030       | 2031      | 2032      | 2033      | 2034      | 2035      |
|-------------------------------|-----------|-----------|------------|-----------|-----------|-----------|-----------|-----------|
| AOI before tax                | 4,102,459 | 4,088,831 | 774,930    | 760,751   | 746,289   | 731,537   | 5,115,424 | 6,145,438 |
| Interest expense              | 553,000   | 362,000   | 201,000    | 168,000   | 132,000   | 19,000    | 0         | 0         |
| Adjusted Income before tax    | 3,549,459 | 3,726,831 | 573,930    | 592,751   | 614,289   | 712,537   | 5,115,424 | 6,145,438 |
| Adjusted tax                  | 674,397   | 708,098   | 109,047    | 112,623   | 116,715   | 135,382   | 971,931   | 1,167,633 |
| Adjusted Income after tax     | 2,875,062 | 3,018,733 | 464,883    | 480,128   | 497,574   | 577,155   | 4,143,494 | 4,977,805 |
| Depreciation                  | 1,516,128 | 1,516,128 | 1,516,128  | 1,516,128 | 1,516,128 | 1,516,128 | 1,516,128 | 1,516,128 |
| Other expenses                | 0         | 0         | 0          | 0         | 0         | 0         | 0         | 0         |
| Investments                   | 0         | 0         | 0          | 0         | 0         | 0         | 0         | 4,378,462 |
| Foreign capital payments      | 5,050,000 | 4,670,000 | 485,000    | 0         | 5,000,000 | 1,020,000 | 0         | 0         |
| Acceptance of foreign capital | 600,000   | 0         | 0          | 3,100,000 | 0         | 0         | 0         | 0         |
| FCFE                          | -58,810   | -135,139  | -2,868,989 | 5,096,256 | 2,986,298 | 1,073,283 | 5,659,622 | 2,115,471 |

\*October-December 2012.

Source: Authors.

## CYBER AGGRESSORS, THEIR MOTIVES, EMOTIONS AND BEHAVIOURAL TENDENCIES IN THE PROCESS OF CYBERBULLYING

<sup>a</sup>VLADIMÍRA HLADÍKOVÁ, <sup>b</sup>SABÍNA GÁLIKOVÁ  
TOLNAIOVÁ

Faculty of Mass Media Communication, University of Ss. Cyril  
and Methodius in Trnava, Nám. J. Herdu, 2, 917 01 Trnava  
email: <sup>a</sup>vladimira.hladikova@ucm.sk, <sup>b</sup>sabina.galikova.tolnaiova  
@ucm.sk

**Abstract:** The contribution focuses on the risk aspects of digital communication in cyberspace with a specific emphasis on bullying and has a theoretical-empirical character. The authors focused on the theoretical reflection of cyber aggressors, presenting number of definitional framework in the context of addressing issues of domestic and foreign authors. The main part of the contribution is focused on the results of the research aimed at the personality of cyber aggressors, their motives, experienced emotions and behavioural tendencies in the cyberbullying process. An important part of the contribution represents authentic statements of cyber aggressors contracted in various contexts. In conclusion, the authors emphasize the importance of prevention and elimination activities, as well as media and digital literacy, which would help to reduce negative phenomena in the digital environment.

**Keywords:** cyberbullying, cyber aggressor, victim, emotions, behaviour, research.

### 1 Introduction

Bullying through digital media and information and communication technologies is basically one of the forms of undesirable aggression and violence in interpersonal relationships.<sup>1</sup> Such so-called cyberbullying is realized by actors – cyber aggressors in the context of certain motives and experiencing different emotions. The main aim of this contribution is to identify the personality of cyber aggressors through the theoretical background and obtained data of empirical research, to map their motives and tendencies of behaviour and actions in connection with the realization of cyberbullying. We used several qualitative and quantitative methods to achieve this goal. Phenomenological and hermeneutic methods are used in the theoretical part, or level of work, the method of self-construction questionnaire dominates in the empirical part. Other general logic methods are also used. The results of the research are shown in graphical overviews. In our opinion, the presented authentic statements of cyber aggressors in various contexts, which we perceive as important data obtained, can be considered as a specific part of research. In conclusion, the contribution reflects on the importance of preventing and eliminating the negative behaviour and actions of cyber aggressors as well as prevention activities (not only) in cyberspace.

### 2 Cyber aggressor

When it comes to bullying and its actors, they are most often divided into three basic groups – victims, aggressors and viewers, and especially in the case of victims and aggressors the emphasis is mainly on their personality characteristics. The terms “victim” and “aggressor” may then tend to suggest that certain children and adolescents are, by their very nature or appearance, disposed to be weaker and victimized, while others have characteristics that predestine them as attackers. However, A. Černá<sup>2</sup> points out that cyberbullying is a group phenomenon. In addition to personality characteristics, most influential in the occurrence of this phenomenon are mainly dysfunctional relationships of given group or team. Other important factors are also the social roles and positions of actors, group norms and the structure and processes of the group. H. Macháčková-L. Dědková<sup>3</sup> also holds a similar opinion and says that it is in the collective that disturbed relationships or norms manifest

themselves in some way, which can result in bullying. In describing cyberbullying, they particularly emphasize witnesses who are performers involved in this process and the overall social environment in which cyberbullying takes place.

An interesting classification of cyberbullying actors is offered by the Slovak cyberbullying expert K. Hollá<sup>4</sup>, who divides them into six categories:

1. cyber aggressor (or cyber tyrant);
2. a combined aggressor, i.e. person who conducts both offline and online bullying;
3. aggressive cyber victim, that can be both cyber aggressor and cyber victim simultaneously;
4. passive cyber victim;
5. a false cyber victim who is not a victim in the true sense of the word but a person of an aggressor/persecutor who pretends to be a victim;
6. watchers and supporters.

Aggressors (perpetrators, attackers) of electronic bullying can also be termed e-aggressors. The notion describes a man aggressively acting and at the same time drawing attention to the way of manifestation through technology. As regards the aggressors, M.R. Kohut<sup>5</sup> says: “*Apart from sophisticated technologies, cyberbullying is no different from traditional bullying by an aggressor. As in any other form of bullying, the aim is the same: to hurt, frighten and humiliate the victim either publicly or in private*”. In cyberbullying, however, aggressors are offered more powerful and insidious weapons in the form of ICT resources.

The aggressor's personality is formed during his ontogenesis. K. Hollá<sup>6</sup> refers to E. Jaššová, who points out that most child aggressors use their physical superiority, maturity, which facilitates their aggressiveness. This kind of self-promotion tends to be more common in children who lack other possibilities of attracting attention, who lack different qualities and have a narrower range of interests. They may have a lot of energy, but it is not directed and they find their venting in aggressiveness. Some aggressors may act as extroverts with the tendency to entertain the collective at the expense of others. In cyberbullying, however, physical strength does not matter. Talking about cyber aggressors, they may not be individuals who are more socially skilful in the real world; on the contrary, they may be people who are shy in real life, lack assertiveness and are unable to relate to others. Cyberspace gives them the opportunity to be active or even aggressive. For individuals who are considered physically or socially disadvantaged, the virtual environment can also be a force due to anonymity and greater skills in handling technology. It does not matter age, gender, strength and social status, or real life achievements. In addition to anonymity, the absence of visual and auditory feedback can also have a negative impact on cyberbullying. By not seeing his/hers victim, the aggressor is unable to assess the consequences of his/hers actions, both affective and cognitive. As reported by M. Vašutová et al.<sup>7</sup>, empathy and set internal limits with limited contact, or lack of feedback significantly decimates. N. Willard<sup>8</sup> has a similar view and says that “*when a young aggressor sees rejection as a response of others' to his aggressive behaviour, this knowledge can lead him to feel*

<sup>4</sup> Hollá, K.: *Sexting a kyberšikana*. Bratislava: Iris, 2016, p.34.

<sup>5</sup> Kohut, M.: *The complete guide to understanding, controlling, and stopping bullies: a complete guide for teachers & parents*. US, Florida, Ocala: Atlantis Publish Group, 2008, p. 26.

<sup>6</sup> Hollá, K.: *Elektronické šikanovanie: nová forma agresie*. Bratislava: Iris, 2010, p. 28.

<sup>7</sup> Vašutová, M. et al.: *Proměny šikany ve světě nových médií*. Ostrava: FF Ostravské univerzity v Ostravě, 2010, p. 91.

<sup>8</sup> Willard, N.: *Cyberbullying and cyber threats: responding to the challenge of online social aggression, threats, and mistress*. Champaign: Research Press, 2007, p.76.

<sup>1</sup> In the cyberspace of digital media, one projects both his positive and negative sides. Cyberspace becomes a kind of “mirror” of man. On this, please see: Gálik, S.: On Human Identity of Cyberspace of Digital Media. In *European Journal of Transformation Studies*. Vol. 7, 2019, No. 2, p. 42.

<sup>2</sup> Černá, A.: Online obtěžování a kyberšikana. In Ševčíková, A. et al.: *Děti a dospívající online. Vybraná rizika používání internetu*. Praha: Grada, 2014, p.129.

<sup>3</sup> Macháčková, H., Dědková, L.: *Aktéři kyberšikany*. In Černá, A. et al.: *Kyberšikana. Průvodce novým fenoménem*. Praha: Grada, 2013, p. 55.

shame, "face loss""). A. Černá<sup>9</sup> adds in this regard that for aggressors of any bullying, there is a common low level of empathy compared to others. They are thus unable to empathize with the victim and understand the injuries they cause. For cyberbullying, this phenomenon will stand out even more – it relates to so-called cockpit effect (Heirman, Walrave, 2008) – an alignment based on World War II pilots dropping bombs on the civilian population. People seemed so distant and unrealistic from the cockpit that they did not even consider them and the suffering they caused. Similarly, the cyber aggressor does not see his/hers victim and his/hers reactions and does not estimate how much harm he or she could cause.

Thus, we can call a cyber aggressor a person who has no guilt, is not worried about hurting someone. He or she does not consider his/hers actions immoral and often blames the victim. Cyberbullying aggressors can be divided into active and passive<sup>10</sup>. An active e-aggressor is a person who in many situations reacts aggressively, has a positive relationship to violence and a strong need to control others. A passive e-aggressor is loyal to the suffering of others and often becomes an accomplice in bullying others.

Different styles of cyberbullying are typical for different types of cyber aggressors. They also differ in the motives of their behaviour, the ways they hide or spread their activities. A. Kavalír eds.<sup>11</sup> classifies four types of cyber aggressors as follows:

- The type of so-called "vengeful angel" – it is typical of this type that he or she does not perceive himself/herself as an aggressor. He or she sees himself/herself as a person who corrects evil and protects himself/herself and others from the "villain" – his or her victim. This includes people who often become aggressors for two reasons. In the first case, because they themselves were victims of offline or cyberbullying and feel they have the right to avenge others for what they had to survive. The second case concerns people trying to protect a friend who was bullied. These types are mostly bullying on their own, but can involve others in their activities. They want to take justice into their own hands.
- The type of power-hungry aggressor – they are those who exercise authority and power, want to demonstrate their strength. They desire to control others through fear and often need an audience they boast about. If they do not receive sufficient response, praise, the attacks intensify. Interestingly, the actors are often girls, less physically fit, disliked children. However, they show greater technical skills. Their intention is to frighten and shame victims, which is enabled by the anonymous environment of cyberspace and the fact that they cannot directly confront the victims. They look harsh, rough, but in reality they are not. Due to the features described above, these may be the most dangerous type of cyber aggressors of all.
- The type of spoiled girls – those are mostly girls who are bored, looking for distraction and fun. Most often bullying other girls on a whim. Cyberbullying is usually for fun and requires an audience. Their activities shall cease if the actors and prospectors do not get the appropriate entertainment they expected from their actions.
- The type of unintentional aggressor – they are not necessarily aggressors in the true sense of the word. They react disproportionately to a hateful, provocative attack, unaware of the consequences of their actions. They may feel injured or angry; tend to react to anger and frustration. They don't think about their actions before clicking the "send" button. They are unaware of the magnitude of cyberbullying, experimenting and doing individual deeds often for fun or simply because they "can".

It is also interesting to mention briefly the characteristics of the cyber aggressor in terms of *gender*. Cyberbullying studies do not provide adequate gender differences between e-aggressors. Some authors state no significant changes and argue that gender is not a significant predictor of involvement in cyberbullying. Analysis of N.A. Card et al (2008) brought findings that boys are more physically aggressive and include physical attacks in individual forms of bullying (e.g. threats of physical violence through electronic communication, happy slapping, etc.). Girls have strong verbal abilities and can make attacks through text messages. However, gender differences are less different in cyberbullying than in traditional bullying. Any differences may be due to different ways of using the Internet and online activities. For example, boys play games more often, so they can be victims of direct cyberbullying – flaming, insults or abuse. Girls are more likely to engage in social activities – they communicate, read, blog, contribute to discussions – they may encounter an indirect form of cyberbullying, e.g. forwarding emails, identity theft, defamation, slander, etc.<sup>12</sup> K. Hollá<sup>13</sup> adds that, from a gender perspective, boys are more likely to become cyber aggressors, as they have greater technical skills with complex Internet applications. However, this finding does not exclude girls from committing this socio-pathological phenomenon, as female aggressors choose this form of violence because of the anonymity of cyberspace and the low possibility of real confrontation.

### 3 Research methodology

We consider the issues discussed at the beginning of this contribution to be extremely topical and interesting. In examining these contexts, we decided to use a quantitative research strategy as it results in diverse data. The basic tool of quantitative research was a questionnaire of our own construction, which contained 51 questions of various characters. In the evaluation and interpretation of research results were used methods of analysis, synthesis, comparison, methods of statistical data processing and their testing, as well as generalization of data or their graphical representation.

The research was focused primarily on high school students, who also formed the object of our research. Questionnaire categories, their content, form and wording were also adapted to respondents' age. In order for the research to achieve relevant and interesting results, our aim was to seek as many respondents as possible. We set a minimum limit of 500 students of both genders. The lower age limit was 14 years; the upper age limit was 20 years. The research was carried out in the region of Třnava.

Since the research carried out was exploratory in nature (we examined the experience, consequences, attitudes and possibilities of protection and prevention from the perspective of cyberbullying victims), we did not formulate hypotheses in this case, but on the basis of comparison of literature and research of discussed problems up to now, we followed several assumptions. The following three selected assumptions are important for the purpose of this contribution:

1. We assume that the most frequent form of cyberbullying among the implementers was identity theft.
2. We assume that the most common reason for cyberbullying is the revenge of cyber aggressor.
3. We assume that cyber aggressors most commonly committed bullying through social networking sites.

We then digitized all print versions of the questionnaires and respondents' answers into electronic form. The electronic questionnaire was created through Google, which we used to process more accurate and thorough results. The obtained data were tested, analysed, evaluated and we have drawn certain

<sup>9</sup> Černá, A.: Online obtěžování a kyberšikana. In Ševčíková, A. et al.: *Děti a dospívající online. Vybraná rizika používání internetu*. Praha: Grada, 2014, p. 133.

<sup>10</sup> Hollá, K.: *Elektronické šikanovalenie: nová forma agresie*. Bratislava: Iris, 2010, p. 29.

<sup>11</sup> Kavalír, A. (eds.): *Kyberšikana a její prevence – příručka pro učitele*. Plzeň: Člověk v tísni o.p.s., 2009, p. 19-21.

<sup>12</sup> Macháčková, H., Dědková, L.: Aktéři kyberšikany. In Černá, A. et al.: *Kyberšikana. Přívodce novým fenoménem*. Praha: Grada, 2013, p. 68.

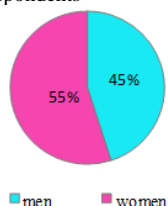
<sup>13</sup> Hollá, K.: *Kyberšikana*. Bratislava: Iris, 2013, p. 34.

conclusions and opinions from them that we present in the next chapter of the contribution.

#### 4 Interpretation of research results

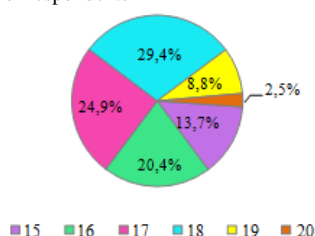
The first part of the questionnaire was devoted to the demographic data of respondents (gender, age, level of education). 775 respondents, both genders, participated in the research. However, some questionnaires were not returned, fully completed or could not be used and included in the research sample for other reasons. The rate of return of the questionnaires is **86.1 %**, which we consider a success. The following graphs report the identification data of the respondents who participated in our research.

Graph 1: Gender of respondents



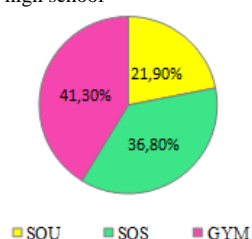
Source: Own processing

Graph 2: Age of respondents



Source: Own processing

Graph 3: Type of high school

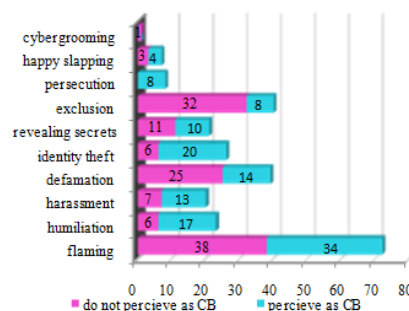


Source: Own processing

In addition to the identification data, we also identified some of the respondents' preferences in the context of spending time in cyberspace or the communication platforms they use there. It should be noted that respondents had the opportunity to indicate more response options for most questions in the questionnaire. We can say that more than 71 % of respondents spend four or more hours on the Internet every day. We consider this to be highly alarming, as several authors point out that being online for more than three hours a day can have a significantly negative, even pathological impact on children and juveniles.

In the following part of the contribution, due to the limited scope and the large amount of data obtained, we will interpret only a selected area of research, which focused exclusively on implementers of electronic bullying, their motives, experienced emotions or behavioural tendencies and actions, and other contexts related to this phenomenon (q. no. 42-51 in questionnaire). The research results show that up to 20.9% of the research sample, which represents 162 respondents belongs to this group. As the respondents may have had multiple experiences of realizing different forms of cyberbullying, they could respond by marking multiple options.

Graph 4: The forms of cyberbullying realized by aggressors



Source: Own processing

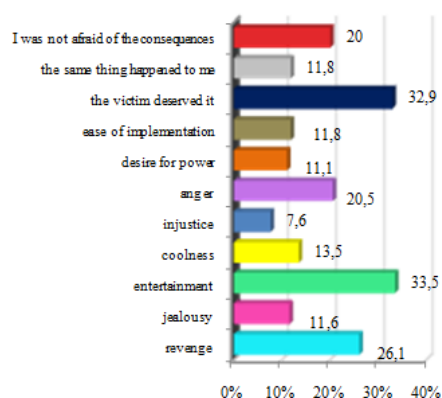
Graph 4 shows the number of respondents who implemented different forms of cyberbullying, as well as the difference in who considers or does not consider their behaviour as being identical to electronic bullying. For offenders, we included two separate questions in the graph. In Question 42 we asked whether respondents in their opinion became the perpetrators of cyberbullying, 68 respondents answered positively, which represents 8.8% of the research sample. In Question 43, we investigated whether they implemented any type of behaviour on the Internet towards other persons, while not using the notion of cyberbullying (or its forms). With this question, we wanted to see what the respondents perceive as cyberbullying and whether they are aware that they have become such aggressors. Up to 162 respondents answered positively in Question 43, which represents almost 21% of the research sample. The most common forms of cyberbullying that e-aggressors used in cyberspace include flaming (44.4%), exclusion from online groups (24.7%), defamation (24.1%) and imitation, use and theft of foreign identity (16%). We assume that flaming and exclusion was identified by most respondents because they are either digital game players and/or members of certain specific virtual communities, where these two types of actions are easiest to accomplish. What is interesting is the difference between whether the perpetrators are aware that they have implemented a certain type of cyberbullying. While in flaming, the ratio between those who evaluate their behaviour as cyberbullying and those who do not evaluate their behaviour as cyberbullying is fairly balanced (38 respondents do not perceive as cyberbullying, 34 perceive as cyberbullying), when excluded from online groups, up to four times the perpetrators do not perceive this phenomenon as a form or manifestation of cyberbullying in proportion to those who deliberately implemented the exclusion as cyberbullying. This disproportion may be due to the fact that in gaming communities it is possible that behaviours such as flaming or ostracization and exclusion are to some extent considered a normal component and natural phenomena in this environment. This is confirmed by the interesting commentary of one of such aggressors, which we present in the original version: *"Flame in small quantities does not cause any malice in person, I do not consider it bullying. I know I do not cause them any harm and in my group this is more of a form of deepening friendship"*. Therefore, most implementers do not seem to realize that it is in fact a real form of negative and inappropriate behaviour in cyberspace. This is also confirmed by the outcome of Question 16, where nearly 19% of respondents said cyberbullying is a common part of the Internet.

We determined a different situation in identity theft; where out of 26 respondents who implemented this action, up to 20 of them realize that this is cyberbullying. It follows that they chose this form deliberately with the aim of harming the victims and clearly causing them problems. The fact that such a significant difference between awareness and ignorance of cyberbullying was proven precisely when imitating and using the identity of others may be related to the fact, that it is possible to realize this form almost exclusively in cyberspace. It offers offenders many options and weapons to deliberately harm or threaten victims. In the persecution, we even found that all who confessed to its

implementation are aware of and evaluate their behaviour as cyberbullying with the intention of hurting others. The least realized form in our research is cybergrooming, which was used only by one respondent. Cybergrooming is mostly associated with older Internet users who target child victims and abuse. Happy slapping was actively performed by 7 students, while the cyberbullying non/awareness rate is approximately the same. However, this number is relatively high. Given that there have been many cases of happy slapping and media coverage recently, we feel that this highly negative and dangerous phenomenon is starting to take place increasingly among young people and that the pain and suffering of victims is spreading virally (especially via YouTube). At the same time, it can be stated here that the Assumption 1 that the most frequent form of cyberbullying among the implementers was identity theft was not confirmed.

To clarify the circumstances of cyberbullying, we also focused on the motivation of the attackers to implement selected forms of bullying. The desire for entertainment (33.5 %) led the e-aggressors to action most often. Almost the same number of respondents committed cyberbullying because the victim deserved it (32.9%). Other notable motivational factors were revenge (26.1%), anger (20.5%) and absence of fear of action consequences (20%). These results are similar to those in question 16, where over 20% of respondents said they perceived cyberbullying as a fun or a way of revenge. The slightly less tendency to activity was caused by the same experiences with cyberbullying, the ease of realization, the desire for power, the coolness or the jealousy. In this context, we can state concrete statements by the respondents-aggressors about what led them to do so: *"I was bullying because the person was doing exactly the same thing to me until I got up to it"; "Although I hurt someone, it was not meant bad, I just wanted him/her to feel the way I felt when he/she hurt me and realized he/she was making a big mistake"; "People will do everything to return what the other deserves"; "If someone is being bullied, whether in real life or on the Internet, I think it is just his/hers fault that he/she cannot defend himself/herself."* Exact data of individual motivating factors of e-aggressors are shown in Graph 5. Research results suggest that Assumption 2 that the most common reason for cyberbullying is the revenge of cyber aggressors was only partially confirmed, as revenge as a motive for aggressive behaviour is among the three most cited initiating reasons for cyberbullying.

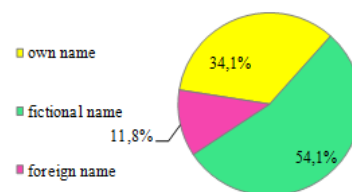
Graph 5: Motivation of cyberbullying implementers



Source: Own processing

Attention was also paid to identifying traits of the perpetrators, and to choosing a username in cyberbullying. We have found that more than half of e-aggressors (54.1%) are cyberbullying under a fictional name. Almost 12% of the total number of attackers use a foreign name in the context of bullying on the Internet, most of which carry out identity theft. More than a third of all implementers are cyberbullying under their own name.

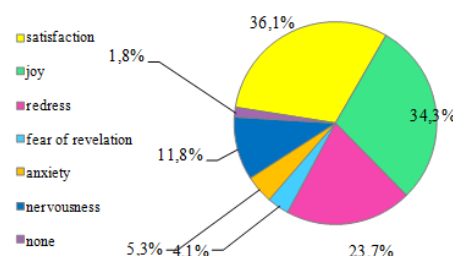
Graph 6: Names of e-aggressors



Source: Own processing

In the next step we tried to find out what feelings in cyberbullying implementers caused their actions. Also in this question, we offered the respondents the opportunity to mark multiple answers for a comprehensive statement, as we assumed that several different emotions culminated in e-aggressors. It is striking that over 94% of e-aggressors experienced positive emotions, namely satisfaction (36.1%), joy (34.3%) and redress (23.7%). Another widespread feeling is nervousness described by almost 12% of the attackers. To a lesser extent, anxiety or fear of revelation is also present. Some respondents (1.8%) even stated that their actions did not result in any emotions.

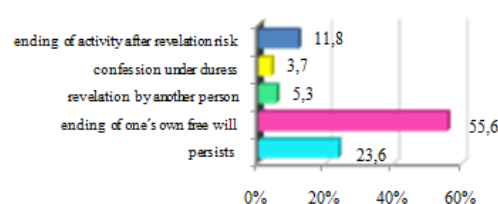
Graph 7: Emotions of e-aggressors



Source: Own processing

Within cyberbullying, it is also noteworthy the ending of this process; we have used Question 47 to map this issue. More than half of the e-aggressors stopped implementing cyberbullying of their own free will. 20.8% of the attackers put an end to bullying by external agents. After the fear of revelation, 11.8% of offenders did so, 5.3% of e-aggressors were directly revealed by another person, and 3.7% of the attackers admitted to cyberbullying because of the perceived pressure. Almost a quarter (23.6%) of e-aggressors describes their actions as persistent.

Graph 8: The process of ending cyberbullying



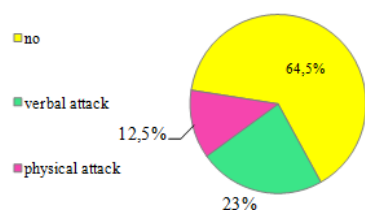
Source: Own processing

We were also interested in the relationship between the perpetrators of cyberbullying and their victims. An exceptionally high percentage (71.3%) of the implementers said they bullied their acquaintances. As many as 32.7% of attackers cyberbullied classmates, 21% of attackers cyberbullied former friends, 10.5% cyberbullied expartners and 8% cyberbullied friends. Completely foreign people were bullied by 27.8% of e-aggressors. In addition to the relationship between cyberbullying actors, we also investigated whether the perpetrators had confided in their deeds and the conduct of these actions and found that up to 77.9% of e-aggressors were silent about cyberbullying. Of the other 22.1% of the actors, half of them admitted their behaviour

to the group of friends. The other 11.05% of the perpetrators confessed publicly to the whole of their surroundings.

Similarly, as we wanted to know in the victims if the aggressive behaviour in some way transferred into reality, we also asked cyberbullying respondents in Question 50 about this. More than 35% said that somehow their aggression shifted to the real environment. Verbal attack was carried out by 23% of offenders, 12.5% of the attackers even carried out some physical attack on their victims. Research shows that people who tend to hurt others more often realize these attacks and aggression in cyberspace.

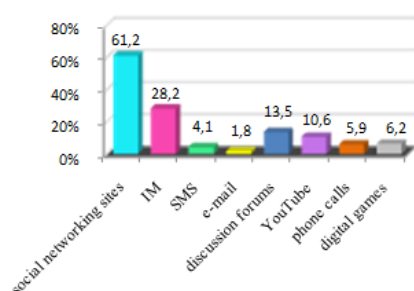
Graph 9: Transfer of cyberbullying to reality by aggressors



Source: Own processing

In analysing the situation of realization of cyber attacks in the context of offenders, in Question 39 we also questioned the use of platforms in which cyberbullying occurred. Similarly to the victims, e-aggressors made the most of their attacks through social networking sites (61.2%). The second "most popular" platform, according to the results of our research, is the IM messages, identified by 28.2% of respondents. In this context, we can also mention digital games, which were mentioned by 6.2% of respondents. More than 10% of aggressors reported negative behaviour on YouTube. We assume that these may be particularly unpleasant, offensive and slanderous comments under the videos of favourite youtubers, many of whom young people take as role models and idols. Therefore, they have a need to express themselves and protect them from possible "haters" who can describe their favourites in not too flattering light. The least used is e-mail communication (1.8%), which is also related to the age of the research sample and we assume that they do not use e-mail very often. Social networking sites and IM messaging are what the young generation is most likely to use to communicate in cyberspace. However, as we can see, these communication platforms are also the space where various forms of electronic aggression are most often applied and implemented. The results of the research shown that the Assumption 3 that cyber aggressors most commonly committed bullying through social networking sites was confirmed.

Graph 10: Platforms used for cyberbullying by aggressors



Source: Own processing

Lastly, with regard to the category of cyber victims and cyber aggressors, we decided to map, compare and interpret this categorization also in the context of traditional bullying. The results of our research show that, while 53 respondents were victims of traditional bullying, which represents 6.8 % of the research sample, cyber victims are nearly 40% of the research sample. Similar results are also in the category of aggressors, with 3.6% of respondents becoming the perpetrators of

traditional bullying and almost 21% of the research sample was cyber aggressors. In both categories, we can see that the increase in victims and aggressors is up to 5 times in cyberspace than in the real world. It is therefore very important to realize that cyberspace is becoming, besides many benefits, an environment with demonstrably increasing aggression and unwanted behaviour by some of its users, and these results cannot be ignored or overlooked.

Tab. 1: Comparison of the number of victims and aggressors in traditional bullying and cyberbullying

| Traditional bullying | n  | %   | Cyber bullying | n   | %    |
|----------------------|----|-----|----------------|-----|------|
| Victim               | 53 | 6,8 | Victim         | 294 | 37,9 |
| Aggressor            | 28 | 3,6 | Aggressor      | 162 | 20,9 |

Source: Own processing

## 5 Conclusion

We are currently experiencing a new social "digital" era in which we can hardly imagine our lives without information and communication technologies and digital media. These undoubtedly make life easier for us in many areas and change it for the better. They are an important source of information, news and knowledge<sup>14</sup>, and represent important opportunities for our personal and social interaction and communication.

It can be stated that important essential elements of communication between people undoubtedly include, whatever its form is, a certain degree of appropriate social behaviour and decency<sup>15</sup>, as well as security. Let us point out that cyberspace security is currently one of the most serious problems, because cyberspace currently provides almost unlimited possibilities for various forms of harming others in terms of communication. Cyberbullying is clearly one of them. It is a socio-pathological phenomenon that negatively affects individuals, families and ultimately society as a whole. It is also a serious psychological, moral and ethical problem, which as such requires adequate professional attention in society as well as a real effort to prevent and address it.

In order to tackle this problem successfully, especially in prevention, we consider it very important to identify cyberbullying, which takes place for many years and unfortunately without notice from the surroundings, especially parents or teachers. At the same time, it is essential that not only the professional but also the general public have sufficient information about this phenomenon, its nature and its manifestations by both the perpetrators and the victims. In this respect, it is important to provide institutional support to preventive information activities on cyberspace risks, as well as various projects, or societal research on them.

In this context, we believe that the family is the basic social environment in addition to the school that can, and should be most preventive in relation to the potential risk of cyberbullying. The use of appropriate techniques of parental mediation, building trusting relationships with children, cooperation of parents and schools on digital security issues, as well as auto-education of parents in media and digital literacy and competences are factors that can have a significant impact on the elimination of various negatives in the context of cyberspace and hence cyberbullying.<sup>16</sup>

In conclusion, we would like to appeal to a consistent and responsible approach to the issue, since cyberbullying does not

<sup>14</sup> Gálik, S.: Influence of Cyberspace on Changes in Contemporary Education. In *Communication Today*, Vol. 8, 2017, No. 1, p. 37.

<sup>15</sup> Hladíková, V.: Ethics of electronic communication- knowledge and its application by primary school students. In *SGEM 2016: 3rd International Multidisciplinary Scientific Conference on Social Sciences and Arts: Sociology and Healthcare*. Volume II: Psychology and Psychiatry, Sociology and Healthcare, Education. Sofia: STEF92 Technology, 2016, p. 463.

<sup>16</sup> Educations in the area of media competences and media literacy are a relevant preparation for effective self-realization in cyberspace. It also answers security questions in today's dynamic information and media age. Kačínová, V.: Media competence as a cross-curricular competence. In *Communication Today*. Vol. 9 (2018), No. 2, p. 39.

remain without the consequences, which are often tragic. Possibilities of its prevention and elimination are in our hands (at least to some extent and in some way). However, we emphasize the need for real cooperation between parents, educators and various experts, as well as the implementation of prevention projects and measures at regional, national and international level.

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# TRENDS IN THE DEVELOPMENT OF SOMATIC PARAMETERS AND MOTION PERFORMANCE IN ROMANY CHILDREN OF PRIMARY SCHOOL AGE

<sup>a</sup>RUDOLF HORVÁTH, <sup>b</sup>PETER PETRIKÁN, <sup>c</sup>INGRID RUŽBARSKÁ

*Pedagogical Faculty, Prešov University in Prešov, ul. 17 novembra 15, 08001 Prešov Slovakia*

*email: <sup>a</sup> rudolf.horvath@unipo.sk, <sup>b</sup>*

*peter.petrikan.p1@gmail.com, <sup>c</sup> ingrid.ruzbarska@unipo.sk*

*This research was implemented within the VEGA 1/0122/19 project Somatic and motor characteristics of primary school children and their development trends with the focus on marginalized Romany communities.*

**Abstract:** The paper presents the results of research covering 596 Romany children of primary school age. The research objective was to identify the somatic parameters and the motion performance of 7- to 10-year old Romany boys and girls. In order to determine the trends in the development of these children, the results were compared to those presented in Horváth (2001). The latter research covered 1093 Romany children living in East Slovakia. We evaluated the data in terms of statistical significance of the differences between the results obtained in 2000 and 2019. We analyzed the somatic parameters and motion performance of Romany children attending primary school in terms of improved or worse results during the period of 19 years. We calculated the basic statistical values and tested the hypotheses by Student t-test. The results are summarized in tables and diagrams. It was found out that the somatic parameters of Romany boys and girls of all age categories have significantly improved. The motion performance has also improved in a statistically significant manner, however, this finding does not hold for all test items not for all age categories.

**Keywords:** Somatic parameters, motion performance, primary school age, Eurofit test, Romany children

## Introduction

The questions of life conditions, social status, health and education of a part of the Romany population in Slovakia have been presented as a serious problem on number of occasions. It has been pointed out that these problems primarily occur in ethnically homogeneous communities defined in the governmental documents as marginalized Romany communities. Academics have pointed out many times that the reason for the effort to tackle and solve these problems (usually of low success rate) is an insufficient knowledge of internal and external causes of these problems. No doubt, these problems are not monothematic; on the contrary, they are highly complex and interrelated (or, mutually conditioned). The Romany population in Slovakia amounts to about 450000 people. They mostly live in East Slovakia. While children in the majority population represent 12%, in the Romany community it is 46%. Our project is aimed to contribute to and update the available empirical and scientific knowledge of the fundamental socio-bio-physiological characteristics and differences in the development of Romany children who attend primary schools. These issues bear on a range of both contemporary and future problems of marginalized Romany communities (we are referring to the interconnection between the health condition, the social-economic situation, success at school, the ability to find a job, etc.). The project objective consists in the identification of the somatic development and motor abilities in primary school children coming from marginalized Romany communities by means of anthropometric methods and by application of the standardized Eurofit test. The new data will be compared to those obtained 19 years ago and presented in Horváth (2001) in order to determine the development trend of motor abilities. No such research has yet been implemented in Slovakia.

## 1 Methods

### 1.1 Data acquisition methods

The research data were collected at East Slovakian primary schools from January to June 2019. We measured somatic parameters, weight (TH) and height (TV) in 7- to 10-year-old Romany children. Based on these data we calculated the BMI value:

$$\text{BMI} = \text{TH} / \text{TV}^2$$

The motion performance was determined by means of the EUROFIT test according to Moravec et al. (1994,1996). We tested 596 Romany pupils at primary schools, including 286 boys and 310 girls.

|                        |   |                          |
|------------------------|---|--------------------------|
| TH                     | weight  |                          |
| TV                     | height  |                          |
| BMI                    | Body mass index                                   |                          |
| EUROFIT                | test items:                                       |                          |
| TR                     | Flamingo balance test                             | factor: static balance   |
| TAP                    | plate tapping                                     | factor: frequency speed  |
| PRKL                   | sit and reach                                     | factor: body flexibility |
| SKOK                   | standing long jump                                | factor: dynamic strength |
| of legs                |   |                          |
| LS                     | sit-ups   | factor: dynamic and      |
| endurance              | strength of the abdominal and loins-thigh muscles |                          |
| VZH                    | push-up test                                      | factor: static and       |
| endurance              | strength of arms                                  |                          |
| CBEH                   | shuttle run 10x5m                                 | factor: running velocity |
| with direction changes |   |                          |
| VBEH                   | multistage shuttle run                            | factor: running          |
| endurance              |   |                          |

### 1.2 Research hypotheses

H0 -1: It is hypothesized that there will be no statistically significant difference between the results of Romany children in the 2000 research and the results in the 2019 research in terms of individual somatic parameters.

H1 -1: It is hypothesized that there will be a statistically significant difference between the results of Romany children in the 2000 research and the results in the 2019 research in terms of individual somatic parameters.

H0 -2: It is hypothesized that there will be no statistically significant difference between the results of Romany children in the 2000 research and the results in the 2019 research in terms of individual motion performance tests.

H1 -2: It is hypothesized that there will be a statistically significant difference between the results of Romany children in the 2000 research and the results in the 2019 research in terms of individual motion performance tests.

H0-3: It is hypothesized that the somatic parameter results of Romany children participating in the 2019 research will be better than those of Romany children who took part in the 2000 research.

H1-3: It is hypothesized that the somatic parameter results of Romany children participating in the 2019 research will not be better than those of Romany children who took part in the 2000 research.

H0-4: It is hypothesized that the motion performance results of Romany children participating in the 2019 research will be better than those of Romany children who took part in the 2000 research.

H1-4: It is hypothesized that the motion performance results of Romany children participating in the 2019 research will not be better than those of Romany children who took part in the 2000 research.

### 1.3 Data processing

These hypotheses will be verified by means of statistical methods. Hypotheses H01 and H0-2 will be confirmed or rejected by Student's one sample t-test. A correct use of this test requires an analysis of the test cohort normality. This is tested by Shapiro Wilk test. This test has confirmed the cohort normality and thus justified the use of the parametric Student's t-test. The "t" value is calculated as follows:

$$t = \left( \frac{x_{2000} - x_{2019}}{s} \right) \sqrt{n}$$

where

$\bar{x}_{2000}$  – arithmetic average of the research values in Horváth (2001)

$\bar{x}_{2019}$  – arithmetic average of the research values in 2019

s – standard deviation in 2019

n – number of probands in 2019

The calculated value t was compared at the expected significance level of  $\alpha=0,05$  to the table value of Student's distribution at n-1 degrees of freedom  $t_{krit}$ . If  $t > t_{krit}$  the null hypothesis  $H_0$  is rejected and the alternative  $H_1$  hypothesis is accepted.

## 2 Results and discussion

### 2.1 Somatic parameters

The obtained somatic parameter values were used to calculate the BMI – the Body mass index - and the basic statistical values – the arithmetic average and the standard deviation. Student's one sample t-test was applied to all the values and age categories in order to confirm/reject the  $H_0$  hypothesis saying that there is no statistically significant difference between the somatic parameters in Romany children in Horváth (2001) and the 2019 research. The data are presented in Table 1 and Table 2.

Tab. 1: Somatic parameters of 7- and 8-year-old Romany boys and girls

| age |       |      | 7   |        |      |      |       |        | 8   |        |      |      |       |        |
|-----|-------|------|-----|--------|------|------|-------|--------|-----|--------|------|------|-------|--------|
|     |       |      | n   | x      | s    | t    | tkrit | t test | n   | x      | s    | t    | tkrit | t test |
| TV  | boys  | 2000 | 135 | 115.59 | 06.3 | 8.53 | 1.993 |        | 142 | 121.09 | 5.31 | 7.69 | 1.99  |        |
|     |       | 2019 | 72  | 122.35 | 6.72 |      |       | **     | 74  | 127.22 | 06.8 |      |       | **     |
|     | girls | 2000 | 136 | 114.84 | 6.71 | 8.91 | 1.99  |        | 132 | 120.47 | 06.4 | 7.79 | 1.987 |        |
|     |       | 2019 | 74  | 120.12 | 05.9 |      |       | **     | 87  | 125.86 | 6.45 |      |       | **     |
| TH  | boys  | 2000 | 135 | 20.92  | 2.39 | 7.69 | 1.993 |        | 142 | 23.18  | 2.91 | 7.26 | 1.993 |        |
|     |       | 2019 | 72  | 24.45  | 03.8 |      |       | **     | 74  | 28.68  | 6.86 |      |       | **     |
|     | girls | 2000 | 136 | 20.78  | 03.1 | 5.52 | 1.993 |        | 132 | 22.64  | 3.00 | 8.74 | 1.95  |        |
|     |       | 2019 | 74  | 22.1   | 2.89 |      |       | **     | 87  | 26.75  | 4.38 |      |       | **     |
| BMI | boys  | 2000 | 135 | 15.66  | 1.51 | 8.49 | 1.993 |        | 142 | 15.81  | 1.56 | 5.25 | 1.993 |        |
|     |       | 2019 | 72  | 16.29  | 01.8 |      |       | **     | 74  | 17.62  | 2.94 |      |       | **     |
|     | girls | 2000 | 136 | 15.66  | 1.69 | 2.84 | 1.992 |        | 132 | 15.75  | 1.27 | 5.46 | 1.98  |        |
|     |       | 2019 | 74  | 17.44  | 2.56 |      |       | **     | 87  | 18.36  | 1.56 |      |       | **     |

Tab. 2: Somatic parameters of 8-, 9- and 10-year-old Romany boys and girls

| age |       | 9   |        |      |       |       |        | 10  |        |      |       |       |        |
|-----|-------|-----|--------|------|-------|-------|--------|-----|--------|------|-------|-------|--------|
|     |       | n   | x      | s    | t     | tkrit | t test | n   | x      | s    | t     | tkrit | t test |
| TV  | boys  | 141 | 125.43 | 05.8 | 5.50  | 1.994 |        | 132 | 130.96 | 01.6 | 6.83  | 1.94  |        |
|     |       | 72  | 130.14 | 7.21 |       |       | **     | 72  | 137.06 | 7.52 |       |       | **     |
|     | girls | 133 | 124.5  | 6.56 | 7.87  | 1.993 |        | 141 | 130.23 | 07.3 | 10.33 | 1.990 |        |
|     |       | 74  | 130.57 | 6.58 |       |       | **     | 77  | 139.85 | 08.4 |       |       | **     |
| TH  | boys  | 141 | 24.94  | 4.53 | 7.94  | 1.994 |        | 132 | 27.4   | 04.7 | 7.34  | 1.994 |        |
|     |       | 72  | 32.04  | 7.54 |       |       | **     | 72  | 35.93  | 10.2 |       |       | **     |
|     | girls | 133 | 24.31  | 3.56 | 7.67  | 1.993 |        | 141 | 27.4   | 04.8 | 9.82  | 1.99  |        |
|     |       | 74  | 29.95  | 6.24 |       |       | **     | 77  | 36.25  | 8.17 |       |       | **     |
| BMI | boys  | 141 | 15.78  | 02.2 | 7.167 | 1.994 |        | 132 | 15.85  | 1.94 | 6.76  | 1.954 |        |
|     |       | 72  | 18.75  | 3.55 |       |       | **     | 72  | 18.87  | 3.77 |       |       | **     |
|     | girls | 133 | 15.66  | 1.85 | 5.41  | 1.993 |        | 141 | 15.85  | 1.82 | 9.15  | 1.99  |        |
|     |       | 74  | 17.44  | 06.7 |       |       | **     | 77  | 18.37  | 02.4 |       |       | **     |

n number of the tested children

x arithmetic average of the measured values

s standard deviation of the measured values

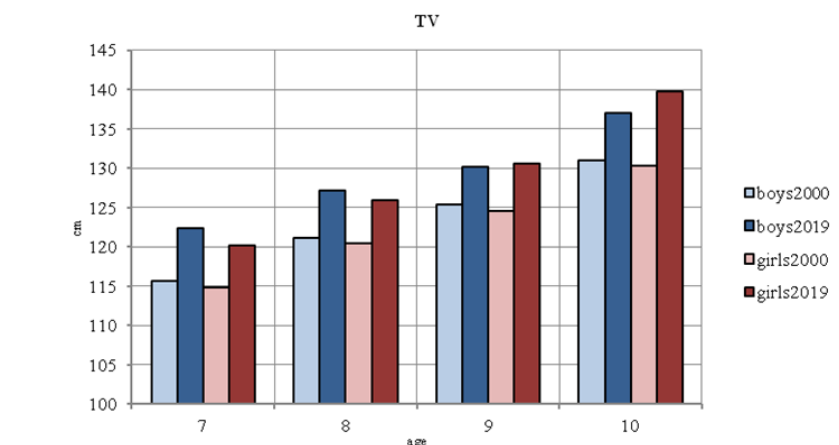
t calculated t-test value

tkrit Student's t distribution table value

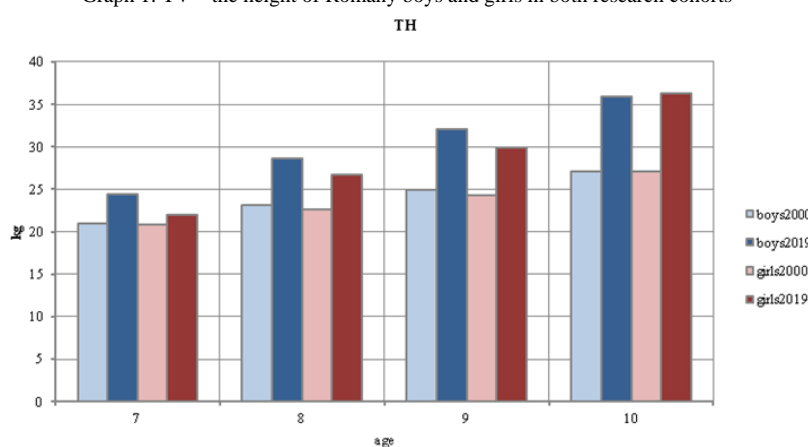
t test \*\* statistical significance of the values at the level of 0.05

Tables 1 and 2 suggest that  $t > t_{krit}$  holds for all age categories of boys and girls and therefore the differences between the 2000 and the 2019 cohorts at the level of 0.05 are statistically significant. This rejects the  $H_0$  null hypothesis. The  $H_1$  hypothesis has been confirmed. It means that there are statistically significant differences between the two cohorts at the expected significance level of  $\alpha=0,05$ .

The differences are illustrated in Graph 1.



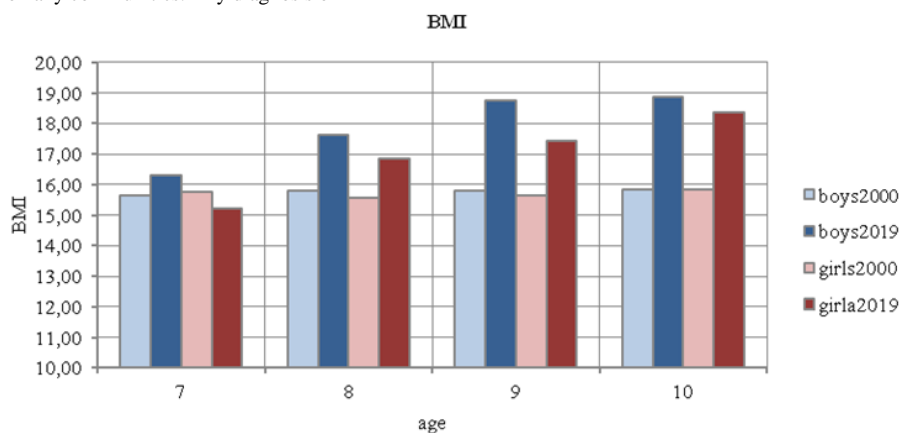
Graph 1: TV – the height of Romany boys and girls in both research cohorts



Graph 2: TH – the weight of Romany boys and girls in both research cohorts

An analysis of the two research projects has confirmed the H0 3 hypothesis according to which all age categories of Romany boys and girls have achieved better results in somatic parameters in the 2019 research than in the 2000 research. Horváth (2001) maintains that, in somatic parameters, Romany children fall behind the majority population by as much as two years. The 2019 results negate this claim. What is the reason for such a substantial improvement in somatic parameters? Is it a better standard of living of the Romany ethnic group? Our analysis of the measured values must take into consideration the heterogeneity of Romany communities. Any diagnosis of

somatic parameters in Romany children must take into account the proportion of children living in settlements, villages and towns. Future research must reflect this fact and extend the number of tested children in order to obtain more reliable results. Diagram3 presents the BMI results for all age categories of boys and girls in both of these research projects. The BMI data give support to the H0 -4 hypothesis saying that the results of the 2019 children are better than those presented in Horváth (2001). While the 2000 BMI data approach malnutrition, the 2019 BMI values meet the standard values for the given age category.



Graph 3: BMI – Body mass index of Romany boys and girls in both cohorts

Tab. 3: Motion performance of 7- and 8-year-old Romany boys and girls

| age  |       |      | 7   |        |       |       |       |        | 8   |        |       |       |       |        |
|------|-------|------|-----|--------|-------|-------|-------|--------|-----|--------|-------|-------|-------|--------|
|      |       |      | n   | x      | s     | t     | tkrit | t test | n   | x      | s     | t     | tkrit | t test |
| TR   | boys  | 2000 | 135 | 16.71  | 06.7  | 09.11 | 1.993 | **     | 142 | 14.76  | 7.31  | 8.54  | 1.99  | **     |
|      |       | 2019 | 72  | 13.87  | 4.55  |       |       |        | 74  | 10.94  | 4.64  |       |       |        |
|      | girls | 2000 | 136 | 16.74  | 6.73  | 8.44  | 1.99  | **     | 132 | 15.81  | 13.24 | 5.56  | 1.98  | **     |
|      |       | 2019 | 74  | 12.8   | 04.1  |       |       |        | 87  | 12.19  | 06.7  |       |       |        |
| TAP  | boys  | 2000 | 135 | 28.31  | 05.1  | 05.3  | 1.99  | **     | 142 | 27.51  | 6.33  | 9.22  | 1.99  | **     |
|      |       | 2019 | 72  | 25.64  | 6.53  |       |       |        | 74  | 21.72  | 5.34  |       |       |        |
|      | girls | 2000 | 136 | 32.12  | 5.47  | 9.26  | 1.99  | **     | 132 | 29.25  | 05.3  | 14.11 | 1.99  | **     |
|      |       | 2019 | 74  | 26.23  | 5.49  |       |       |        | 87  | 21.19  | 05.4  |       |       |        |
| SKOK | boys  | 2000 | 135 | 94.46  | 19.2  | 4.65  | 1.99  | **     | 142 | 106.34 | 17.61 | 05.5  | 1.99  | **     |
|      |       | 2019 | 72  | 103.13 | 20.7  |       |       |        | 74  | 116.3  | 16.83 |       |       |        |
|      | girls | 2000 | 136 | 81.5   | 17.1  | 2.35  | 1.99  | **     | 132 | 95.99  | 16.59 | 3.49  | 1.99  | **     |
|      |       | 2019 | 74  | 76.31  | 18.95 |       |       |        | 87  | 102.55 | 17.62 |       |       |        |
| LS   | boys  | 2000 | 135 | 10.17  | 4.29  | 1.14  | 1.99  | 1.14   | 142 | 12.25  | 4.49  | 8.81  | 1.99  | **     |
|      |       | 2019 | 72  | 09.6   | 4.25  |       |       |        | 74  | 16.24  | 3.87  |       |       |        |
|      | girls | 2000 | 136 | 7.54   | 3.93  | 0.21  | 1.99  | 0.21   | 132 | 9.17   | 4.72  | 12.2  | 1.99  | **     |
|      |       | 2019 | 74  | 7.61   | 2.95  |       |       |        | 87  | 14.28  | 3.91  |       |       |        |
| CBEH | boys  | 2000 | 135 | 39.21  | 5.89  | 8.49  | 1.99  | **     | 142 | 28.99  | 5.85  | 04.9  | 1.99  | **     |
|      |       | 2019 | 72  | 25.75  | 5.49  |       |       |        | 74  | 25.32  | 03.5  |       |       |        |
|      | girls | 2000 | 136 | 39.21  | 4.64  | 12.7  | 1.99  | **     | 132 | 30.68  | 6.71  | 13.73 | 1.99  | **     |
|      |       | 2019 | 74  | 29.66  | 6.47  |       |       |        | 87  | 25.35  | 3.62  |       |       |        |
| VBEH | boys  | 2000 | 135 | 11.48  | 4.57  | 03.9  | 1.99  | **     | 142 | 17.31  | 11.54 | 04.9  | 1.99  | **     |
|      |       | 2019 | 72  | 13.39  | 5.24  |       |       |        | 74  | 14.14  | 5.53  |       |       |        |
|      | girls | 2000 | 136 | 11.48  | 3.19  | 1.48  | 1.99  | 1.48   | 132 | 13.1   | 4.55  | 1.49  | 1.99  | 1.49   |
|      |       | 2019 | 74  | 10.71  | 4.48  |       |       |        | 87  | 13.81  | 05.2  |       |       |        |

Tab. 4: Motion performance of 9-and10-year-old Romany boys and girls

| age  |       |      | 9   |        |       |       |       |        | 10  |        |       |       |       |        |
|------|-------|------|-----|--------|-------|-------|-------|--------|-----|--------|-------|-------|-------|--------|
|      |       |      | n   | x      | s     | t     | tkrit | t test | n   | x      | s     | t     | tkrit | t test |
| TR   | boys  | 2000 | 141 | 08.9   | 06.9  | 01.2  | 1.99  | 01.2   | 132 | 12.54  | 6.56  | 6.17  | 1.99  | **     |
|      |       | 2019 | 72  | 9.44   | 4.47  |       |       |        | 72  | 9.35   | 4.47  |       |       |        |
|      | girls | 2000 | 131 | 13.76  | 7.39  | 06.1  | 1.99  | **     | 141 | 12.54  | 06.3  | 09.11 | 1.99  | **     |
|      |       | 2019 | 74  | 9.37   | 06.7  |       |       |        | 77  | 8.26   | 04.9  |       |       |        |
| TAP  | boys  | 2000 | 141 | 27.67  | 6.98  | 12.88 | 1.99  | **     | 132 | 24.75  | 4.87  | 10.28 | 1.99  | **     |
|      |       | 2019 | 72  | 21     | 4.36  |       |       |        | 72  | 19.64  | 4.19  |       |       |        |
|      | girls | 2000 | 131 | 28.18  | 5.86  | 16.71 | 1.99  | **     | 141 | 24.75  | 05.11 | 9.72  | 1.99  | **     |
|      |       | 2019 | 74  | 20.31  | 04.1  |       |       |        | 77  | 19.97  | 4.29  |       |       |        |
| PRKL | boys  | 2000 | 141 | 18.89  | 4.98  | 1.86  | 1.99  | 1.86   | 132 | 18.78  | 4.25  | 3.47  | 1.99  | **     |
|      |       | 2019 | 72  | 17.13  | 7.95  |       |       |        | 72  | 15.14  | 8.82  |       |       |        |
|      | girls | 2000 | 131 | 18.12  | 4.32  | 2.96  | 1.99  | **     | 141 | 18.78  | 04.5  | 3.64  | 1.99  | **     |
|      |       | 2019 | 74  | 15.35  | 7.97  |       |       |        | 77  | 15.39  | 08.12 |       |       |        |
| SKOK | boys  | 2000 | 141 | 108.34 | 22.44 | 0.373 | 1.99  | **     | 132 | 108.51 | 19.84 | 3.92  | 1.99  | **     |
|      |       | 2019 | 72  | 107.6  | 16.5  |       |       |        | 72  | 117.06 | 18.34 |       |       |        |
|      | girls | 2000 | 131 | 97.75  | 15.31 | 2.98  | 1.99  | **     | 141 | 108.51 | 16.9  | 1.49  | 1.99  | **     |

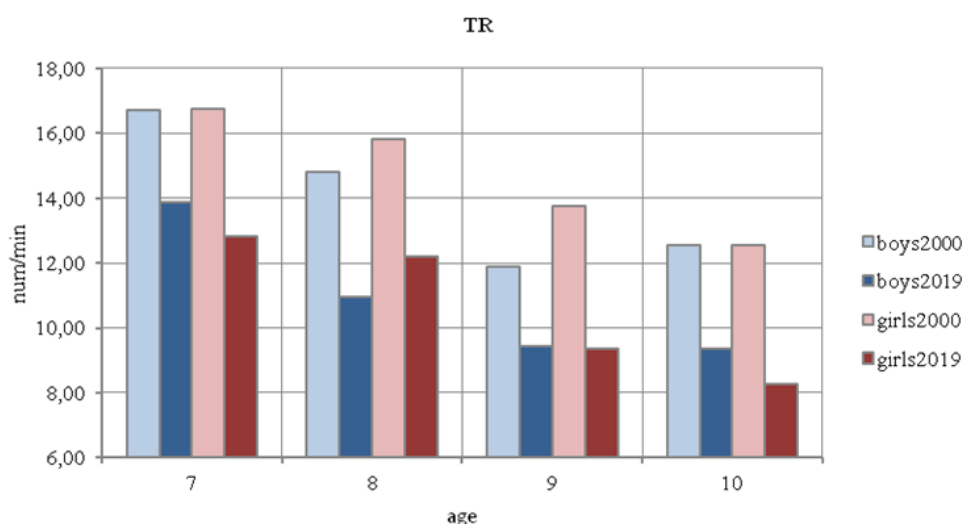
|      |       |      |     |       |       |      |      |      |     |        |       |       |      |     |
|------|-------|------|-----|-------|-------|------|------|------|-----|--------|-------|-------|------|-----|
|      |       | 2019 | 74  | 97.65 | 17.27 |      |      |      | 77  | 105.51 | 20.25 |       |      |     |
| LS   | boys  | 2000 | 141 | 14.21 | 04.9  | 4.49 | 1.99 | **   | 132 | 12.13  | 4.74  | 13.27 | 1.99 | **  |
|      |       | 2019 | 72  | 16.56 | 4.39  |      |      |      | 72  | 18.65  | 4.14  |       |      |     |
|      | girls | 2000 | 131 | 11.69 | 4.86  | 5.41 | 1.99 | **   | 141 | 12.13  | 4.46  | 8.85  | 1.99 | **  |
|      |       | 2019 | 74  | 14.38 | 4.24  |      |      |      | 77  | 16.57  | 4.36  |       |      |     |
| VZH  | boys  | 2000 | 141 | 13.84 | 10.9  | 0.07 | 1.99 |      | 132 | 8.67   | 06.5  | 7.93  | 1.99 | **  |
|      |       | 2019 | 72  | 13.91 | 8.16  |      |      |      | 72  | 19.15  | 11.13 |       |      |     |
|      | girls | 2000 | 131 | 7.76  | 4.64  | 0.35 | 1.99 |      | 141 | 8.67   | 5.66  | 2.95  | 7.99 | **  |
|      |       | 2019 | 74  | 7.55  | 4.94  |      |      |      | 77  | 11.79  | 9.21  |       |      |     |
| CBEH | boys  | 2000 | 141 | 27.35 | 06.12 | 7.47 | 1.99 | **   | 132 | 28.83  | 05.12 | 17.71 | 1.99 | **  |
|      |       | 2019 | 72  | 23.85 | 3.95  |      |      |      | 72  | 22.22  | 3.15  |       |      |     |
|      | girls | 2000 | 131 | 29.74 | 5.77  | 9.19 | 1.99 | **   | 141 | 28.83  | 5.79  | 13.89 | 1.99 | **  |
|      |       | 2019 | 74  | 25.79 | 3.76  |      |      |      | 77  | 24.52  | 2.71  |       |      |     |
| VBEH | boys  | 2000 | 141 | 18.97 | 7.28  | 3.57 | 1.99 | **   | 132 | 18.17  | 7.19  | 0.8   | 1.99 | 0.8 |
|      |       | 2019 | 72  | 16.64 | 05.5  |      |      |      | 72  | 17.5   | 6.98  |       |      |     |
|      | girls | 2000 | 131 | 14.57 | 5.37  | 0.86 | 1.99 | 0.86 | 141 | 18.17  | 6.31  | 3.71  | 1.99 | **  |
|      |       | 2019 | 74  | 14.23 | 3.37  |      |      |      | 77  | 16.13  | 4.79  |       |      |     |

The EUROFIT test was used to test motion performance. The measured values were used to calculate the basic statistical variables, i.e., the arithmetic average and the standard deviation. The results of Horváth (2001) were compared to the present data for each age category of Romany boys and girls with regard to each test item in order to verify the hypotheses. This was performed by means of the one sample t-test. We specified the statistical significance of the identified differences. The values are given in Tables 3 and 4.

item separately for boys and girls and for each age category.

Our analysis of the TR, TAP, SKOK a CBEH item tests indicates statistical significance at the level of 0.05 for all the differences between the compared cohorts (Horváth 2001 and

When analyzing the basic statistical items we decided to exclude the test items PRKL – sit and reach, and VZH - push-up test, because the coefficient of variation, i.e., the proportion between the standard deviation and the arithmetic average exceeds 50%. This means that the arithmetic average and the standard deviation in these two test items are not sufficiently valid for subsequent processing. Turek (1999) arrived at a similar conclusion in similar research which, however, was focused on the majority population in East Slovakia. Since the t-test was the 2019 tests) and for all age categories of boys and girls. Consequently, we reject the H0-2 null hypothesis and confirm the alternative H1-2 hypothesis. All in all, statistically significant differences between the two cohorts have been confirmed for these test items.

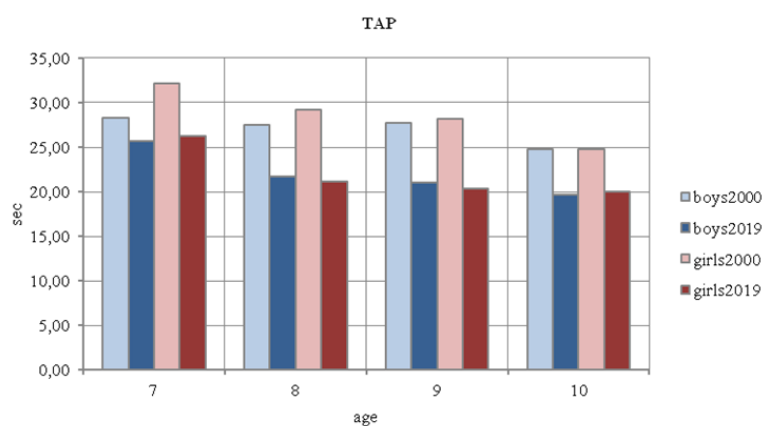


Graph 4: Comparison of the TR test item values – Flamingo balance test

It follows from Graph 4 that the most significant improvement was achieved for 8-year-old boys and 9-year-old girls. In general, the H0-4 null hypothesis has been confirmed for the TR item, according to which the Romany children of 2019 tests

achieve better results for all age categories of boys and girls than the Romany children tested in 2000.

TAP – plate tapping – factor: frequency speed of hand

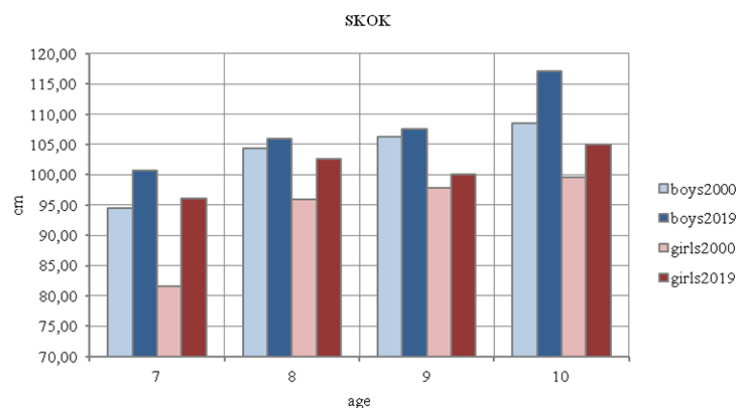


Graph 5: Comparison of the TAP test item values – plate tapping

It follows from graph 5 that the 2019 cohort's results are better than those of the 2000 cohort for all age categories. The most striking difference occurs in the groups of 8-year-old boys and 9-year-old girls. In general, the H0-4 hypothesis has been

confirmed for all age categories of both genders. This means that the 2019 cohort achieved better results than the cohort presented in Horváth (2001).

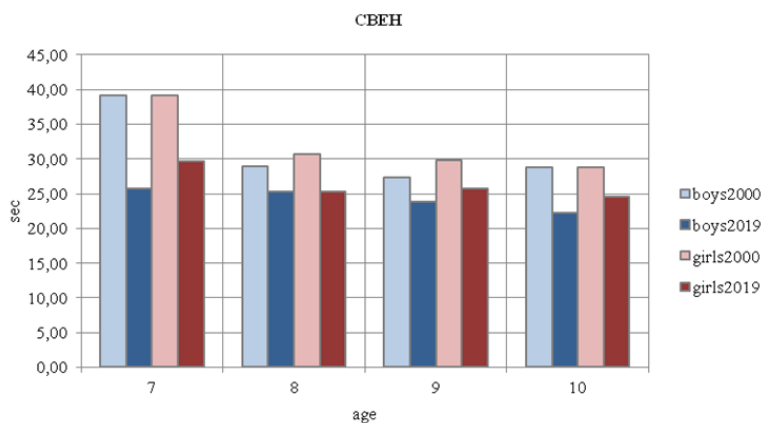
SKOK – standing long jump - dynamic strength of legs



Graph 6: Comparison of the SKOK test item values – standing long jump

Better results of the 2019 cohort compared to the 2000 cohort, including all age categories of both genders, also apply to the SKOK item. The biggest difference has been identified for the groups of 10-year-old boys and girls. The H0-4 hypothesis has been unambiguously confirmed. In sum, the results of Romany boys and girls tested in 2019 are better than those discussed in Horváth (2001).

CBEH – shuttle run 10x5m – running velocity with direction changes



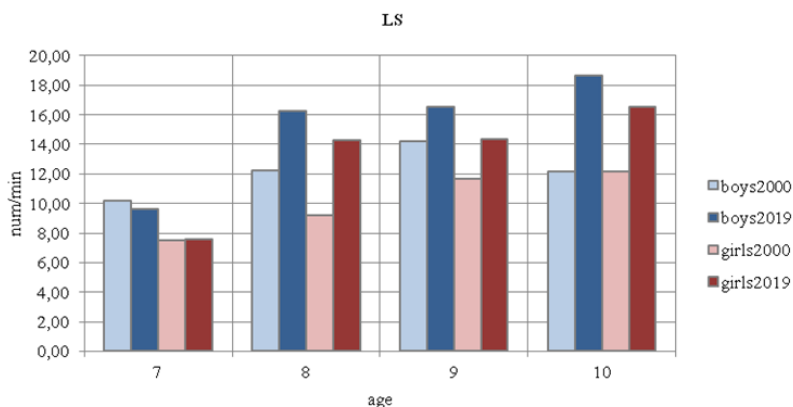
Graph 7: Comparison of the CBEH test item values – shuttle run 10x5m

The H0-4 hypothesis has been confirmed for the CBEH test item, too: the results of the Romany boys and girls tested in 2019 are better than the results presented in Horváth (2001).

LS – sit-ups – dynamic and endurance strength of the abdominal and loins-thigh muscles

As it follows from Tab. 3 and 4, this test item does not unambiguously confirm the H0-2 hypothesis for all age categories of boys and girls. The H0-1 has been confirmed for

the groups of 7-year-old boys and girls, i.e., there are no statistically significant differences between the two compared cohorts.



Graph 8: Comparison of the LS test item values – sit-ups

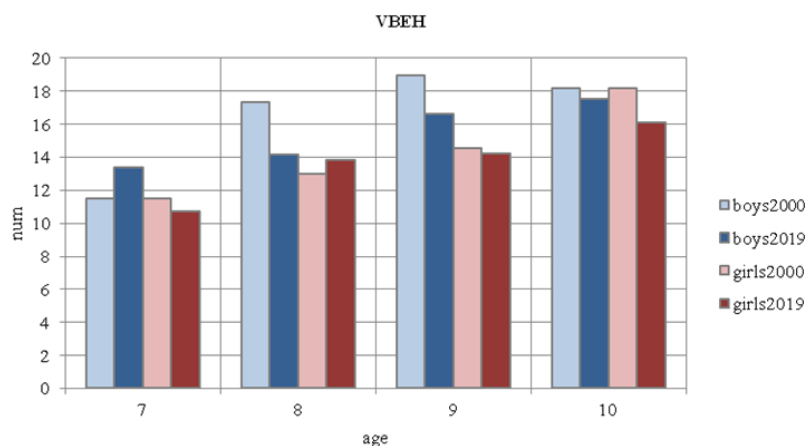
Graph 8 indicates that the H0-4 hypothesis has not been confirmed for the groups of 7-year-old boys and girls. The results of the 2019 cohort for this age group are not better than those of the 2000 cohort. However, this hypothesis has been confirmed for all the other age categories. The alternative H1-2 hypothesis, according to which there are statistically significant

differences between the 2000 and the 2019 cohorts, has been confirmed for the age categories of 8-, 9- and 10-year-old boys and girls. In addition, the hypothesis H0-4 has been confirmed for the age categories of 8-, 9- and 10-year-old children, i.e., the results of the 2019 cohort are better than those of the 2000 cohort.

VBEH – multistage shuttle run – running endurance

Tables 3 and 4 clearly show that the VBEH test item – multistage shuttle run – is the most ambiguous of all test items. The H1-2 hypothesis has been confirmed for the category of 7-,

8- and 9-year-old boys and the category of 10-year-old girls. In these cases, the differences between the results of the two compared cohorts are statistically significant.



Graph 9: Comparison of the VBEH test item values – multistage shuttle run

Graph 9 shows that the H0-4 hypothesis has been confirmed only in the category of 7-year-old boys and 8-year-old girls: the results of the 2019 cohort are better than those of the 2000 cohort only in these groups of Romany children. The age

categories of 8-, 9- and 10-year old boys and 7-, 9- and 10-year old girls tested in 2000 have better results than their counterparts in 2019, even though these differences are not statistically significant in every single case.

### 3 Conclusion

Research covering 596 Romany children at the age of primary school has brought the following observations and findings:

1. Somatic parameter tests have confirmed the H1-1 hypothesis, according to which there are statistically significant differences in somatic parameters between the

cohort reported in Horváth (2001) and the 2019 cohort. This hypothesis has been confirmed for all age categories of boys and girls.

2. The 2019 cohort features statistically significant advantage against the 2000 cohort. While the 2000 cohort fell behind the majority population in somatic parameters by as much as

two years, the 2019 data do not show this kind of differences. Do the reasons for this change stem from a higher standard of living of Romany children and better socialization of Romany population, especially in towns? This question is still to be answered in future research.

3. The motion performance was tested by a modified EUROFIT test. Due to the insufficiently valid results, the test items PRKL – sit and reach, and VZH – push-up test, were excluded from subsequent evaluation. The results of the other items can be divided into two groups:
  - a. Test items TR, TAP, SKOK and VBEH fall within the hypothesis H1-2, i.e., there are statistically significant differences between the results of the Romany children in Horváth (2001) and the results of the Romany children in the 2019 research. Our analysis has confirmed the H0-3 hypothesis for these items saying that the results of Romany children tested in 2019 are better than the results of the cohort reported in Horváth (2001) in a statistically significant way.
  - b. The testing of hypotheses for test items LS and VBEH has been ambiguous for all age categories of boys and girls.

The results of the motion performance coincide in the majority of cases with the results obtained for somatic parameters.

A comparison of the results of Romany children must take into consideration the fact that they live in three substantially different environments:

- Romany children who live in towns and regularly attend school
- Romany children who live in villages and are relatively well socialized with the village population
- Romany children who live in settlements

Future research should:

Focus on a balanced composition of a sample of Romany children in terms of the three above-mentioned groups;  
Increase the number of tested Romany children in order to avoid statistical errors due to a small number of tested children.

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**Primary paper section: A**

**Secondary paper section: AM**

## THE SPEECH-THERAPY COMPETENCE OF AN INCLUSIVE CLASS TEACHER AS A TEACHING EFFICIENCY INDICATOR REGARDING CHILDREN WITH LANGUAGE DISORDERS

<sup>a</sup>VIKTORIA CHORNA, <sup>b</sup>IRYNA YAKOVENKO

<sup>a,b</sup>*Bohdan Khmelnytskyi Melitopol State Pedagogical University,  
72312, 20 Hetmanska Str., Melitopol, Ukraine*

*email: <sup>a</sup>chernajaviki@gmail.com, <sup>b</sup>irinka.yakovenko@ukr.net*

**Abstract:** This article discusses the structure, characteristics, and ways of forming one of the key competencies of an inclusive class teacher and organizer of an inclusive space, namely, speech therapy. The problematic of the research is particularly relevant in the conditions of the primary education trans-modernity and the formation of the educational space of the New Ukrainian School. The results of the study, which were conducted in 2017–2018 on the basis of the Bohdan Khmelnytskyi Melitopol State Pedagogical University in the framework of the budget theme “Development of psychological and pedagogical support methodology of families who bring up children with special needs”. The article presents the results of an empirical study, which was conducted as part of the certification program “Speech therapy work with children with phonetic-phonemic speech underdevelopment” which was attended by 77 teachers from Melitopol and Berdiansk. The authors of the article came to the conclusion that the professional competence of the teacher organizing this process arises as a significant component of the educational process at the primary school, especially in the inclusive classes. One of the components of professional competence is a logopedic component. Taking into account that the mastery of oral and written language is a key stage in the educational training of junior pupils, we are invited to include a logopedic component in the list of basic competencies of a teacher. Speech competence diploma implies knowledge about the specifics of speech impairment.

**Keywords:** competence, speech therapy, inclusive class, children with special educational needs, language disorders.

### 1 Introduction

Analysis of key international documents on the rights of children with special educational needs, such as “The universal declaration of human rights”, “The declaration of the child’s rights”, “The Salamanca Declaration”, “The declaration on the rights of mentally retarded persons”, “The declaration on the rights of persons with disabilities” makes it possible to determine the vector of referral methodological work of the new school – the acquisition specific competencies of inclusive class teachers with respect to an individual development of children with special educational needs (further – SEN), allows critically analyze key competence of teachers in inclusive classes.

The law of Ukraine “On Education” defines the concept of a person with special educational needs. (1) These include a person or group of individuals who “needs additional permanent or temporary support in the educational process in order to ensure their right to education.” (1) This category includes not only children with disabilities but also refugee children, internally displaced persons who need temporary protection and support. Under this category are also children with special language needs. (1)

If we understand the educational process as a whole, then any school or teacher, in particular, must adhere to inclusive philosophy in their teaching activities, that is, to create the most comfortable development environment for each participant in the educational process.

It is important to emphasize that often the presence of a child with SEN in class leads to controversial thoughts about the success of the educational process. Numerous studies (2-5) show that the educational level of the children of the inclusive class is not lower than the rates for the ordinary class. On the contrary, teachers who teach a child with an SEN increase their qualifications, learn to be more attentive to the particular child and, in turn, to the whole team. Also very important is the moment when members of the children’s team noticed that a child who has difficulty mastering the material, learns better, they also try to raise their own level.

Positive was also the dynamics of self-education and in-depth teacher training for the acquisition of special competencies that would help to organize the educational environment in the inclusive class. The law “On education” states that teachers of

inclusive classes should improve their qualifications annually, passing the corresponding training modules. It is important to emphasize that the leaders of the educational process in the inclusive class should not become doctors or receive the education of correctional teacher, speech therapist. They must understand the peculiarities of the child’s diagnosis and choose methods of correction and methods of material reporting, forms of control and assessment of knowledge. An important thing for the teacher is the information on working with a child with SEN are related to educational activities: memory work, the process of thinking processes, dominant ways of remembering information, peculiarities of perception and thinking, development of the emotional and volitional sphere. To create a comfortable educational environment in the inclusive class for the teacher, it is also advisable to have information about the peculiarities of the communicative relationship of the child with the SEN.

We also have to note that the law “On Education” (January 1, 2018) grants the teacher the right to choose a place for the improvement of qualification among establishments with accredited educational programs. Among the recommended educational institutions for higher education, higher education institutions and institutes of postgraduate pedagogical education become effective. These include Bohdan Khmelnytskyi Melitopol State Pedagogical University, which is the base platform for the New Ukrainian School (“NUSH”). (1)

The purpose of the research work is to highlight the content of the preparation for the acquisition of the elementary school teacher’s logopedic competence for the effective education of children with speech disorders.

Objectives of the study are to find out the essence of the concepts of “competence”, “professional competence of the teacher”, “speech therapist competence of the teacher”, working with speech disorders children; to prove the necessity to include logopedic competence in key competencies of the inclusive class teacher; to determine the minimum content of the theoretical and practical training of the teacher for working with children with speech disorders.

### 2 Materials and Methods

The research was conducted on the basis of the Correction-Developing Technologies Center for preschool and elementary pupils schoolchildren of Bohdan Khmelnytskyi Melitopol State Pedagogical University in the framework of the state budget theme “Development methodology of psychological and pedagogical support of families educating children with special needs” (0119U002003). Participants were teachers of the primary school of the Melitopol and Berdiansk area of the Zaporizhzhia region in Ukraine. The experiment was attended by 77 participants. In accordance with the mentioned purpose, an analysis of philosophical and pedagogical sources, legal and administrative documents were used to determine the essence, content, ways, expediency of inclusion of speech therapist’s competence in the preparation of elementary school inclusive class teachers. A questionnaire was also used to identify the content of the necessary theoretical and practical training of the inclusive class teacher for working with children with speech disorders.

### 3 Results and Discussion

The experimental study was conducted from December 2017 to December 2018 on the basis of Bohdan Khmelnytskyi Melitopol State Pedagogical University. In order to identify the feasibility of incorporating logopedic competence into the list of competencies of the inclusive class teacher, teachers of the elementary school of Melitopol and Berdiansk region were asked to go for their own account to certify the educational program

“Speech therapy with children with phonetic and phonemic underdevelopment of speech”. The experiment was conducted three times to determine the authenticity of the data received: winter (27 participants) – spring (25 participants) – winter (26 participants). Among the students of the program, in addition to primary school teachers, there were school principals who were in charge of teaching and educational work. The preparation of primary school teachers for the certification education program included 48 hours of classes and 162 hours of independent work. The following training courses have been included in the certification education program with a classroom attendance and on their own such as “Speech Therapy” (20 (70) hours), “Games in Speech Therapy” (10 (50) hours), “Logopsychology (6 (30) hours)”, “Psychological and Pedagogical Diagnosis of Children with Speech Disorder” (8 (30) hours), “Logotype” (4 (30) hours).

The purpose of the certification education program “Speech therapy with children with phonetic and phonemic underdevelopment of speech” was to academically prepare primary education specialists to work with children with speech disorders, based on theoretical research and practical scientific results, taking into account world experience in the field of speech therapy and its current state; formation of the ability to solve complex specialized tasks and practical problems in the field of professional activity, development of skills for further professional self-education.

Students, according to the requirements of the program, after passing the program, should know:

- Peculiarities of development of children with speech disorders;
- The main indicators of normative and pathological development of motor and speech activity in various speech disorders;
- Clinical typology and psychological and pedagogical characteristics of the contingent, which the teacher cares for;
- The main directions in the system of preventive measures and the methodology of diagnostic and corrective work on prevention of deviations in the written speech.

Students also should be able:

- To identify features of motor and speech functions, differentiate them from normative development;
- To determine the clinical typology of speech pathology, the level of speech and motor development of the child;
- To use different methods and techniques of training and education in the process of conducting classes based on cognitive abilities and prospects of children with speech disorders;
- To implement a specific and individual approach to children with speech disorders based on knowledge about the structure of their defect, conditions of education, abilities, motivation;
- To identify and improve the forms and content of the pedagogical process aimed at overcoming disorders of speech activity in primary school children.

The practical skills to be learned by the students of the program include the following: to practice prevention methods to prevent possible abnormalities in speech development of the child: to be able to prepare and conduct demonstrative classes with students with speech disorders; to present reports at parents' meetings, councils, methodological associations, seminars; be able to keep confidentiality in working with family; to work with parents and their substitutes; be able to choose a creative approach to solving pedagogical situations.

After passing the certification educational program “Speech therapy with children with phonetic and phonemic underdevelopment of speech”, a questionnaire was conducted on the theoretical and practical training of primary school teachers for work with children with speech disorders. The following

suggestions were made to the listeners to improve the content of the program:

- To help the school team to systematize knowledge about the child's language training in school;
- To provide recommendations on working with parents of children with speech disorders;
- To describe the algorithms of interaction between the parents of children with speech disorders and the teacher in order to achieve the ascending results in the written speech of the child;
- To increase of lecture material on the prevention of dyslexia and dysgraphia in elementary school pupils;

The experimental work was confirmed by orders at Bohdan Khmelnytskyi Melitopol State Pedagogical University: currently No. 154 / 01-06 dated November 9, 2017, “On the introduction of the Certification educational program”, order No. 15 / 01-05 of November 26, 2018 “On Introduction in operation of the certification educational program”.

Because of the conducted experimental study, the necessity of acquiring the inclusive classes of speech therapist competence was revealed. On the basis of the certification of students it was proved that the certification educational program “Speech therapy with children with phonetic and phonemic underdevelopment of speech” contributed to the formation of the necessary ideas about the specifics of work with children with speech disorders and familiarization with the normative and legal support of the educational process of children with SEN.

Before analyzing and disclosing the features of this teacher's training to work in the inclusive class, it is advisable to consider the concept of competence.

The term “competence” includes a range of issues in which the employee is well informed, has knowledge and experience. O. Gordiychuk and V. Gatkowicz (6) examined this issue from different sides. Scientists pay attention to the essence of the teacher's competence as “interdependent qualities of the person (knowledge and skills)” in a certain issue that determines qualitative productive activity. It is important to note that competence is an appreciable and dynamic category, which also includes the teacher's attitude towards his activity and, accordingly, expression through personal qualities (acquisition of innovative knowledge, accumulation of experience).

N. N. Vasyagina and Y. V. Bratchikova (2012) (7) incline to the idea that a greater role in the process of training plays a practice of the teacher. One of the objectives of teaching practice is to create the experience of pedagogical activity. The authors believe that a well-organized passage of students, future teachers of different types of practices, determines the effectiveness of the formation of the most important skills, abilities, and attitudes. According to Zakirova (8), there is no need to enable the “professional experience” in the structure of a teacher's competence.

N. Bibik, L. Vaschenko, and O. Lokshina (9) believe that competence is the key notion of the professional growth of a teacher. It is there that the “interpretation of the content of education” is laid down. Acquiring a number of competencies, the teacher more widely understands the ways of reporting information, the selection of adequate methods for teaching a given question, assessing the level of assimilation of material by a group of pupils and the intellectual and communicative capacities of each child. That is, in acquiring appropriate competencies regarding the teaching of children in the inclusive class, the teacher will clearly understand the purpose of the educational process and the main goal of the school development, create the necessary educational environment, and stimulate the educational and cognitive interest of the child with the SEN.

A fundamental element in the structure of primary school teachers' professional competence is a professional and personal component. Regarding this, scientists agree to link the

preparation of the future teacher with the priority task of forming a unique image of the personality of a professional teacher. Considered in the structure of personality, motivation, activity components bear the idea of concentration on requirements directly to the personality of the teacher.

The professional image that can be seen in the proposed structure, in essence, is a request for a professional teacher training. This means that the proposed structure of primary school teachers' professional competence can be introduced in the process of preparing future teachers in order to increase their effectiveness.

Abilities are presented as ability to intelligent activity on the basis of theoretical knowledge (professional and informative component) and practical skills (component related to professional activity). For comparison, in M. Yanova's (10) research, procedural component of teacher's professional competence is presented by three elements, in the following sequence: skills – abilities – experience. Special attention requires the presence in the structure of such a component as a motivation, assuming aspiration to the professional growth and development. The motivational sphere is the basis and the logical center of the teacher's personality model that defines its cognitive, vocational and educational orientation. Motivation induces to professional activity, forms the ability to pedagogical work, a positive attitude to the educational process, contributes to the manifestation of the best personal and professional qualities. Motivation is impossible without the orientation of the teacher to achieve a positive result. Values, ideals, and goals that guide the teachers in the management of their teaching activities have a huge impact on the effectiveness of this activity. Therefore, it is strategically important in the process of training to ensure the future teacher readiness and need to self-education, self-development, and self-management of their activities.

The professional image that can be seen in the proposed structure, in essence, is a request for a professional teacher training. This means that the proposed structure of primary school teachers' professional competence can be implemented in the process of training future teachers in order to increase its effectiveness. (8)

An important point is an idea of expressing the teacher's competence through active activity. Regarding the forms of expression, one can follow a certain tendency between increasing the level of ability to communicate material and gaining the opportunity to self-fulfillment, to increase their own level of educational and educational activities. Also, the opinions of researchers on the manifestations of acquiring competence through the transfer of the theoretical material to the practical plane of the educational process with the ability to apply the acquired knowledge in combination with the appropriate methods and methods of reporting the material to the participants in the educational process are also useful. (3)

An essential marker of a successful educational process in the inclusive class is the presence of a teacher's professional competence. The professional competence of the teacher covers various fields of interaction with the children's team: educational, educational, organizational, communicative, and also the ability to organize a team to achieve the common goal and others. (11) The dynamism of acquiring new forms and methods in the education and upbringing of the pupils' team and determines the level of growth of professional competence, one of which is the acquisition of the organizer of the educational process of speech therapy competence.

In the context of our study, access to the legal basis for inclusive education is important. Thus, the "Concept of the inclusive education development" indicated that the priority of inclusive education depends on the teacher's ability to determine the peculiarities of the educational and cognitive activity of the child with the SEN. The same document states that the introduction of inclusive education is aimed at qualitative changes in teacher training. (12) That is, the standard competencies of the teacher,

who previously fully met the educational process, appears to be insufficient in the inclusive educational space of the school.

Based on the research of V. Pelageichenko (13) on the competencies that a modern school teacher must possess, let us consider major ones. They include the following competencies: informational (ability to work with information, rework, find key points), communicative (ability to enter into communication, to understand children and parents), productive (ability to work on a result, make appropriate decisions), autonomous (self-development, creativity, readiness to study new), moral (readiness to live and raise pupils according to the established moral norms of society), psychological (the ability to use psychological methods of teaching), objective (a set of skills and abilities that add the ability to work with children of different psychological and mental structures to achieve maximum results), and mathematical one (processing of numerical information). V. Pelageichenko (13) emphasizes that, perhaps, the most important components of a teacher's professional competence are goodwill, sensitivity, balance, grace, tolerance, reflexion, and humanity. In our opinion, the list of competencies presented by the teacher working in the inclusive class should be complemented by one more speech therapist.

In the report of the Ministry of education and science of Ukraine for 2017–2018, we find that, at the present moment, in Ukraine, 5033 inclusive classes have been opened in 2620 institutions. There are 7179 children with SEN, 3732 teacher assistants. (14)

According to information reports on the work of psychological-medical-pedagogical consultations (PMPC) in Ukraine for 2017 – 2018, the total number of primary school children with speech impairment ranges from 12 to 16% on average. Comparing these data with the last years, we can conclude that there is an increase in the number of children with speech disorders, mental retardation, general underdevelopment of speech (I–III degree), disorders of phonetic-phonemic processes, and the lack of coherent speech development. Also, pay attention to the fact that on sites of PMPC, along with the section "Inclusive education" we can find another section "Nosology", which provides information about the education and training of children from the SEN. Thus, the teacher of the school needs not only to know the decoding of speech therapy diagnoses but also to be able to work with these children.

On the basis of the analyzed reporting documentation, we can state the need for a teacher of a new school that will possess not only standard but also special competencies regarding the child's education with the SEN. In our research, priority is given to the logical competence of the teacher of the inclusive class. Under the logopedic competence, we understand the ability to work with children with speech disorders; to be aware of the peculiarities of the development of memory, attention, thinking, small motility, communicative functions; methods and methods for successful reading and writing.

Theoretical issues of the formation of the logopedic competence of primary school teachers were addressed by L. Zhuravleva (15), who identified the structure of logopedic competence that consists of the following components: professional–personal (meaning, purpose, need for special training), cognitive (a set of vocational and pedagogical knowledge for working with children with speech disorders), related to professional activity (a complex of professional skills and skills of correctional and pedagogical activity), and analytical reflexive ones (the ability to analyze their own pedagogical activity).

In the opinion of a wide range of scholars, the key to preparing for and continuing education of a child of school age is a sufficient level of mastering in the mother tongue (reading, writing, understanding of the received information, ability to retell, answering questions, etc.). (5, 16-19)

Theoretical and practical preparation for the acquisition of logopedic competence by teachers of inclusive classes is covered in the certification educational program "Speech therapy with children with phonetic and phonemic underdevelopment of

speech". The program was tested on the basis of the center of correction-developing technologies for children of pre-school and junior school age at Bohdan Khmelnytskyi Melitopol State Pedagogical University. Certification educational program is designed for 210 hours (48 hours – classwork and 162 hours - independent work). The certification program includes five blocks: "Speech Therapy", "Speech Therapy Games", "Psychological Psychology", "Psychological and Pedagogical Diagnosis of Children with Speech Failure", "Symbolism".

For the successful acquisition of speech therapist competence, the students of the program were offered the following topics:

- The "Speech therapy" block (general issues of speech therapy, dyslexia, dysarthria, rhinolalia, phonetic and phonemic underdevelopment of speech, general underdevelopment of speech, aphasia, alalia, stuttering, disorders of written speech);
- The "Games in speech therapy" block (the theory of gaming activity, the characteristics of the play of children with speech disorders, the particular use of games in logopedic work, especially the selection and use of games for the development of mental processes, especially the use of games in speech therapy);
- The "Logopsychology" block (general issues of logopsychology, peculiarities of cognitive activity of children with speech impairment, personality, and activity of children with speech impairments, a psychological study of children with speech disorders, peculiarities of psychological assistance to children with speech impairment);
- The "Logorhythmics" block (the essence and subject of speech therapy rhythm; means and methods of speech therapy rhythm, the content, and structure of speech therapy rhythm);
- The "Psychological and pedagogical diagnostics of children with speech disorders" block (general principles of psychological and pedagogical diagnostics;
- General principles of constructing a comprehensive psychological and pedagogical examination;
- Psychological and pedagogical diagnostics of children of preschool and junior school age;
- Psychological and pedagogical support for the development of children with speech disorders.

#### 4 Conclusion

The main objective of the modern school should be to create the necessary conditions for stimulating the child's educational, practical, communicative, and research activities, which will help the person to acquire the necessary life skills for the successful acquisition of knowledge and self-realization. Note that a child's life skills cannot form or develop beyond the daily educational, communicative, and creative activities. (20-24) That is why a very important component of the educational process in junior school, especially in the inclusive classes, is the professional competence of the teacher who organizes this process. The professional competence of the concept is multifaceted. The growth of professional competence can be traced through the mastery of the teacher with new forms and methods of training and education. One of the components of professional competence is logopedic. Taking into account that the mastery of oral and written language is a key stage in the educational training of elementary school pupils, we are invited to include a logopedic teacher in the list of basic competencies of the teacher. Speech-diploma competence is expressed through knowledge of the specifics of speech impairment, ways of their correction for the successful mastery of the child by the skills of coherent speech, translation, writing (reading and writing).

The demand and feasibility of acquiring a junior teacher's logopedic competence class are proved on the basis of an experiment that lasted from December 2018 to December 2019 based on the center of correction-developing technologies for preschool and junior schoolchildren at the Bohdan Khmelnytskyi Melitopol State Pedagogical University. The experiment was

conducted three times. Teachers of inclusive classes have expressed the need for theoretical and practical training for working with children with speech disorders, which was reflected in the registration for the certification educational program "Speech therapy with children with phonetic and phonemic underdevelopment of speech". 77 teachers expressed their desire to undergo training (at their own expense), indicating an inadequate level of theoretical knowledge and practical skills in working with children of this category, which confirms the need to include logopaedic competence in the special competencies of the inclusive class teacher.

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**Primary Paper Section: A**

**Secondary Paper Section: AN, AQ**

# ASSESSMENT OF THE COMPANY'S FINANCIAL SITUATION THROUGH LIQUIDITY AND ITS INDICATORS

<sup>a</sup>ANNA JACKOVÁ

*University of Žilina, Faculty of Management Science and Informatics, Univerzitná 1, 010 26 Žilina, Slovak republic, email: "Anna.Jackova@pd.uniza.sk"*

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**Abstract:** The existence of each company is conditional on its ability to pay its liabilities. It must therefore have at its disposal a certain amount of money by which it can meet these liabilities. The ability to repay liabilities is referred to as liquidity. Assessing the financial situation through liquidity indicators and then managing it is extremely important for every company. If a company does not monitor and manage liquidity, it can lead to major problems with customers, states, employees, and other entities that are in certain relationship with the company.

**Keywords:** liquidity, solvency, liquidity indicators, liquidity management.

## 1 Introduction

Liquidity is an economic and financial term that expresses the ability of a company to pay its liabilities on time, i.e. within the maturity period. The liquid company is a beneficial business for the state economy because such a company does not cause financial problems to other entities in the economy. This means that the company pays the vendor an invoice within the maturity date, sends the payment to the bank in time for the loan repayment, pays salaries to their employees, pays the social insurance and pays the insurance premiums to the social insurance companies within the maturity date, and the tax office receives the tax payment from the company... The liquid company with the optimum amount of money ensures financial stability and a firm market position within the framework of the mutual competitiveness of companies.

## 2 Liquidity

Liquidity is one of the important indicators that interest the various stakeholders in the company's interaction environment. In doing so, each entity requires a different level of liquidity. On one hand managers understand low liquidity as an untapped opportunity or a loss of control over a company. On the other hand, owners may consider this to be an inefficient tying of funds. Creditors will assume that low liquidity will be reflected in the deferral of interest collection, and customers with suppliers will expect the company to be unable to meet its liabilities, which can lead to a loss of supplier-customer relationships. For these reasons, it is necessary to manage liquidity so that the individual components of the asset acquire a cash flow in the course of their circulation before the liabilities that cover the assets in question are due.

A reliable statement of the financial situation of the company can be obtained by analysing its ability to pay its liabilities. It is true that a company that is financially stable is able to pay its liabilities and a company with financial difficulties has problems with it. The ability to pay liabilities is influenced by many factors, especially by the structure of assets and cash flow. When analysing this aspect of the company's financial situation, it is necessary to explain the terms liquidity in, liquidity and solvency, as they are often understood as synonyms.

Liquidity is one of the characteristics of a particular type of assets. Indicates the degree of difficulty in transforming assets into cash. In the balance sheet, assets are ranked according to their degree of liquidity, i.e. according to how quickly and without major losses they can be transformed into cash. For example, inventories are generally more liquid components than components of fixed assets. Liquidity is the current ability to pay due liabilities. It depends on the structure of assets and in particular the proportion of liquid assets in it. It is considered as

a criterion of short-term or immediate solvency. Solvency is the general ability of a company to obtain funds to pay its liabilities when they become due. It is one of the basic conditions for the company's existence.

## 2.1 Liquidity analysis

Liquidity analysis consists of liquidity:

- vertical (liquidity of assets, liquidity of liabilities),
- horizontal (golden balance rule, liquidity ratios, liquidity differentials).

In the case of vertical liquidity, the individual components of assets and capital are assessed separately; the structure of assets and liabilities, i.e. their individual liquidity, is examined. Vertical liquidity consists of both liquidity of assets and liquidity of liabilities.

### 2.1.1 Liquidity of assets

The liquidity of assets is based on the differentiation of assets according to liquidity, i.e. the ability of individual components of assets to transfer their value into cash. It is characterized by the time of conversion of part of the assets into cash and the costs related to this conversion. The source base for asset liquidity is the asset side of the balance sheet. In it, the asset components are, as already mentioned, divided from the most liquid to the least liquid asset.

### 2.1.2 Liquidity of liabilities

Liquidity of liabilities can be characterized as the capital structure of the company. In its analysis it is necessary to monitor the ratio between foreign and own resources. Equity is a type of capital which belongs to the business owner. Foreign capital represents the debt that a company has to repay at a certain time. For the use of foreign capital, the company pays interest but also other expenses related to its acquisition. However, foreign capital is cheaper than own capital. When analysing the liquidity of liabilities, it is necessary to divide the liabilities into short and long-term. It is also necessary to monitor the ratio between foreign and equity and the ratio between foreign and total capital. The ratio between foreign and own capital reflects the debt ratio, which should not exceed 70%. The value of this indicator is of particular interest to banks, in the case of granting a bank loan.

The subject of horizontal liquidity is the analysis of the relationship between asset and liability components. The source of information is the balance sheet. Horizontal liquidity consists of a golden balance rule, liquidity ratios and liquidity differentials.

### 2.1.3 Golden balance rule

An important part of horizontal liquidity is the golden balance rule. Compliance with this requires that the sources of fixed assets coverage should be long-term resources (equity and long-term foreign capital), with the amount of long-term foreign capital at least equal to the value of fixed assets.

$$\text{Fixed assets} \leq \text{equity} + \text{long-term foreign capital}$$

The company should have as much capital as it needs. If the assets are still less than the sum of equity and long-term foreign capital, then the company is overcapitalised. This situation comes to the forefront when current assets are also covered by long-term capital. The opposite of overcapitalising a company is its undercapitalization, which is a situation where the value of fixed assets exceeds the volume of foreign resources. This other portion of fixed assets must be covered by short-term foreign

capital. The case of undercapitalization occurs in the company at the time of expansion, when the company expands its production and sales, which is associated with an increase in assets not covered by financial resources. These are assets such as inventories, receivables and long-term assets.

The company is thus indebted at the suppliers and this causes the short-term foreign capital to be covered also by the long-term assets. This situation is considered unfavourable from the liquidity point of view.

$$\text{Current assets} \geq \text{short-term foreign capital}$$

Stated relationship relates to the ratio of current assets to short-term foreign capital. The optimal situation is when the current assets are larger than the short-term foreign capital. The difference arises from the net financial assets to the company if the current assets were acquired by the company from long-term foreign sources. Conversely, if the current assets are smaller than short-term foreign capital, the company incurs uncovered debt.

### 2.1.4 Liquidity ratios

The best-known liquidity indicators are liquidity ratios. Their essence is to determine the ratio between the various components of assets to short-term liabilities. "The liquidity ratios interpret the immediate, current and total liquidity of the business entity.

$$\text{Immediate liquidity} = \frac{\text{financial assets}}{\text{short-term liabilities}}$$

The indicator shows the relationship between the most liquid part of assets and short-term liabilities. It is great when the indicator takes values in the range of 0.9 to 1.0, which actually means that 90 to 100% of short-term liabilities should be able to cover the company's own financial assets. For companies engaged in manufacturing activities, the range of values for this indicator is between 0.2 and 0.6.

$$\text{Current liquidity} = \frac{\text{financial assets} + \text{short-term receivables}}{\text{short-term liabilities}}$$

Current liquidity gives a partial concept of future developments in the payment situation. Short-term receivables should be receivables within maturity. We do not count on overdue receivables and bad receivables that distort the concept. Current liquidity should be in the range of 1.0 to 1.5.

$$\text{Total liquidity} = \frac{\text{financial assets} + \text{short-term receivables} + \text{inventories}}{\text{short-term liabilities}}$$

Total liquidity serves for long-term evaluation of the development of the company's solvency. The total current assets are taken into account in its calculation. When compiling the total liquidity, we do not take into consideration the degree of liquidity of individual types of inventories. A company showing an appropriate level of total liquidity may nevertheless find itself in an unfavourable situation when non-resale inventories form part of the current assets. Total liquidity should range from 2.0 to 2.5," (Baran, 2006, p. 31 - 32).

Atypical ratios of liquidity include the insolvency indicator. "Insolvency is a ratio indicator that is calculated as the ratio of liabilities (in the strict sense) to receivables. It expresses the extent to which the receivables are covered by liabilities (in the strict sense) and indirectly suggests to what extent, in the event of immediate repayment of debts, liabilities (in the strict sense) could be settled by the receivables," (Kotulič and collective, 2010, p. 62).

$$\text{Insolvency} = \frac{\text{liabilities}}{\text{receivables}}$$

### 2.1.5 Liquidity differentials

Differential liquidity ratios, together with net monetary assets and net available funds, include also net monetary capital. Net monetary capital can be calculated according to the relation:

$$\text{Net monetary capital} = \text{current assets} - \text{short-term liabilities}$$

This indicator is structurally closest to the total liquidity, which, however, puts the data in proportion, not the difference. Net monetary capital is the portion of current assets of short-term assets that is financed by long-term corporate resources. In carrying out its intentions, the company is thus free to dispose of it.

$$\text{Net monetary assets} = \text{financial assets} + \text{short-term receivables} - \text{short-term liabilities}$$

$$\text{Net available funds} = \text{available funds} - \text{short-term liabilities}$$

### 2.2 Degree of liquidity

In terms of the time when liquidity problems are examined, two basic levels of liquidity are distinguished:

- short-term liquidity,
- long-term resp. medium - term liquidity.

Short-term liquidity refers to immediate, current and total liquidity. Short-term liquidity is mainly influenced by the current status and structure of current assets and the status and structure of current liabilities. It is also influenced by the concept of the company's cash cycle and its normal operation. It can be influenced by short-term financial planning using tools with short-term financial impact.

These tools are:

- inventories management of materials, goods, semi-finished goods, work in progress and finished products so that the financial resources in these components of the assets are transformed as soon as possible into receivables and subsequently into cash,
- the management of receivables in such a way as to minimize the risk of default and to transform them into cash after the due date,
- management of cash in such a way that the undertaking has at its disposal sufficient amounts of cash or bank accounts at all times,
- management of short-term financing in the form of a fair balance of commercial liabilities and short-term bank loans.

On the contrary, long-term thus medium-term liquidity can only be influenced in the long term. The strategic financial plan is used and the following tools play a key role:

- overall business strategy aimed at expanding, attenuating, stabilizing or maintaining business activities,
- interconnection of individual business strategies,
- a thorough analysis of the effectiveness of investment projects," (Landa, 2007, p. 5).

### 3 Liquidity management

Liquidity management has a specific character and it is up to the financial managers of the company how to solve this problem. There are some general principles on how to manage a company's liquidity. They can be summarized as follows:

- avoid delays in the needs of liabilities,
- making optimal use of credit limits,

- prevent credit lines from being exceeded,
- avoiding financial sources inactivity losses;
- regulate the flow of funds,
- ensuring the availability of flexible short-term resources,
- build information systems supporting cash disposition.

The liquidity is conditioned by the volume of funds. Their condition is in turn conditioned by the cash flows that take place in the company. They are captured in cash flow statement, which also plays an important role in liquidity management. The analysis of past economic phenomena in the company are also very important. Information on these phenomena can be assessed in relation to liquidity, i.e. how they affected it. Thus, the company can plan cash flow, ensuring liquidity in the future.

At present, the understanding of liquidity management is different than in the past. Today it is not just about precise plans and cash flow forecasts. Rather, business finance managers focus on getting resources from customers and making suppliers deliver their services flawlessly. Liquidity management policy is a set of tools that improve liquidity, eliminate liquidity risk and reduce the need for net working capital. However, there are obstacles to such management. Liquidity problems and shortcomings can be summarized in two main areas:

- centralization of cash,
- control of the financial supply chain.

Cash centralization, as one of the activities for effective liquidity management, involves two tools by which cash can be centralized. The first is the real concentration of cash. In this tool, the money is kept in one master account. This creates a liquidity position across multiple side accounts. In this case, cash can be transferred from one account to the other in both directions. In the event of an excess of funds in the secondary account, the funds shall be transferred to the main account. Conversely, in the case of a negative sub-account balance, there will be a transfer of funds from the main account to the sub-account. The second tool for cash centralization is fictitious pooling. Credit and debit balances are only credited virtually, so there is no real money transfer.

The second critical area in liquidity management is business finance in the financial supply chain. While they are a critical factor, they provide an opportunity to improve risk management and process efficiency. Improving processes will ultimately help to optimize liquidity. Conversely, unmanaged commercial finance will result in reduced liquidity and cash drainage. Ultimately, managed liquidity will also lead to further improvement, not just in terms of process improvement.

Elements from the financial supply chain can also be considered as financial sources. They can also serve to increase liquidity. This form of financing is called financing secured by assets such as receivables or inventories. By selling receivables or by discounting bills of exchange, a company will receive finance for further use. Such an alternative financing option is mainly used in companies that have difficulty obtaining a traditional loan. Supply chain financing can also help improve business processes. The financial support of its suppliers is ultimately beneficial for both parties. Especially in recent years, the interest of companies in this type of financing has been increasing. However, many companies are skeptical about this type of funding. This is because financial managers do not know the benefits of this solution, companies have limited financial resources or companies overestimate their ability to extend the maturity of liabilities. However, this is an important opportunity for many companies to improve their liquidity.

“Liquidity stands and falls on the relationship between short-term assets and short-term liabilities. When managing it, it is necessary to keep in mind whether the company has sufficient funds at the moment to pay its liabilities. At any moment, each company has a certain mix of means of payment, composed of different forms of assets. They can be used immediately (cash or bank accounts) or in a short time (receivables, inventories). A

company is liquid if it has sufficient amount of funds at a certain date to meet its liabilities,” (Landa, 2007, p. 4).

#### 4 Conclusion

Permanent and stable liquidity is a must for every company. If this condition is not fulfilled, it is likely that in the near future the company will encounter problems related to the inability to pay liabilities, which may lead not only to loss of competitiveness and reputation, but also to its existential problems. Insolvency entails a loss of confidence of suppliers, banks and customers. Therefore, ongoing liquidity assurance is essential for companies. This means having at its disposal the amount of funds available so that the company is able to pay its liabilities and at the same time not to commit the excess of financial resources, which then represent a loss of potential opportunities. Therefore, it is necessary for the company to balance its revenues and expenditures both in the short and in the long term. The solution to this issue is usually addressed in the financial plan and its control. The revenue and expenditure balancing process has a very specific character and is characterized by a certain degree of inaccuracy. A balanced financial plan is not always a guarantee of continuous and permanent liquidity. Deviations may occur due to different developments in actual and planned cash flow. Although the company's liquidity planning is not a 100% guarantee for continuing liquidity, it is important because it significantly increases the likelihood of achieving liquidity and helps to avoid predictable errors.

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#### Primary Paper Section: A

#### Secondary Paper Section: AH

# THE THIRD SECTOR – THE NEW PATH TOWARDS THE ENTREPRENEURSHIP OF THE FUTURE? – POLISH INSIGHTS

<sup>a</sup>ANNA JASIŃSKA-BILICZAK

*Opole University of Technology, Prószkowska Street 76, 45-758  
Opole, Poland, email: a.jasinska-biliczak@po.edu.pl*

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**Abstract:** The national economy can be conceptualized as having three sectors: the public sector, a private economy, and a third sector "with organisations established by people on a voluntary basis to pursue social or community goals" (Ridley-Duff and Seanor 2008). The third sector includes organizations that directly affect the structure, market behavior or activity. This paper sets out reasons why do entrepreneurial person choose the economics of the third sector as their way towards entrepreneurship, address some of the potential scope and limits of particular forms of economic thinking about the third sector and extends economic research on the third sector, which still is the research gap. It also presents alternative view at third sector economics as the new-way entrepreneurship and addresses implications for further research.

**Keywords:** economics; Poland; social economics; third sector; third sector entrepreneurship, third sector development.

## 1 Introduction

According to the literature overview the third sector is by nature unsuited to singular definitions (Osborne 2008). The academic discipline of economics has focused much attention on conceptualising and operationalising core concepts and dimensions of economic activity. In that meaning its analytic methods are focusing on achieving rigour. Moreover, the specific sector requirements tend to stress economic analysis as providing the rationale for, proof of, and the ability to choose between potential policy options (Westall 2009). There has been work on measuring the direct contribution of third sector activities of different kinds to aggregate measures of economic activity such as employment levels, GDP or GVA. The third sector concept is used to distinguish such organizations from the other two sectors of the economy: the public sector (government) and the private sector (businesses) (NAO 2009). Some literature also relates to the impact of economic theory and language on third sector development (Parkinson and Howorth 2008) argue that there is a marked difference between the language of policymakers, proponents of social entrepreneurship and the activities identity and language of people classed in this way. There also the case could be made to refer to the third sector as the "fourth sector" since communitarian groups such as clans and families and informal associations are also often excluded from the idea of a third sector (Priller and Zimmer 2001).

The third sector exists without either of those two mechanisms instead relying on the manipulation of symbolic rewards and deprivations, the power of persuasion and on appeals to shared values and idealism (Lewis 2003, Jasińska-Biliczak 215). The definition, called continental or European definition of the third sector, does not envisage separate sectors. The third sector or third system is thus conceived not as a corrective add on to the blind spots of a market economy, but as a hybrid form of various kinds of organizations such as enterprises, bureaucracies and kinship associations. They act as hybrids, intermeshing different resources and connecting different areas, rather than setting clear demarcation lines around a sector and mapping its size (Evers 1995). The third sector organizations are defined as organisations with an explicit aim to benefit the community, initiated by a group of citizens and in which the material interests of capital investors is subject to limits (Nyssens 2008).

After all is has its own highly prestigious scientific discipline of economics, the third sector remains comparatively under-theorized despite some good efforts to the contrary (Corry 2010). It is developing, focused bigger and bigger percentage of national economies sector, and, because of that, employing more and more workers, especially specialists in fields covering its action fields, sector. In European economies, the importance of a third sector, distinct from the private non-profit and public

sectors, is increasingly being acknowledged, from various point of view (Defourny and Pestoff 2008).

## 2 Research methodology

Economic analysis, seeking to use economic models and measures to assess the key features of the sector and the contribution it makes to the economy and society. This will include analysis of employment and employment trends in the sector (Alcock 2009). According to The European Commission in its 2009 online Evaluating Socio Economic Development: Sourcebook 2 multicriteria analysis appeared in the 1960s as a decision-making tool. It is used to make a comparative assessment of alternative projects or heterogeneous measures. With this technique, several criteria can be taken into account simultaneously in a complex situation. The method is designed to help decision-makers to integrate the different options, reflecting the opinions of the actors concerned, into a prospective or retrospective framework. Participation of the decision-makers in the process is a central part of the approach. The results are usually directed at providing operational advice or recommendations for future activities (Sourcebook 2 2009).

In present research the qualitative research design was developed in order to achieve an in-depth understanding of the entrepreneurship of the third sector. The research was based at the in-depth interview analysis, being applied to studies of the research gap. That is, the use of in-depth interview analysis in an important factor in which representative groups were selected rather than focusing on the number of samples and whether respondents responded consistently. It is the probe to obtain a broad generalization based on single case studies evidences, while presenting findings and conclusions altogether. Research data was collected from Poland. This national approach allows to point some general rules at national level and also be a part of further, comparing at international level, research.

There was stated the main research hypothesis to reach so pointed results:

**Hypothesis:** The nonprofit entrepreneurship is chosen as the more and more preferable form of developing of the entrepreneurship.

There were also stated subsidiaries hypotheses for achieving the in-depth analysis:

H1: entrepreneurship use some existing facilities in leading of the economic activity by third sector organizations

H2: third sector enterprises reach higher level of satisfaction, including personal job satisfaction, connected to entrepreneurship development.

There was obtained the access to ten nonprofit enterprises and their employees, both: managers and workers, of whom half were men and women, during the research. Due to confidentiality issues, the participating organizations are anonymous in the paper. The main characteristics of the interlocutors are provided in table 1.

Table 1. Main characteristic of interviewees.

| NON-PROFIT ENTERPRISE NO. | POSITION WITH CODING <sup>1</sup> | EDUCATION  | EXPERIENCE IN THIRD SECTOR (IN YEARS) | AGE | GENDER <sup>2</sup> | LOCATION OF NON-PROFIT ENTERPRISES <sup>3</sup> |
|---------------------------|-----------------------------------|------------|---------------------------------------|-----|---------------------|---|
| 1                         | Manager (m)                       | Higher     | 2                                     | 33  | M                   | 2   |
| 2                         | Medical staff (w)                 | Higher     | 14                                    | 42  | F                   | 1   |
| 3                         | Chief accountant (m)              | University | 8                                     | 53  | F                   | 3   |
| 4                         | Team manager (m)                  | Bachelor   | 4                                     | 29  | M                   | 4   |

|    |                                |                  |    |          |   |   |
|----|--------------------------------|------------------|----|----------|---|---|
| 5  | Social worker (w)              | NVQ <sup>2</sup> | 12 | 41       | F | 2 |
| 6  | Team leader (w)                | NVQ              | 9  | 24       | F | 4 |
| 7  | Accountant (w)                 | Bachelor         | 4  | 32       | M | 3 |
| 8  |                                | NVQ              | 14 |          | M | 3 |
| 9  | Manager (m)<br>Team leader (w) | NVQ              | 9  | 27<br>39 | F | 2 |
| 10 | Psychologist (w)               | University       | 5  | 31       | M | 3 |

<sup>1</sup>m-manager; w-worker.

<sup>2</sup>M-male; F-female.

<sup>3</sup>Legend: 1-city more than 100 000 people; 2-city 99 999-50-000 people; 3-city 49 999-5000 people, 4-village.

<sup>4</sup>National Vocational Qualification.

Source: own elaboration.

To sum up: the methodological approach it is possible to point the Manski theory, where agents as decision-makers endowed with preferences, forming expectations, and facing constraints. Preferences are given formal expression through utility functions, expectations through subjective probability distributions and constraints through choice sets (Manski 2000).

### 3 Results

There were selected both – the areas as well as the main factors of nonprofit enterprises development, which are presented in the table below.

Table 2. Areas and main factors criteria<sup>1</sup> of third sector development.

| Area                   | Item                         | Answers with coding <sup>2</sup> in numbers |
|------------------------|------------------------------|---|
| Entrepreneurial skills | Market analysis              | 5m / 5w                                     |
|                        | Organizational culture       | 4m / 5w                                     |
|                        | Network utilization          | 3m / 5w                                     |
| Social skills          | Social problems solving      | 3m / 5w                                     |
|                        | Active listening             | 5m / 2w                                     |
|                        | Conflict management          | 5m / 1w                                     |
| Funds                  | Per negotiation              | 4m / 5w                                     |
|                        | Initial capital              | 2m / 4w                                     |
|                        | Funding capacity             |   |
|                        | Available funds              |   |
|                        | Growth of the fund potential |   |
|                        | Used technology              |   |
|                        | IT skills                    |   |
|                        | R&D infrastructure           |   |

<sup>1</sup>The interviewees had the possibility to choose few answers, because of that the percentage do not sum up to 100%.

<sup>2</sup>m-manager; w-worker.

Source: own elaboration.

The access was obtained to ten respondents, of whom half were men and half were women. Due to confidentiality issues, the participating organizations are anonymous in the paper. Presented results allows to state that entrepreneurial skills are most important for workers (100% in each item from that area) than for managers (market analysis for 100% of them, organizational culture for 80% and network utilization for 60%). In other the case of social skills given answers allow to point at managers as the group for which they are more important. Only such social skill as social problems solving was more important for third sector enterprises workers (100%) than for their managers (60%). Other social skills such as active listening and conflict management were more important for all managers. At the same time only 40% of workers pointed active listening and only 20% of them pointed conflict management as the skills which may be important for third sector enterprises development.

Very interesting is, as the research results, the funding matter. Research has shown that opinions between managers and workers differed. The workers pointed such items as per

negotiation and available funds as the most important – 100% in both cases. For managers they were not so important: per negotiation was pointed by 80% of managers and available funds by 60% of them. Tax facilities was the most important item, from the fund area, for all questioned managers. Into works 60% pointed this item as important from the social enterprise development point.

What is interesting the technical skills were not so important for both – managers and workers. The used technology and technological potential were pointed by 80% of managers and IT skills were pointed by 80% of workers. This is the important part of research because in IT sphere enterprises of the third sector work at the same rules as open market enterprises. They also work in the advertisement, promotion, development. These skills are used for creative projects, which are characteristic also for analysed sector.

Another part of research was focused at the reasons of personal taking part into third sector by the employees, both – managers and workers. Answers given by interviewees are presented in the following table.

Table 3. Reasons of acting in the third sector.

| Variable               | Position in third sector enterprise <sup>1</sup> - number of answers |
|------------------------|--|
| Salaries               | 3m / 4w  |
| Flexible working hours | 4m / 5w  |
| More free time         | 2m / 5w  |
| Lower stress           | 3m / 4w  |
| Independence           | 5m / 4w  |
| Feel needed            | 3m / 5w  |
| Job satisfaction       | 4m / 5w  |

<sup>1</sup>m-manager; w-worker.

Source: own elaboration.

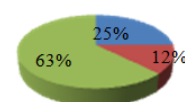
Research shows that salaries are not most important variable nor for managers nor for workers. The most important aspect of the employment in the third sector are flexible working hours, more free time, the feeling being needed and job satisfaction for all workers. Managers, asked about pointing the same value, have chosen flexible working hours and job satisfaction as well. But those answers were chosen by 80% of them. It means that workers can see bigger difference between employment in open market and third sector enterprise. That differ may occur from managers' situation at work market – they are often hired at managers contracts, which give them such possibilities in open market companies. The most important value, for all reviewed managers, was independence. Possibly they can see that value more attractive and developed in third sector employment. Variables such as possessing more free time was not attractive for managers hired in third sector (only 40% choose that answer). This corresponds directly with variables pointed in research and described earlier.

There was also asked one general question about job satisfaction in nearest future perspective at the end of the survey. The answers are presented at the graph below.

Graph 1. The subjective possibility of return to previous work place.

Would you like to back to previous work (in open market enterprise) in the nearest future?

■ 1. Managers - yes ■ 2. Workers - yes ■ 3. No



Source: own elaboration.

Answers given in this part of research allow to state, that work in the third sector enterprises is really attractive in comparison with the work in open market enterprises.

#### 4 Discussion

When analysing the data collected in research it is possible to point that there is still growing interest to carry out the research on the third sector's potential. There were led studies at the improvement of management skills (Kowal, Makio and Jasińska-Biliczak 2017), in order to facilitate the combination of social purposes and economic efficiency of the third sector (Perista and Nogueira 2006), which showed that issues such as innovation, quality, equal opportunities, social marketing, funding sources, management systems and indicators, evaluation still need to be developed in that kind of entrepreneurship. There is no sharp, well-defined dividing line between this so-called third sector and the other two sectors, but its characteristics still set it apart (McKeever 2018). The European third sector is an enormous economic force, outdistancing most major industries in the scale of its workforce. Third sector organizations have long been associated with the provision of human services that contribute to well-being and the quality of life. the lack of data about the third sector's output and even more so about potential impact indicators hinders the empirical validation of these theoretical insights (CORDIS 2017).

Because the third sector service providers are akin to what the relevant academic literature has dubbed social enterprises (UNDP 2008), thereby it is identified that third sector organisations generally provide a necessary complement to both public and private for-profit provision of basic welfare services (Salamon and Sokolowski 2018). There is no doubts that the third sector organisations deliver a range of public services for government. This confirms the increasing relevance of the topics related to the development of this sector and the existence of a growing demand for new managerial and organizational tools (Jasińska-Biliczak and Sitkowska 2014) to improve the performance of third sector organizations (Evers and Laville 2004). In that meaning the present research fills the gap in analysed issue of the third sector development in.

#### 5 Conclusion

There is much more possibilities of creating own business, the business may be provided in various ways being, from the competitiveness point of view, safer than common enterprises – many facilities for third sector. The third sector entrepreneurs also observed the higher level of satisfaction from their work which is strictly connected to their real influence at providing local services addressed to some special consumers. Similar situation is pointed by third sector employees. The main variable pointed by both research parties was so called flexible working hours connected, with specific for analyzed sector, work in projects. This kind of work guarantees employment and income during the time the project lasts. But also, at the same time, both parties declare enabling of creativity and flexibility as well as increasing the job satisfaction as the consequences of that form of employment. Mentioned variables should be the directions for governments, especially self-governments, for creating the directions of the third sector policy. Research allows to declare social changes which bring the vision of the work concept. The work should bring not only the income or salaries but also satisfaction and self-realization too.

There is possible to point the main reasons of being attractive to lead the business activity in the third sector form in the analyzed economy. They differ from the motives of leading the business activity in the open market economy. At the same time they are going to create the groups of specialists, who incorporate for reach also other, often social aims, with simultaneously reaching satisfying work place. As the research showed opinions of managers and workers, employed in the third sector, differ. This may cause dissonance between understanding of the mission and actions of analyzed sector. Problems with cooperation for project realization as well as direction at projects realization may be

their negative results. Because of that leaders responsible for third sector development, acting inside and outside this sector, should take the action for developing cooperation and better mutual understanding between the third sector employees. On the other hand agreeing in pointing the job satisfaction reaching by both – third sector managers and workers – can generate new trend in the future. The third sector enterprises may be the answer for nowadays employees needs and to point the direction of open market enterprises evolving.

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**Primary Paper Section: A**

**Secondary Paper Section: AH**

# PUBLIC PROCUREMENT IN THE VIEW OF THE COURT OF JUSTICE OF THE EUROPEAN UNION DECISIONS

\*DANIELA JEŽOVÁ

Comenius University, Law Faculty, Šafárikovo nám. 6,  
Bratislava, Slovakia  
email: daniela.jezova@flaw.uniba.sk

The article is part of the grant project of Slovak Research and Development Agency No. APVV-17-0641 „Making the public procurement legislation more effective and its application in the context of European Union law “

Abstract: The article focuses on the role of the Court of the European Union in the public procurement. The article will deal with the contract's cases, recent case law in public procurement and cases in preliminary ruling procedures issued by Slovakian courts. The article focuses on cases in the preliminary ruling procedure.

Keywords: Court of Justice, Public Procurement, Preliminary rulings, Case Law.

## 1 Introduction

The role of the Court of Justice of the European Union is crucial in public procurement area. The Court of Justice has clearly jurisdiction to deal the cases of public procurement. This article will focus on the cases dealt in the preliminary rulings based on article 267 TFEU. The Court in the preliminary ruling creates the law and goes beyond the legal framework. The reference for a preliminary ruling is an important procedure in the European Union law, the aim of which is to achieve an uniform interpretation of European law. The only competent body to initiate this procedure is the national judge, respectively the court. However, the concept of “a court” is not so clear and its interpretation is carried out by the Court of Justice on the basis of its case-law.

The regulation of public procurement in the European Union has multiple dimensions, as a discipline of European law and policy, directly relevant to fundamental principles of the common market and as policy instrument in the hands of Member States. Its purpose is to insert a regime of competitiveness in the relevant markets and eliminate all non-tariff barriers to intracommunity trade that emanate from preferential purchasing practices which favour national undertakings<sup>1</sup>.

## 2 Public Contracts in Case Law

In the context of definition of the public contract the case *Auroux and Others*<sup>2</sup> shall be reminded. The Court held that an agreement by means of which a contracting authority entrusted another body with the execution of works constituted a public works contract, regardless of whether the contracting authority was or would become the owner of all or part of those works. It made no difference that the authority would not acquire ownership of the work, or that the successful tenderer would not execute the works itself but would have them carried out by subcontractors. It was also no defence that the successful tenderer itself would apply the directive's competitive procedures when awarding the sub-contracts for work.

In case *Helmut Müller*<sup>3</sup> the Court held that only a contract concluded for pecuniary interest constituted a public contract within the scope of the Directive. The “pecuniary nature of the contract” means that the contracting authority that has concluded a public works contract receives a service pursuant to that contract in return for remuneration. That service consists in the realization of works from which the contracting authority intends to benefit. Economic benefit is clearly established where it is shown that the public authority is to become the owner of the works that are the subject of the contract. Economic benefit may also be considered to exist where the contracting authority is to

hold a legal right over the use of the works so that they can be made available to the public. Economic benefit may also exist through the economic advantages that the contracting authority may derive from the future use or transfer of the works, the financial contribution of the authority to the realization of the works or its assumption of the risk that the works may turn out to be an economic failure.<sup>4</sup> The *Helmut Müller* makes clear that not all land development agreements with public authorities will fall within the EU procurement rules. It should therefore quell some of the more expansive interpretations that were being given to the earlier *Auroux* judgment. The Court has made clear that a public works contract will arise from a development-type agreement only when the resulting works will be of direct economic benefit to the authority, such as where the authority will acquire ownership or use of the works or contributes at least some of the cost. The Court also gave a useful steer on the circumstances when the works will be regarded as corresponding to requirements specified by the authority. What is made clear is that the mere exercise of planning powers by a local authority is not sufficient to trigger the procurement rules.

In the recent case *Tirkkonen*<sup>5</sup> the Court of Justice specified the concept of a procurement contract in the way, that not every contract is a public contract. Farm advisory scheme, through which a public entity admits all the economic operators who meet the suitability requirements set out in the invitation to tender and who pass the examination referred to in that invitation to tender, even if no new operator can be admitted during the limited validity period of that scheme, does not constitute a public contract. The case *Tirkkonen* clarifies the concept of a public procurement contract. In case the contracting authority does not make a comparison between the bids, the question is not of a public procurement procedure.

The Directive 2014/24/EU in recital 4 says that that situations where all operators fulfilling certain conditions are entitled to perform a given task, without any selectivity, such as customer choice and service voucher systems, should not be understood as being procurement but simple authorization schemes. The Court of Justice also considered the doctrine of *Falk Pharma*<sup>6</sup> pointed out by the referring court. In the *Falk Pharma* case the Court has already pointed out that the choice of a tender and, thus, of a successful tenderer, is intrinsically linked to the regulation of public contracts by that directive and, consequently, to the concept of ‘public contract’ within the meaning of Article 1(2) of that directive. The contracting authority does not designate an economic operator to whom contractual exclusivity is to be awarded means that there is no need to control, through the detailed rules of Directive 2004/18, the action of that contracting authority so as to prevent it from awarding a contract in favor of national operators.

In the *Tirkkonen* case<sup>7</sup> Finland launched a tender procedure in order to conclude contracts for advisory services. The advisory services referred to in that contract notice were offered to farmers who were part of the agreement. Farmers who fulfil condition and who wish to request advice are free to contact an advisor of their choice, who is a member of the Farm Advisory Scheme. That advisor is then paid according to the work carried out, by way of an hourly rate excluding value added tax (VAT) paid by the Agency, the farmer only bearing the amount of VAT. It can be stated that what distinguishes a procurement contract from other purchases is the use of award criteria.

The difference between *Falk Pharma* and *Tirkkonen* was that the latter system was not open for new operators during the contract term.

<sup>1</sup> Bovis, Ch.: EU Public Procurement Law. Second edition. Cheltenham: Elgar European Law. 2012. p. 1. ISBN: :978085793841

<sup>2</sup> Judgment of 18 January 2007, Auroux and Others, C-220/05, EU:C:2007:31

<sup>3</sup> Judgment of 25 March 2010, Helmut Müller, C-451/08, EU:C:2010:168

<sup>4</sup> <http://www.sigmaweb.org/publications/Judgements-CourJustice-31July2014-Eng.pdf> (27.12.2019)

<sup>5</sup> Judgment of 1 March 2018, Tirkkonen, C-9/17, EU:C:2018:142, paragraph 42.

<sup>6</sup> Judgment of 2 June 2016, Falk Pharma, C-410/14, EU:C:2016:399, paragraph 37, 38

<sup>7</sup> Judgment of 1 March 2018, Tirkkonen, C-9/17, EU:C:2018:142, paragraph 15

### 3 Recent Case Law in Public Procurement

#### 3.1 General Principles

In *Telaustria* case<sup>8</sup> the Court made clear that the contracting authorities are bound by the fundamental rules of the Treaty, in general, and the principle of non-discrimination on the ground of nationality, in particular, that principle implying, in particular, an obligation of transparency.<sup>9</sup> The obligation of transparency flows from the economic freedoms and is implied by the application of principle of non-discrimination, as is stated very explicitly in the *Union des Syndicats Immobilier (UNIS)*<sup>10</sup> case. In UNIS case the Court made clear that a public authority creating an exclusive right is under a duty to comply with the obligation of transparency. The public authority must have given potentially interested operators other than the one appointed an opportunity to express their interest in providing such management, any must have acted with full impartiality when appointing the operator entrusted with management of that supplementary scheme.<sup>11</sup>

In recent *Rudigier* case<sup>12</sup> the obligation to provide prior information laid down in that provision applies to contracts for public transport services by bus which are in principle awarded in accordance with the procedures provided for by Directive 2014/24/EU or by Directive 2014/25/EU and an infringement of that obligation to provide prior information does not entail the annulment of the call for tenders concerned, provided that the principles of equivalence, effectiveness and equal treatment are complied with, which is for the referring court to ascertain.

#### 3.2 Green Public Procurement<sup>13</sup>

In the *Concordia Bus*<sup>14</sup> case the Court considered award criteria relating to ecology (emissions and noise). The main issue was to consider to what extent can environmental requirements be taken into consideration at the point of earning extra points under the award criteria. The Court stated that it is acceptable to take into consideration environmental award criteria when assessing the most economically advantageous tender. But the Court put these conditions for such consideration: (i) award criteria must have a link to the subject matter of the contract; (ii) award criteria must be specific and objectively quantifiable; (iii) award criteria must have been expressly mentioned in the contract documents or in the tender notice; (iv) award criteria shall comply with general principles of EU law (namely the non-discrimination); (v) the criteria chosen must be capable of identifying the most economically advantageous tender. Once the criteria have been chosen, by reference to the requirements that they must fulfill as mentioned above, the contracting authority will proceed to weigh such criteria. Lastly, the evaluation to be carried out by the contracting authority will be determined which tender best meets the needs of the entity.<sup>15</sup> The *Concordia Bus* opened the possibilities for contracting authorities to include environmental award criteria in their tenders, provided the above conditions are met. The case concerned the possibility of imposing environmental requirements in public procurement, which the relevant directive at that time did not expressly permit. The court thus paved the way for a formal amendment of EU law concerning public procurement. This enabled Member States to include environmental protection requirements in the list of criteria for assessing the most economically advantageous tender. The integration principle thereby has the effect that legal rules outside the area of environmental policy can be interpreted

in the light of Treaties' environmental protection requirements.<sup>16</sup> The ruling has been considered as significant for environmental protection because it diminishes, for example, the Commission's demand that environmental aspects should be economical by nature.<sup>17</sup>

The *Wienstrom* case<sup>18</sup> is another "environmental" award criteria case deal by the Court. The criterion was to supply of energy producing from as much energy possible using renewable sources. In order to identify the best tender from that perspective, the contracting authority included an award criterion whereby tenders had to state how much electricity they could supply from renewable energy sources to a non-defined group of consumers.<sup>19</sup> A weighting of 45% was provided to the award criterion of supplying the electricity from renewable sources.

The Court held that it is acceptable to make use of ecological award criteria, even if the criterion in question doesn't provide an immediate economic benefit for the contracting authority and it is furthermore possible to give an important weighting to such criteria (in this case 45%). On the other hand, the court ruled that it is not acceptable when this criterion is not accompanied by requirements which permit the accuracy of the information contained in the tenders to be effectively verified; when it requires tenderers to state how much electricity they can supply from renewable energy sources to a non-defined group of consumers, and allocates the maximum number of points to whichever tenderer states the highest amount, where the supply volume is taken into account only to the extent that it exceeds the volume of consumption expected in the context of the procurement. The court reasoned the decision by findings that an award criterion that relates solely to the amount of electricity produced from renewable energy sources in excess of the expected annual consumption, as laid down in the invitation to tender, cannot be regarded as linked to the subject-matter of the contract. Moreover, the fact that, in accordance with the award criterion applied, it is the amount of electricity in excess of the expected annual consumption as laid down in the invitation to tender which is decisive is liable to confer an advantage on tenderers who, owing to their larger production or supply capacities, are able to supply greater volumes of electricity than other tenderers. That criterion is thus liable to result in unjustified discrimination against tenderers whose tender is fully able to meet the requirements linked to the subject-matter of the contract. Such a limitation on the circle of economic operators in a position to submit a tender would have the effect of thwarting the objective of opening the market to competition pursued by the directives coordinating procedures for the award of public supply contracts. The court considered as unobjective criterion using only the numbers stated by the application in their proposals without being able to verify that information by the contracting authority. The case specified more the previous case *Concordia Bus* requirements by setting two additional. First, the criteria must be accompanied by requirements which enable the contracting authority to verify the information submitted regarding compliance with the environmental criteria. Second, award criteria must be related specifically to the subject-matter of the contract, and not to the general capacity of the economic operator.

*Dutch coffee*<sup>20</sup> was another case in the raw of environmental cases at the Court. Although it was a case in the infringement procedure not in preliminary ruling, the mentioning is important due to the relevance with the above-mentioned cases. In this case the contracting authority sought to acquire fair trade and organic supplies for its vending machines. In this case the Court found the contracting authority at fault due to the prescription of the

<sup>8</sup> Judgment of 7 December 2000, *Telaustria*, C-324/98, EU:C:2000:669, paragraph 67.  
<sup>9</sup> See also Caranta, R.: Public Procurement and Award Criteria, p. 149, In: Research Handbook on EU Public Procurement Law, Northampton, Cheltenham :Edward Elgar Publishing, 2016. ISBN: 9781781953259

<sup>10</sup> Judgment of 17. December 2015, *Union des Syndicats Immobilier (UNIS)*, C-25/14 and C-26/14, EU:C:2015:821, paragraph 46

<sup>11</sup> Ericsson, A., Groussot, X.: The Obligation of Transparency, In: Discretion in EU public procurement law. Chicago : Hart publishing. 2019. p. 111. ISBN: 9781509919499.

<sup>12</sup> Judgment of 20 September 2018, *Rudigier*, C-518/17, EU:C:2018:757, paragraph 73  
<sup>13</sup> [https://ec.europa.eu/environment/gpp/index\\_en.htm](https://ec.europa.eu/environment/gpp/index_en.htm) (27.12.2019)

<sup>14</sup> Judgment of 17 September 2002, *Concordia Bus*, C-513/99, EU:C:2002:495

<sup>15</sup> Franch, M., Grau, M.: Contract Award Criteria, In.: EU Public Contract Law: Public Procurement and Beyond, Bruxelles : Bruylant, 2014, p. 35

<sup>16</sup> Langlet, D., Mahmoudi, S.: EU Environmental Law and Policy, New York : Oxford University Press, ISBN: 9780198753933, p. 61

<sup>17</sup> Palmujoki, A., Parikka, Alhola, K., Ekroos, A.: Green Public Procurement: Analysis on the Use of Environmental Criteria in Contracts, In: Reciel 19 (2) 2010, p. 252

<sup>18</sup> Judgment of 4 December 2003, *Wienstrom*, C-448/01, EU:C:2003:651, paragraph 68,69

<sup>19</sup> Sanchez-Graells, A.: Some Reflection on the "Artificial Narrowing of Competition" as a Check on Executive Discretion in Public Procurement, In: Discretion in EU public procurement law. Chicago : Hart publishing. 2019. ISBN: 9781509919499.

<sup>20</sup> Judgment of 10 May 2012, *Dutch Coffee*, C-368/10, EU:C:2012:284, paragraph 91

specific labels that the supplies had to bear in order to obtain points linked to fair trade and organic production requirements.<sup>21</sup> The ruling confirmed that it was not possible to set a requirement that the supplied goods need to bear a specific label. According to the Court, organic production could be a required as a technical specification, but it found that social criteria under the 'Max Havelaar' label could not, as they relate to the 'conditions under which the supplier acquired them from the manufacturer'.<sup>22</sup> there is no requirement that an award criterion relates to an intrinsic characteristic of a product, that is to say something which forms part of the material substance thereof. The Court held thus, in paragraph 34 of EVN and Wienstrom, that European Union legislation on public procurement does not preclude, in the context of a contract for the supply of electricity, a contracting authority from applying an award criterion requiring that the electricity supplied be produced from renewable energy sources. There is therefore nothing, in principle, to preclude such a criterion from referring to the fact that the product concerned was of fair trade origin.

#### 4 Slovakia and Case Law in Public Procurement

In this part of the article some of the preliminary cases issued by Slovakian court will be mentioned and analysed. The first case in preliminary ruling was a case *SAG ELV Slovensko and others*<sup>23</sup>. The case was about the public procurement of Slovak company controlled by State: Národná diaľničná spoločnosť, to the supply of services relating to toll collection on motorways. In this case, the Court considered whether, in certain circumstances, a contracting authority could or would have to seek clarification from an economic operator that had submitted a tender in a restricted procedure. The relevant circumstances occur when a contracting authority takes the view that a tender submitted is abnormally low or imprecise or does not meet the technical requirements of the tender specifications. Abnormally low tenders: The Court decided that a contracting authority was obliged to ask an economic operator to clarify an abnormally low tender. This decision was based on the provisions of article 55 of the directive 2004/18/EC, which relates to abnormally low tenders. Imprecise tenders or tenders that do not meet specification requirements: The Court concluded that a contracting authority was not obliged to seek clarification of a tender that it considered to be imprecise or incapable of meeting the technical requirements of the specifications. Furthermore, it could reject a tender on that basis. Permitted clarification: The Court was of the view that the Directive did permit "the correction or amplification of details of a tender, where appropriate, on an exceptional basis". However, such changes were to be permitted only when a number of additional conditions were satisfied.<sup>24</sup> The case is an important case in the view of contract award in public procurement. The Court provided guidance on the issue of permitted clarification in award criteria. The Court stated a general rule that the tender should not be amended after the submission, however some corrections to a tender are possible. The important ruling of the Court in this case was: "Article 55 of Directive 2004/18 precludes a contracting authority from taking the view that it is not required to ask a tenderer to clarify an abnormally low price. Article 2 of Directive 2004/18 does not preclude a provision of national law, such as Article 42(2) of the abovementioned Law No 25/2006, according to which, in essence, the contracting authority may ask tenderers in writing to clarify their tenders without, however, requesting or accepting any amendment to the tenders. In the exercise of the discretion thus enjoyed by the contracting authority, that authority must treat the various tenderers equally and fairly, in such a way that a request for clarification cannot appear unduly to have favoured or

disadvantaged the tenderer or tenderers to which the request was addressed, once the procedure for selection of tenders has been completed and in the light of its outcome."

*Metrostav*<sup>25</sup> is another case in the area of public procurement started by Slovakian Supreme Court. The issue was that one of the tenderers did not satisfy the economical requirement and did not provide the statement from a Slovak bank or a Slovak branch office of a foreign bank confirming that it would grant them credit in the amount of at least EUR 3 000 000 but instead of such a bank statement provided statement, given by a bank, which contained information on the opening of a current-account credit facility for an amount exceeding EUR 5 000 000, and a sworn statement from the tenderer certifying that, if its bid was successful, it would have available in its current account, at the time of conclusion of the contract for works and throughout the period of performance of the contract, a minimum amount of EUR 3 000 000. It was considered that he did not meet the tender economic and financial standing. The Court answered that on one hand the contracting authority can exclude the tenderer from tendering on the ground of not complying with the economic and financial standing. On the other hand the Court stated that in case the bank of tenderer considers themselves unable to provide the tenderer with a statement in the terms specified by the contract notice may constitute a 'valid reason', within the meaning of that article, allowing the tenderer, where appropriate, to prove its economic and financial standing by any other document considered appropriate by the contracting authority, provided that it was objectively impossible for the tenderer to provide the references required by the contracting authority.

#### 5 Conclusion

The Court of Justice has definitely an important role also in the area of public procurement. In the article several important decisions of the Court were mentioned such as *Telaustria*, *Helmut Müller and Auroux*. Then the analysis continues with the recent case law in decisions such as *Tirkkonen*, *UNIS* and *Rudigier*.

Next the green public procurement is analysed with significant recent decisions such as *Concordia Bus*, *Wienstrom* and *Dutch Coffee*. Green public procurement is about setting environmental criteria while complying with the legal principles of the free movement of goods, transparency and equal treatment of bidders. Important in legal matters is the objectivity of the award criteria, so that they are linked to the subject matter of the public contract in question. In some cases, this linking need, however, at least some kind of justification related to requirements and their importance from an environmental point of view. Generally, if a purchaser wishes to address detailed environmental issues in contract award criteria, these requirements may also need more precise justification.<sup>26</sup>

The article proves that the Court of Justices provides new standards and not only interprets the law but also provides new rules for the public procurement area in EU law such as allowing adding the environmental award criteria in tenders.

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# DETERMINING FINANCIAL COMPENSATION IN THE CASE OF AGRICULTURAL LAND EXPROPRIATION – NEW METHODOLOGY

<sup>a</sup>PETR JUNGA, <sup>b</sup>JAROMÍR VRBKA, <sup>c</sup>TOMÁŠ KRULICKÝ

*Institute of Technology and Business, School of Expertness and Valuation, Okružní 517/10, 37001 České Budějovice, Czech Republic*

*email: <sup>a</sup>22879@mail.vstecb.cz, <sup>b</sup>vrbka@mail.vstecb.cz, <sup>c</sup>krulicky@mail.vstecb.cz*

**Abstract:** The objective of the contribution is to propose new methodology for determining financial compensations for the damage caused by expropriation of agricultural land. Using the methodology, all aspects affected by the expropriation of agricultural land are considered. In particular, loss of obtainable profit from particular crop on the expropriated land or its part of the deduction of all cultivation costs is taken into account. It was concluded that the current methodology is "unfair" to the owner of the expropriated land in many aspects. Using the methodology proposed, the financial compensation for the damage caused in a model case was increased by nearly CZK 25,000.

**Keywords:** method of capitalization of earnings, expropriation, damage, financial compensations, build-up model, agricultural land, investment plan

## 1 Introduction

Expropriation is an extreme case of the withdrawal or limitation of the right of ownership or the right corresponding to the easement of the subject of expropriation, usually real estate. It is an important act of power, ex officio interfering with one of the fundamental human right in the rule of law, namely the right to own a property. Expropriation can thus be executed only in the public interest, by law, and for compensation. Due to the significant interference in property rights, expropriation is executed only to a limited extent. The most frequent case is the case of agricultural land expropriation. Given the frequency of agricultural land expropriation, the paper submitted is directed in the same area, that is, expropriation of agricultural land.

In the Czech legal environment, expropriation is governed by the Act on Acceleration of the Construction of Transport Infrastructure (Czech Republic, 2009) and the act on revocation or limitation of ownership of land or building (Expropriation Act) (Czech Republic, 2006). Currently, in accordance with Czech legislation, expropriation of land is compensated by financial compensations in the amount of the usual price. This compensation is based on Section 10 (1) a) (Czech Republic, 2006). However, in practice, it is less common to determine compensation for ownership also under Section 10 (2) and (3) of the same Act, where both experts and expropriation authorities either do not take the compensation into account or consider them only partial, through a non-uniform methodology.

The absence of uniform methodology for determining the compensation for the damage caused by the expropriation often results in disputes between an owner and the expropriation authority as well as in possible negative impact on the schedule of an implemented/considered investment. Delaying the start of the construction due to the complications related to the expropriation has usually negative impacts on the whole society.

The objective of the paper submitted is to propose a uniform methodology that would respect the existing legislation and could be applied in the case of agricultural land expropriation. The proposed methodology could thus significantly contribute to accelerating the execution of engineering work (purchasing the lands) of the investment to which the conditions of the expropriation act are related. The objective of the paper is to create a methodology for determining the financial compensations as a compensation for the damage caused to the owner by the expropriation of land.

The proposed methodology for determining financial compensation for expropriated agricultural land will be applied in a model case of a medium-sized agricultural company Alfa.

The data for calculating the amount of financial compensation will be converted to average values in the year 2018.

## 2 Literary research

Under the Valuation Act, property and services are valued at the usual price, unless otherwise provided by the Act. For the purposes of this Act, the usual price is the price that would have been achieved by selling the same or similar property or by providing the same or similar service in the ordinary trade pattern in the Czech Republic on the valuation date, considering all circumstances that affect the price but not reflecting the effects of exceptional market circumstances, personal situation of a buyer or seller nor the influence of special popularity (Czech Republic, 1997). The usual price expresses the value of a thing and is determined by comparing (Stehel, Rowland and Mareček, 2019).

International Valuation Standards (IVS) (2017) do not clearly define this term. However, they define some basic terms based on which it is possible to define an equivalent term, which is the market value.

Market value is an estimated amount for which the property shall be exchanged on the valuation date between a voluntary buyer and voluntary seller in an independent transaction after proper marketing, where each party acts in an informed, reasonable, and non-compulsive manner (Vrbka et al., 2019).

In this case, the estimated amount is the value expressed by money obtained within an independent payment for a similar asset. Persons inwardly motivated to selling and buying within this transaction are called voluntary seller and voluntary buyer (Vochozka et al., 2019). An independent transaction refers to the assumption of the absence of any factor that would affect the entire course of the transaction of the amount of financial compensation between both participants in the transaction. IVS also considers rational the fact that both participants in the transaction strive to achieve the best and reasonable price form themselves. Having relevant information about the value of the purchased object is thus essential for both parties (Mařík, 2004).

It is clear from the analysis above that expropriation is not a standard market act where a voluntary seller and voluntary buyer meet, but it is a unilateral legal act in which the owner (the expropriate) is "forced" to agree with the transaction and does not have any significant means of defence or any choice to voluntary selling. It is thus clear that expropriation is specific to a large extent, and the determination of the damage caused by expropriation should be paid increased attention to.

In the case of land expropriation, the main problem is always the determination of an adequate amount of financial compensations for expropriation and compensation for the damage caused. In the issue of land expropriation, there are two conflicting interests. First of them is the existence of the public need of the land and the second is the expected protection of land tenure and the protection of the owners' property rights (Gebremichael, 2016). The process of land expropriation is one of the key instruments available to the state to carry out land reform and other interests (Marais, 2017). Land expropriation is also one of the tools to satisfy the demand for building plots (Chu, 2009), which occurs in the case of agricultural land expropriation, most often in favour of technical infrastructure construction. In the Czech Republic, land expropriation is carried out mostly due to the construction of road and energy infrastructure (Hanák, 2015). Land expropriation can be executed on any type of land. In some regions in the world, agricultural land expropriation is a great risk endangering the survival of the owner, and it also represents a risk of job loss for seasonal farmers and other workers. These are only two of a number of reasons why the determination of adequate compensation for a land owner shall be paid great

attention to (Gao and Feng, 2013). According to Chu (2009), the compensation for the owner should be in accordance with the market mechanisms. Currently, the compensation for expropriation corresponds to the usual price of the subject of expropriation, that is, the market value of the given asset.

In Brazil, the risk of expropriation has a very negative impact on the local forest cover. The owner of forests often fell the whole forest on their land due to their fear of possible expropriation and transform the originally afforested areas into agricultural land. In Brazil, the risk of expropriating is much lower in the case of agricultural land, since it is much easier for their owners to convince the government wishing to expropriate the land that the land has its production value (Araujo et al., 2009). However, this also contributes to illegal logging (Amacher, Koskela and Ollikainen, 2009).

Wang, Qian and Guo (2019) analysed the impact of agricultural land expropriation on the lives of farmers active in the area where the expropriation has been executed in the People's Republic of China. From their perspective, expropriation mostly concerns land near towns and cities, and is carried out for the purposes of urbanization. According to the findings obtained, the way the compensation system in the People's Republic of China is established is not able to compensate sufficiently all property and non-property damage caused to the owners by the expropriation of agricultural land.

Subic-Kovac and Rakar (2010) point out that the expropriation of particular land significantly reduces the value of the surrounding land, which should not be forgotten when determining the compensation amount. This always depends on the characteristics of the given site, conditions, and purpose of the expropriation.

Remeikiene and Gaspareniene (2017) also state that the constant changes in the land layout, which can be also caused by the expropriation process, represent a major obstacle to the pursuit of organic farming.

Mei and Lei (2010) suggest an increase in financial compensation for property damage on agricultural land due to mining and construction activities through environmental tax. He and Asami (2014) investigated what amount of financial compensation would the land owners consider appropriate for the involuntary sale of the land. On average, the land owners require 3.74 times the financial compensations offered for the involuntary selling of their agricultural land. This is considered to be due to a strong emotional value the land has for its owner.

In the event that a high contribution of the real estate for the society is legally recognized, the government's first option is to try to purchase it through a voluntary selling/purchasing transaction. If the owner is not willing to sell the real estate in question, the government can use the expropriation process in order to obtain it. In the case of expropriation, the amount of financial compensations is set at the usual price (Sumrada, Ferlan and Liseč, 2013).

The expropriation process can take several forms. According to Wang et al. (2017), higher amounts of financial compensations for involuntary selling were achieved by the owners who negotiated with the investors on price than in the case of the owners who agreed to sell the agricultural land at the standard rate.

In African Rwanda, "unfair" law on providing financial compensation of expropriated land was in force until 2015. In 2015, the Act underwent an amendment, which considered the area of the expropriated land the main attribute for determining the amount of financial compensation, which was welcome news (Uwayezu and de Vries, 2019).

In the event of expropriation of land around towns due to urbanization, farmers who have lived only on crop and livestock

production for all their lives often do not have any choice but move to a town. Here, however, a big problem is with their employment in the labour market, as towns often do not offer any employment in this field (Bao and Peng, 2016).

Shi (2016) summarizes the impact of agricultural land expropriation as a reduction in the level of well-being of the land owners. For an investor, the expropriation process represents a multi-annual problem. Each year of delay in the implementation of the investment plan represents a 5-percent increase in the implementation costs. Frequent changes in the legislation regulating the expropriation process also significantly prolong the entire process. The relevant Czech legislation enables to provide compensation only for the loss of the land. However, land owners are justified in claiming the compensation for the loss of the profit from the expropriated and the surrounding land. Very often, therefore, they are more inclined to accept compensation in the form of other land with a corresponding fertility level (Hanák, 2015).

Pursuant to the Expropriation Act, the expropriate is entitled to claim a compensation at the amount of the usual price of the land or building including the accessories if the ownership right was revoked or at the amount of the right corresponding to easement if the right of ownership to the land or building was limited by easement or if the right corresponding to easement was withdrawn or restricted (Czech Republic, 2006).

Di Benedetto (2017) points out the problem that the current case-law is established to protect an individual property rights but does not take into account the rights of common utility that is connected with functional ecosystems. Agricultural areas also provide some ecological and thus publicly useful service for all inhabitants. This fact should not be forgotten.

The current political situation leaves the decisions regarding land management on the land owners. Land ownership overcomes the dilemma between the issue of waste of natural resources and the moral obligation to abandon land ownership in favour of public interest (Katz, 2013).

In the Republic of South Africa, the government considered the idea of making a law that would allow land expropriation without any right for compensation. The aim of this law was to encourage the farmers to strive for a maximum efficiency of land use (Sibanda, 2019). Kwarteng and Botchway (2019) drew the consequences the enforcing of such law would have for the government of the Republic of South Africa. Such a law would be contrary to international law and would damage the economy of the state; the government would become a target of individual litigation for which it would have to spend considerable financial resources.

### 3 Materials and methods

#### 3.1 Determination of revenue from crop production on expropriated agricultural land

First, there will be analysed the process of agricultural land valuation currently used in the Czech Republic in the case of providing compensation for their expropriation. Subsequently, there will be proposed and presented a methodology for determining the amount of financial compensations that would better compensate the damage caused according to the current agricultural market. The methodology proposed will be demonstrated on the example of a model situation in the process of expropriation of a part of agricultural land owned and cultivated by a company Alfa. Finally, the methodology will be applied to determine the breakeven point for the possible purchase of agriculture land by an economically minded and rational farmer.

Information about the current method of land valuation and calculation of financial compensations for the damage caused by the agricultural land expropriation will be sought. To determine the market price of agricultural land, the data from the

agricultural information portal farmy.cz will be used. In the model case, the average market price of agricultural land for the year 2018 will be used.

Since in the following model case, the reason for expropriation will be the construction of a motorway across the land to be expropriated due to the construction of this type of transport infrastructure, technical parameters for construction of motorway infrastructure in the Czech Republic will be used. In this case, it will be the construction of a six-lane motorway. According to the technical parameters, for this type of motorway infrastructure, the width will be 33.5 m (ceskedalnice.cz, 2019).

For the model case, it will be assumed that the company Alfa farms 16.1 ha of farmland, which, according to Eurostat (2019), corresponds to an average area of agricultural land farmed by an average agricultural company in the EU. On the basis of this data, the size of expropriated land necessary for the implementation of the investment plan for the construction of this type of transport infrastructure.

For the calculation of the amount of financial compensations in accordance with the standard valuation process in the Czech Republic, Formula 1 will be used.

$$AFC = \text{area of expropriated land} \times \text{market price of agricultural land} \quad (1)$$

where:  $AFC$  refers to the amount of financial compensations.

After the calculation carried out using the current method of determining the amount of financial compensations for the damage caused by expropriation, the proposed methodology for calculation using the method of capitalization of earnings will be used. Capitalization of earnings is calculated using Formula 2.

$$LV = \frac{e_z}{r} \quad (2)$$

where:  $LV$  is the value of the expropriated land,  
 $e_z$  is permanent earning based on the past or future development,  
 $r$  is the degree of capitalization.

For the application of the proposed methodology for determining the amount of financial compensations as the compensation for the damage caused, a model case will be a set of crops cultivated most on the agricultural land in the Czech Republic. Specifically it will be winter wheat, spring barley, oilseed rape, and ware potatoes. First, it will be necessary to determine the attainable profit based on the past or future development ( $e_z$ ).

This set of crop will be chosen on the basis of the proportion of the individual crops in the total cultivated arable land in the Czech Republic. The share of individual crops cultivated on the arable land in the Czech Republic is shown in Table 2. The data from the year 2018 will be obtained from the database of the Czech Statistical Office (CSO).

Tab. 1: Percentage of selected crops on the arable land in the Czech Republic in 2018

| Crop          | Share on arable land [%] |
|---------------|--------------------------|
| Winter wheat  | 31.4                     |
| Spring barley | 9                        |
| Oilseed rape  | 16.7                     |
| Ware potatoes | 0.9                      |
| In total      | 58                       |

Source: Czech Statistical Office, 2019 (Own adaptation).

Table 1 indicates that in the Czech Republic, the most cultivated crop is winter wheat (31.4%), while ware potatoes are the crop with the lowest share (0.9%). Other cultivated crops making up for the remaining 42% will not be considered in this case due the high crop heterogeneity. This is the model calculation for an

average farm in the Czech Republic; the composition and share of crops can therefore be considered sufficient for determining the average.

Furthermore, it will be necessary to determine the yield of all aforementioned crops per one hectare of agricultural land in the climatic conditions of the Czech Republic. According to the information portal vynosyplodin.cz (2019), the yield of winter wheat ranges between 5-7 t\*ha<sup>-1</sup> per year. In the case of oilseed rape, it is 3-3.8 t\*ha<sup>-1</sup> per year. According to the Czech Statistical Office (2019), the yield of ware potatoes in 2018 was 29.12 t\*ha<sup>-1</sup> per year. The yield of spring barley was 4.93 t\*ha<sup>-1</sup> per year in 2018 (Agrarian Chamber of the Czech Republic, 2019).

In the model case, the upper yield limit of the individual crops per hectare will be considered, since there is the assumption that the model agricultural company Alfa strives for achieving the highest yield possible using available means.

In determining the financial return on sales of the selected crops, the data on the development of their market value obtained from the database Eurostat (2019) will be used. As the values in the database are given Euros, this amount will be converted according to the average exchange rate for the year 2018 (1€ = 25.643 CZK. Table 2 shows the market values for 100 kg of all selected crops in the Czech Republic in 2018.

Tab. 2: Market values of 100 kg of selected crops in the Czech Republic in 2018

| Crop          | Market value [€] |
|---------------|------------------|
| Winter wheat  | 15.94            |
| Spring barley | 15.28            |
| Oilseed rape  | 36.08            |
| Ware potatoes | 19.09            |

Source: Eurostat, 2019 (Own adaptation).

Table 2 clearly shows that in 2018, the highest price was in the case of oilseed rape (36.08 €), while the lowest price was in the case of spring barley (15.28 €).

The amount of permanent attainable profit based on the past or future development ( $e_z$ ) will be calculated using Formula 3.

$$e_z = a * b * c \quad (3)$$

where:  $a$  is the yield of winter wheat from 1 hectare (t/ha),  
 $b$  is the area of the land expropriated in hectares (ha),  
 $c$  is the market price of winter wheat (CZK/t).

As in the Eurostat database in the Czech Republic, the market values of all crops are given per 100 kg, it will be necessary to calculate the yield of all crops from 1 hectare in tons using the coefficient 10, due to the correction of the units for further numerical operations.

For the proposed methodology, it will also be necessary to determine the value of the degree of capitalization ( $r$ ). To determine the capitalization rate ( $r$ ), build-up model will be used according to Formula 4.

$$r = r_f + r_{pod} + r_{finstab} + r_{LA} \quad (4)$$

where:  $r_f$  is risk free yield,  
 $r_{pod}$  is the risk premium for business risk,  
 $r_{finstab}$  is the risk premium for financial stability,  
 $r_{LA}$  is the risk premium for the size of the company.

As input values for the build-up model to determine the degree of capitalization, the data released by the Czech National Bank (CNB) and the Ministry of Trade and Industry (MTI, 2019) will be used. Given that the model agricultural company Alfa represents an average company farming on an average-sized land, the risk premium for the size will not be considered in this case ( $r_{LA}$ ).

The final calculation of the amount of financial compensations for the damage caused by the expropriation of agricultural land will be carried out using Formula 2 for each of the selected crops. Finally, a weighted average will be calculated from all resulting yield values for each crop in order to achieve the optimum result of the overall average yield from the expropriated land.

To the weighted average yield from the selected crops, the subsidy provided for the area of cultivated crop irrespective of the type of crops (SAPS payment) will be added. The amount of SAPS for the year 2018 was 3,388.15 CZK/ha.

### 3.2 Determination of the costs of expropriated agricultural land farming

From the economic point of view, farming and sowing of crops is a cost item. It is necessary to consider all costs of the individual agro-technical operations that need to be carried out in preparing agricultural land for cultivation and subsequent care of the crop in order to maximize the yield per hectare.

In the model case of land expropriation, all agro-technical cost operations will be considered for cultivation of each of the selected crops separately.

The data on the amount of costs of growing individual crops will be taken from the information web of the Institute of Agricultural Economics and Information (Institute of Agricultural Economics and Information, 2005). Since only the data on the average costs of the individual selected crops on one hectare of arable land for the year 2005 were found, the costs will be recalculated using the increase by the rate of inflation between 2005 and 2018 to the prices corresponding to the year 2018. Table 3 shows the costs of growing selected crops in 2005 and the costs corresponding to the year 2018 after the recalculation using the inflation rate.

Tab. 3: Average costs of growing selected crops

| Crop          | Costs in 2005 (CZK) | Costs in 2018 (CZK) |
|---------------|---------------------|---------------------|
| Winter wheat  | 15,931              | 20,721              |
| Spring barley | 13,140              | 17,091              |
| Oilseed rape  | 15,162              | 19,721              |
| Ware potatoes | 73,504              | 95,604              |
| In total      | 117,737             | 153,137             |

Source: Institute of Agricultural Economics and Information, 2005 (Own adaptation).

Table 3 shows that in 2018, the highest costs of growing crops on one hectare were in the case of ware potatoes (CZK 95,604), while the lowest costs required growing spring barley (CZK 17,091).

As in the case of yield, a weighted average will be calculated for all resulting cost values for each crop in order to achieve the optimum average yield from the expropriated land.

The weighted average costs of growing selected crops will be deducted from the weighted yield average. This will provide the resulting amount of the damage caused by expropriation.

### 3.3 Determination of breakeven point

After calculation, the breakeven point will be determined for the maximum yield from the use of the agricultural land. After its determination, it will be possible to specify the appropriate amount of money which a potential economically minded and rational farmer would consider appropriate to purchase agricultural land even if they have the information about its subsequent expropriation in a longer time horizon (that is in a year or in a longer period of time). The calculation of breakeven point will be calculated using Formula 5.

$$\text{Breakeven point} = \frac{\text{yield from use}}{\text{area of land}} \quad (5)$$

To determine the breakeven point using Formula 5, the yield value from the use of the land will be used as the numerator in order to identify the amount of money that an economically minded and rational farmer would consider reasonable to buy such a land. The profit will be achieved if the purchase price of the land is below the breakeven point.

## 4 Result

A model case for which both methods of determining the financial compensation for the damage caused by agricultural land expropriation will be applied is represented by a medium-sized agricultural company Alfa.

The dimensions of the arable land with an area of 16.1 hectares, considering a regular rectangular shape, were set to 500 x 322 m. The investment plan in the form of the transport infrastructure construction should run across this area, in parallel with the shorter side of the rectangle (land). The length of the aforementioned motorway infrastructure is thus 322 m.

The resulting expropriated area required for the implementation of this investment plan is 1.0787 ha (10,787 m<sup>2</sup>) of agricultural land (33.5 m \* 322 m = 10 787 m<sup>2</sup>). The average market price of agricultural land for the year 2018 was set at 24.1 CZK/m<sup>2</sup> (www.farmy.cz, 2019).

By inserting the data in Formula 1, it is possible to obtain the amount of financial compensation for the damage caused by the agricultural land expropriation determined in accordance with the current methodology used.

$$\begin{aligned} AFC &= 10,787 \text{ m}^2 * 24.1 \text{ CZK/m}^2 \\ AFC &\cong 259,967 \text{ CZK} \end{aligned} \quad (6)$$

According to the current methodology, the amount of the financial compensation would be 259,967 CZK (after rounding).

For the application of the proposed methodology for the calculation of the compensation for the damage caused, the value  $e_z$  was determined using Formula 3 for each of the selected crop. After inserting the values in Formula 3 in order to determine the value  $e_z$  for each of the selected crop, the following relations will be obtained:

- Winter wheat
 
$$\begin{aligned} e_z &= 7 * 1.0787 * (15.94 * 25.643) * 10 \\ e_z &\cong 30,864 \text{ CZK} \end{aligned} \quad (7)$$

- Spring barley
 
$$\begin{aligned} e_z &= 4.93 * 1.0787 * (15.28 * 25.643) * 10 \\ e_z &\cong 20,837 \text{ CZK} \end{aligned} \quad (8)$$

- Oilseed rape
 
$$\begin{aligned} e_z &= 3.8 * 1.0787 * (36.08 * 25.643) * 10 \\ e_z &\cong 37,924 \text{ CZK} \end{aligned} \quad (9)$$

- Ware potatoes
 
$$\begin{aligned} e_z &= 29.12 * 1.0787 * (19.09 * 25.643) * 10 \\ e_z &\cong 153,768 \text{ CZK} \end{aligned} \quad (10)$$

The weights for calculating the weighted average for all selected crops are represented by their percentage of total agricultural arable land in the Czech Republic (see Table 1).

After rounding, the weighted average yield of all selected crops is CZK 33,248. Furthermore, the data in Table 3 were used to calculate the weighted average of costs of growing the selected crops. The weighted average after rounding is CZK 23,060.

The subsidy intended for agricultural land for the year 2018 was converted to the level of subsidy for the expropriated land in the model case.

$$3,388.15 \text{ CZK} * 1.0787 \text{ ha} \cong 3,655 \text{ CZK} \quad (11)$$

The resulting amount of subsidy was subsequently added to the weighted average of yield from the selected crops.

$$33,248 \frac{\text{CZK}}{\text{ha}} + 3,655 \frac{\text{CZK}}{\text{ha}} = 36,903 \text{ CZK} \quad (12)$$

Subsequently, the permanent attainable profit in the model case was calculated by the difference of the yield and costs.

$$36,903 \text{ CZK} - 23,060 \text{ CZK} = 13,843 \text{ CZK} \quad (13)$$

The permanent attainable profit in the model case was set to CZK 13,843. Subsequently, the capitalization rate ( $r$ ) will be calculated using Formula 14.

$$r = 2.01\% + 2.49\% + 0.36\% = 4.86\% \quad (14)$$

According to the CNB (2019) data, the risk-free yield was 2.01% as of 31 December 2018. The value of the risk premium for business risk and financial stability were taken from the MTI data as of the same date. On the basis of this data, the capitalization rate was set at 4.86%. Subsequently, all necessary values were inserted in Formula 15.

$$HP = \frac{13,843 \text{ CZK}}{0.0486} \cong 284,835 \text{ CZK} \quad (15)$$

According to the proposed methodology, the amount of financial compensation for the damage caused by the expropriation of a part of agricultural land was determined at CZK 284,835 after rounding, which is CZK 24 868 (284,835 CZK – 259,967 CZK = 24,868 CZK) more than when using the current methodology.

In order to respect the current methodology for calculating the amount of compensation for the expropriated land, the results achieved can be interpreted as a compensation for the loss of ownership in the amount of CZK 259,967, while the compensation of the loss of the possibility to use the expropriated land economically is CZK 24,868.

In the event the farmer decides to purchase the agricultural land for the purposes of a profit from the subsequent sale in the expropriation process, about which they were informed in advance, the breakeven point is determined in order to identify the maximum yield from the use, at which the purchase of the land would be worth for the farmer. For the determination of the breakeven point, Formula 5 was used.

$$\text{Breakeven point} = \frac{284,835 \text{ CZK}}{10,787 \text{ m}^2} \cong 26.41 \text{ CZK/m}^2 \quad (16)$$

In the case of purchasing the land for the purposes of its later selling, the land would be worth buying for the farmer if the purchase price was lower than 26.41 CZK/m<sup>2</sup>.

## 5 Conclusion

The objective of the paper was to propose a methodology for determining the amount of financial compensations in the case of compensation for the damage caused by the expropriation of a part of agriculture land.

According to the proposed methodology for determining the amount of financial compensation for the expropriation of the agricultural land, the amount was higher compared to the methodology currently used. In the model case, the increase was nearly CZK 25,000.

However, in our opinion, the proposed methodology better reflects all the aspects of the damage caused that shall be compensated to the owner of the expropriated land. The calculation of the permanent attainable profit derived from the past or future development in the model case is based on the statistical data from the year 2018 for each of the selected crops. The data are available for other crops; therefore, the methodology can be applied to any agricultural land used for the production of any crop. The capitalization rate has been determined using the built-up model and is a very variable tool, since in specific cases, it is possible to consider the individual aspects of the assessed land that may or may not be considered in the calculation. This ensures the universality of the proposed methodology and its repeatable applicability.

Although the annually determined average market price of agricultural land also considers the compensation for the damage caused, it does not take into account the damage caused in terms of the type of crop produced on the expropriated agricultural land. This lack is also eliminated using the proposed methodology.

Finally, another contribution of this paper is the possibility to determine the breakeven point for the purchased land. The objective of the paper was thus achieved.

The paper also deals with the current methodology for determining the amount of financial compensation of the expropriated land. The output of the paper can be applied in connection with the current methodology for calculation.

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#### Primary Paper Section: A

#### Secondary Paper Section: AH

# SOCIAL WORKERS' COMPETENCE METATHEORY IN THE CONTEXT OF WORKING WITH ADDICTS AT RISK OF LONELINESS DUE TO SOCIAL ISOLATION

<sup>a</sup>JÁN KAHAN, <sup>b</sup>EVA ŽIAKOVÁ

*Pavol Jozef Šafárik University in Košice, Faculty of Arts,  
Department of Social Work, Moyzesova 9, 040 11 Košice, Slovak  
Republic*  
email: <sup>a</sup>jankokahan@gmail.com, <sup>b</sup>eva.ziakova@upjs.sk

The article entitled *Social Workers' Competence Metatheory in the Context of Working with Addicts at Risk of Loneliness Due to Social Isolation* pertains to the Vega No. 1/0285/18 *Rizikové správanie adolescentov ako klientov sociálnej práce v dôsledku ich osamelosti/Risk Behaviour in Adolescents as Social Work Clients as a Consequence of Loneliness* project.

**Abstract:** Addiction is a complex issue, which requires integration of multiple theories. In the work with an addicted client, social work employs several theories simultaneously and the process of metatheoretical thinking implicitly ensues. The research focused on measuring the levels of social loneliness experienced by substance-addicted clients during the treatment and its follow-up. The total research sample consisted of 235 addicted respondents divided into those i) hospitalised and ii) abstaining at the time. Several tests were used to identify statistically significant differences in experiencing loneliness due to social isolation. Social loneliness is a significant risk factor during treatment and its follow up in terms of abstinence.

**Keywords:** Metatheory. Social Work. Social Loneliness. Substance Addiction.

## 1 Introduction

In terms of research and clinical practice, social work follows relevant theories, paradigms, and philosophical basis. In clinical practice, theories represent guidelines for case analysis, social diagnostics, and planning work with the client as well as the social intervention procedure. As all scholarly fields, social work has attributes that define it as a research-based system. It has its own research subject, which differentiates it from other scholarly fields, specific research methods and procedures, and specialised functions implemented in terms of research as well as in a broad range of practical and clinical activities. Last but not least, social work formulates its own scientific rules that characterise it. The subject of social work research is the social reality as a specific form of human existence within an ecosystem. Since social phenomena are relative, it is impossible to achieve ultimate knowledge; not even paradigms as the broadest thinking frameworks for tackling the research problems can be applied without reserve.

## 2 Metatheory, theory, model

Metatheory allows for theoretical thinking about a phenomenon (Lawler, Ford 1993). Wallis (2010) defines metatheory as a stage in which a specific theory is analysed, developed, and combined with other theories. Metatheory determines the conditions upon which general prospects are formed as well as the way the questions regarding the nature of reality, human as an entity, nature of knowledge, significance of theory and research, values and ethics, and the nature of power are answered (Dervin 2003). Metatheory is also understood as the philosophy behind a specific theory that represents the way the respective phenomena are examined and processed (Bates 2005). Constructivism, social constructivism, feminism, phenomenology, postmodernism, system and ecosystem meta-theory are examples of metatheoretical frameworks employed by social work. Metatheory represents a set of basic ideas on how to perceive and examine certain phenomena – the subject of research (Vakkari 1997). It is created through examination, analysis, and description of a theory (theories) (Bates 2005). Theories are sets of generally accepted principles and procedural rules related to the practice (ethos), which are used to explain human thinking, emotions, and behaviour including the causes of dynamic changes in the social and physical environment. Theories are not static. They result from processes that are constantly taking place (research & practice) – theories are based on evidence. Research is also a continuous process, always developing and providing new data for the existing database of theoretical knowledge (Barth 2014; Payne 2014). Interconnecting theory and practice is

not a linear process of deduction and induction – it is a complex process of responding to current ideas and social needs (Payne 2014). Theory resembles a compass that connects the helping professional with the practice (Ellis, Ellis 2013; Blackburn 2008). Models are irreplaceable in science. Their role is heuristic as they represent the structure of knowledge and the ways certain phenomena as well as systems behave; based on models, scientific explanations can be derived. Models always simplify the reality – they isolate certain aspects and abstract them from individual cases. In a sense, models substitute theory or their significant parts, i.e. models are constructs created based on theories. *Testing theoretical models* are used to verify the consistency of axiomatised systems. *Confirmation theoretical models* study deductive relationships within the structure of a system (Blackburn 2008; Jandourek 2007; Ludewig 2011; Navrátil 2013a). A *practical model of social work* provides the social worker with a systematic, analytic framework, which enables them to evaluate the client's situation, identify their immediate needs, and resources or their lack thereof (Payne 2014; Galvani 2012; Navrátil 2013b). In this context, a paradigm integrates metatheory, theories, methodology, and ethos (Bates 2005). Different psychological theories employed by social work are usually referred to as “waves”. The first wave includes psychodynamic theories (Adlerian, psychoanalytical); the second wave includes learning theories (behavioural, cognitive, cognitive-behavioural); the third wave includes humanistic theories (anthropocentric approach, existential theories, Gestalt theory, psychotherapy); the fourth wave is characterised by feminist and multicultural theories, and the fifth wave is represented by postmodern and constructivist theories (Ellis, Ellis 2013). The aforementioned categorisation is merely approximate as it is difficult to specify precise and absolute borders between theories. Individual theories determine, enrich, influence and integrate one another to different extents, which happens within a field as well as among different sciences. For example, Ellis, Ellis (2013) and Ellis, MacLaren (2005) refer to the *Rational Emotive Behavior Theory/Therapy (REBT)* that helped establish a multimodal, integrative therapeutic approach; it was the first modern cognitive-behavioural theory with significant therapeutic approach. Ellis, Ellis (2013) and Ellis, MacLaren (2005) also consider REBT a postmodern, constructivist therapy, which draws from philosophy rather than psychology; it takes into account multicultural aspect and is interconnected with psychodynamic and psychoanalytical therapy, systemic and family therapy. Specifically, it draws from the existential theory and REBT is considered one of the most humanistic psychological approaches (Ellis, Ellis 2013, p. 35). Based on this, it could be said that the rational emotive behavior therapy is the rational emotive behavior metatheory as a theory about the aforementioned theories in their practical contexts.

## 3 Loneliness due to social isolation

Most theoretical starting points, clinical studies, and empirical research define loneliness as intense experience, a subjectively perceived state in which a person suffers from severe quantitative and/or qualitative deprivation in terms of intimate and social relationships (Bowman 1955; Brenner 1974; Cacioppo, Patrick 2008; De Jong Gierveld 1987; Fromm-Reichmann 1959; Perlman, Peplau 1982; Rogers 1961, 1973, 1999; Sullivan 1953; Slater 1990; Weiss 1985a,b,c; Zilboorg 1938; Žiaková 2008). However, quality of interpersonal relationships is more important than their quantity (Cacioppo, Hawkley, Kalil, Hughes, Waite, Thisted 2008).

Tab. 1 Approaches to loneliness

| Approach         | Starting points            | Characteristics |                         | Causes                       |                                    |
|------------------|----------------------------|-----------------|-------------------------|------------------------------|------------------------------------|
|                  |                            | Positive        | normality/<br>pathology | personal/situational/genetic | history, childhood/<br>present day |
| Psychodynamic    | clinical practice          | no              | pathology               | personal                     | childhood                          |
| Phenomenological | clinical practice          | no              | pathology               | personal                     | present day                        |
| Existential      | clinical practice          | yes             | panhuman<br>universal   | human condition              | life-long (permanent)              |
| Sociological     | social analysis            | no              | normative               | society                      | history and the present day        |
| Cognitive        | research                   | no              | normality               | personal and situational     | history and the present day        |
| Personal         | theory                     | no              | normality               | personal and situational     | present day                        |
| Systemic         | theory                     | yes             | normality               | personal and situational     | present day                        |
| Interactional    | clinical practice          | no              | normality               | personal and situational     | history and the present day        |
| Biological       | clinical practice/research | no              | normality               | genetic and situational      | history and the present day        |

Sources: (Perlman, Peplau 1982, p. 130; Weiss 1985a,b,c; Cacioppo, Patrick 2008) in: Kahan, Žiaková 2019 (adjusted by the authors)

The definition of *social loneliness* draws mainly from the interactional approach (Weiss 1985a, b, c), but it shares certain features with psychodynamic, Bowlby 1985; Weiss 1985b), phenomenological (Rogers 1973, in: Perlman, Peplau 1982; Rogers 1999; Hegel 2015; Maslow 2013; Ellis, MacLaren 2005), cognitive (Perlman, Peplau 1982; Kollárik 2008; Janoušek, Slaměnik 2008), and sociological approach (Riesman, Glazer, Denney 2007). Therefore it is justified to consider loneliness a phenomenon that requires *metatheoretical thinking*.

*Loneliness due to social isolation* results from the absence of a social network of peers, colleagues, neighbours, family, or friends in which a person can participate and engage. Any serious disruption of social roles and positions may cause a person to experience social isolation. A broad range of events can cause mental load, which are further enhanced by loneliness. In fact, everything that results in the loss of contact with people sharing the same interests can lead to loneliness due to social isolation. Therefore, the symptoms of social isolation can be observed in different groups, e.g. divorcees, unemployed, those who move to live in another place, but also in people whose behaviour and values differ from those of their surroundings, stigmatised persons (health disadvantage, minority religion, ethnic or racial identity, age – specifically –seniors, minority sexual orientation, persons suffering from psychiatric diseases) (Weiss 1985c; Kahan, Žiaková 2019).

Engagement in a peer group is almost or even equally important as the initial maternal bonding. Affiliation follows bonding and long-term absence of activities with peers causes anxiety as it does if bonding does not occur. Anxiety and suffering caused by loneliness due to social isolation in terms of which a person is excluded from group activities ensues very soon, and the pain grows over time. A lonely child waiting to join other children who merely watches them playing and mutters complains to the adults. When a person becomes adult, the issue of acceptance gains existential importance (Weiss 1985c). Sullivan (1953, in: Weiss 1985c) assumes that most of us have experienced the pain caused by being excluded by our peers in childhood. This bitter experience could be referred to as “fear of ostracisation”. States related to social integration are different from initial bonding and these two cannot compensate each other. Children need to play with friends as well as they need their parents’ care. Adults also need a social network that provides them with support and opportunities to engage, and also intimate bonding, which provides them with feelings of safety and love (Maslow 2013; Bowlby 1961; Weiss 1985c).

Weiss’ (1985a,b,c) definition of loneliness refers to every individual’s social and emotional worlds in which there is a broad range of situations that may lead to loneliness. The aforementioned dichotomous structure of loneliness can also incorporate different types of loneliness reflecting a person in the context of time and space. The following types of loneliness can therefore be specified:

- short-term or transient loneliness* – occasional lonely mood with short duration,
- situational loneliness* – caused by losing satisfying relationships due to a specific situation, e.g. divorce,

moving. Situational loneliness can be very stressful, but does not necessarily be long-term,

- chronic loneliness* – caused by continuous absence of satisfying social relationships over two and more years. (Young 1982; Cacioppo, Patrick 2008).

From the psychological point of view, loneliness takes three forms:

- cognitive* loneliness manifests as the need to share one’s ideas related to their professional or creative activity with another person who understands these,
- behavioural* loneliness can be described as the absence of friends with whom one can perform free-time activities and share the joy of doing so,
- emotional* loneliness occurs when the needs for love, intimacy, and security are not satisfied. This is the most extreme state of loneliness with most serious consequences, mainly if the sufferers are children (Žiaková 2008).

#### 4 Substance addiction

The *bio-psycho-socio-spiritual* metatheoretical synthesis integrates the most relevant aspects that need to be taken into consideration in the context of addiction. The *bio-psycho-social* approach draws from the pharmacological model; it is based on the idea that the way psychoactive substances affect human body needs to be determined to select effective treatment. From the medical point of view, addiction is a health issue and in this context, the Alcoholics Anonymous perceive addiction as an incurable disease that can only be battled through one thing – life-long abstinence. Alcoholics Anonymous provide *social support* to other alcoholics and drug addicts who wish to overcome their addictions. The bio-psycho-social approach also takes into account the genetic determinants. Learning theories are often used effectively in therapeutic processes when clients are adopting new ways of behaviour. There is no universal treatment, some people need to rationally understand the internal, social, and physical stimuli that affect them personally, others achieve abstinence through understanding their own irrational patterns of behaviour through experiencing and emotional response (Ellis, Ellis 2013; Nešpor 2011; Volpicelli, Szalavitz 2000; Kudrle 2008; Vágnerová 2012). The journey to recovery and fully-fledged abstinence often requires searching for new sources of inner strength and a *sense*, which provides one’s life with a *direction* and *purpose*. This approach built on three pillars is stable only as far as each of them is stable. Last but not least, *spirituality* represents the four pillar in treatment as well as abstinence, as it provides the opportunity for the person to find themselves and identify their resources, which can help them to overcome addiction and accept responsibility for their life in abstinence. Jung (in: Nešpor 2011) claims that addiction may result from unfulfilled spiritual needs. Skála (in: Nociar 1991) describes addiction as a deformed form of human search for self, which Frankl (2009) further characterises as an escape from perceived meaninglessness in which the subjective experience of intoxication renders the person unable to capture the true meaning of their life. The existential vacuum with a

deep feeling of emptiness was diagnosed in almost 100% of drug and alcohol addicts. It indicates that the absence of life meaning, spiritual values and an authority represent the most significant risk factors in excessive use and abuse of addictive substances (Volpicelli, Szalavitz 2000; Křivohlavý 2006, 2010; Kudrle 2008).

Substance addiction and loneliness are multifactorial and conditioned psychosocial metatheoretical phenomena, which negatively affect the whole inner world of the addict and devalue their social and physical environments. Therefore, it is important to speak of social work competences in terms of theory integration in a way that allows for consistent research and safe, helpful work with the client.

## 5 Research

The aim of the research was to statistically determine how experiencing of social loneliness changes in substance-addicted people during treatment and its follow up in the context of abstinence, prevention, and lapse/relapse. Cognitive, behavioural and affective processes pertaining to loneliness were captured using respective measuring instruments, which reflect different dimensions of internal and external world of the person. Some of these instruments directly determined the level and type of loneliness, others can be characterised as reflective loneliness indicators, e.g. affiliation. In terms of this researches, substance addiction and abstinence was perceived as one of the constitutive and formative indicators that complete, enhance, and modify the level and type of loneliness. Scaling tools provide different ways to identify the presence and level of loneliness symptoms (Ferjenčík 2009; Hendl 2017a; Lovašová 2017; Ochrana 2013). Data from respondents were collected using a questionnaire battery. The selection of respondents was based on their willingness to cooperate, availability, and qualitative quotas (demography); the distribution was non-proportional. Using the IBM SPSS Statistics 20 program, descriptive, inferential, and exploratory statistics were created. Based on the analysis and collected data distribution, alternative correlation and causation tests were selected (Hendl 2009; Hendl 2017b, c; Campbell, Taylor, Mcglade 2017; Pallant 2007).

The questionnaire battery consisted of four independent tests and demographic data. The following tests were included:

1. UCLA Loneliness Scale (Version 3) is the third revised version of the loneliness measuring instrument (Russell 1996). UCLA is a one-dimensional construct which primarily evaluates the subjective feeling of loneliness due to social isolation. It identifies the general (overall) level of loneliness in accordance with the theoretical models of determinants and consequences of loneliness. The higher the score, the higher the rate of loneliness.
2. The T-98 Social Inclusion Questionnaire is a standardised diagnostic tool created by Kollárik (2008) designed for adult population; it diagnoses the need for social inclusion (NSI) among different groups that can be expected to experience difficulties with social inclusion. The questionnaire examines the motivational (desired social inclusion – DSI) and behavioural (achieved social inclusion – ASI) components of affiliation in terms of social inclusion. The social inclusion (SI) questionnaire consists of two theoretical SI concepts:
  - I. *Desired affiliation* (DSI)– represents the desired level of social inclusion determined by the intensity of the need; it is examined using the *need for social inclusion* (DSI) questionnaire. The part of the DSI questionnaire that examines the motivational level of affiliation consists of 30 questions with dichotomous answers (yes – no). The higher the score, the higher the need for social inclusion.
  - II. *Achieved affiliation* (ASI) – is the level and extent of social inclusion achieved; it is diagnosed based on the behavioural affiliation component. *This part of the SI questionnaire consists of 30 questions.* The higher the score, the higher the rate of social inclusion. Again, the answers are dichotomous.

The results are interpreted based on the scores in individual questionnaire as well as the polarity of the differences between questionnaire values (Kollárik 2008).

3. *Manual of the loneliness scale*, OESL – Overall, Emotional, and Social Loneliness (De Jong Gierveld, Van Tilburg 1999). The test examines the level of emotional, social, and overall loneliness. Individual dimensions of loneliness can be processed together or separately. The lower the score, the higher the rate of loneliness. Questions are of conative, cognitive, and emotional nature.

## 6 Research sample

The total research sample N consisted of 235 addicted respondents. They were divided into two main subgroups: The hospitalised addicted respondents undergoing primary addiction treatment  $N_H = 139$  and abstaining addicted respondents  $N_A = 96$ . The total research sample consisted of 160 males and 75 females aged 18–75; average age  $\bar{x} = 42.51$ ,  $Med(\bar{x}) = 43$ . Tab. 2 shows the distribution of respondents based on their gender and basic diagnostic characteristics.

Tab. 2 Basic categorisation of respondents

|  | $N_H 139$<br>hospitalised<br>respondents |      | $N_A 96$<br>abstaining<br>respondents |      | $N 235$ total<br>number of<br>respondents |      |
|--|--|------|---------------------------------------|------|---|------|
|  | n  | %    | n                                     | %    | n   | %    |
| males  | 101                                      | 72.7 | 59                                    | 61.5 | 160                                       | 68.1 |
| females  | 38                                       | 27.3 | 37                                    | 38.5 | 75  | 31.9 |
| substance<br>addicted                          | 122                                      | 87.8 | 88                                    | 91.7 | 210                                       | 89.4 |
| non-<br>substance<br>addicted                  | 17                                       | 12.2 | 8                                     | 8.3  | 25  | 10.6 |
| substance and<br>non-<br>substance<br>addicted | 4  | 2.9  | 5                                     | 5.2  | 9   | 3.8  |

## 7 Social loneliness

According to Weiss (1985c), social loneliness roots in childhood. Anxiety and suffering in result of social loneliness when a child is not accepted by the peer group and excluded from common activities is carried into adulthood; it determines whether the person is able to establish a social networks, make social contacts, and join certain social groups. Statistical processing did not confirm a difference between hospitalised and abstaining respondents in terms of experiencing social loneliness ( $p(\alpha) 0,08$ ), but the average values in Tab. 3 clearly show that hospitalised respondents experienced social loneliness more than their abstaining counterparts. Social loneliness may play a significant role in prevention of abstinence lapses. Based on this, it can be assumed that respondents who lapsed in their abstinence experience social loneliness in a statistically more significant way than those who retain abstinence (Tab. 5). However, it is obvious that respondents who do not undergo follow-up treatment are at higher risk of lapse/relapse. This risk seems to be higher in women, since statistically significant differences were found between hospitalised men and women in terms of experiencing loneliness due to social isolation (Tab. 6). On the other hand, no such difference was identified among the abstaining respondents (Tab. 7). Different rates of social loneliness in abstaining men and women were not expected, since all abstaining respondents were approached in self-help, socio-therapeutic, and psychotherapeutic groups. These groups saturate their need for safety, intimacy, and affiliation. To some extent, they can even saturate the need for intimate connection with another person, but these types of relationships must not be interchanged. The relationship between social loneliness and abstinence duration was statistically significant only in terms of the total abstinence duration with a weak correlation of  $r_s = -0,291$  ( $p_\alpha < 0,01$ ) (Tab. 4). The one-dimensional UCLA test identifies the overall level of loneliness, but it primarily focuses

on the subjective feeling of loneliness due to social isolation. The UCLA test identified a medium-strength relationship between loneliness and abstinence duration 0–12 months, and a weak relationship in terms of total abstinence duration. Based on individual calculations, it can be stated that social loneliness is related to abstinence duration, especially during the first 12 months; during this period, social loneliness represents a high risk factor of relapse (Tab. 4; Tab. 5).

Tab. 3 U-test – The rate of experiencing loneliness in substance-addicted people

|                      |   | N   | x(score) | x $\Sigma$ P | p( $\alpha$ ) |
|----------------------|---|-----|----------|--------------|---------------|
| UCLA                 | H | 122 | 46.32    | 122          | <0.001****    |
|                      | A | 88  | 40.48    | 82.3         |               |
| SL Social loneliness | H | 122 | 16.81    | 98.8         | 0.08          |
|                      | A | 87  | 18.07    | 113.7        |               |

\*\*\*\*  $p_{\alpha} < 0.001$

Tab. 4 The correlation ( $r_s$ ) between total abstinence duration and loneliness

|   |                                  | Duration of abstinence (months)<br>(substance + non-substance<br>addicted) |               |       | Total<br>duration of<br>abstinence<br>(substance<br>-addicted) |               |
|---|----------------------------------|--|---------------|-------|--|---------------|
|   |                                  | 0–12   | 13–36         | 36<   |  |               |
|   |                                  | $r_s$  |               |       |  |               |
| Spearman's correlation<br>coefficient ( $r_s$ ) | UCLA                             | $r_s$  | <b>-.422*</b> | -,236 | -,141  | <b>-.265*</b> |
|   |                                  | $p_\alpha$   | ,025          | ,228  | ,412   | 0.015         |
|   |                                  | N  | 28            | 28    | 36   | 84            |
|   | OESL<br>social<br>lonelines<br>s | $r_s$  | ,331          | ,119  | -,058  | <b>,291**</b> |
|   |                                  | $p_\alpha$   | ,086          | ,555  | ,738   | 0.008         |
|   |                                  | N  | 28            | 27    | 36   | 83            |

\*\*  $p_{\alpha} < 0,01$ ; \*  $p_{\alpha} < 0,05$

Tab. 5 U-test – Lapse in relation to loneliness

|                      | abstinence broken | N  | x(score) | x $\Sigma$ P | p( $\alpha$ ) |
|----------------------|-------------------|----|----------|--------------|---------------|
| UCLA                 | yes               | 19 | 43.63    | 51.1         | 0.06          |
|                      | no                | 64 | 39.41    | 39.3         |               |
| SL Social loneliness | yes               | 19 | 14.79    | 23.8         | <0.001****    |
|                      | no                | 63 | 19.14    | 46.8         |               |

\*\*\*\*  $p_{\alpha} < 0.001$

Tab. 6 U-test – Difference between males and females in terms of experiencing loneliness (hospitalised)

|                      | gender | N  | x(score) | x $\Sigma$ P | p( $\alpha$ ) |
|----------------------|--------|----|----------|--------------|---------------|
| UCLA                 | M      | 84 | 44.5     | 54           | <0.001****    |
|                      | F      | 38 | 50.34    | 78           |               |
| SL Social loneliness | M      | 84 | 17.68    | 67.4         | 0.006***      |
|                      | F      | 38 | 14.89    | 48.5         |               |

\*\*\*\*  $p_{\alpha} < 0.001$ ; \*\*\*  $p_{\alpha} < 0.01$

Tab. 7 U-test – Difference between males and females in terms of experiencing loneliness (abstaining)

|                      | gender | N  | x(score) | x $\Sigma$ P | p( $\alpha$ ) |
|----------------------|--------|----|----------|--------------|---------------|
| UCLA                 | M      | 51 | 40.25    | 44.8         | 0.882         |
|                      | F      | 37 | 40.61    | 44           |               |
| SL Social loneliness | M      | 51 | 18.25    | 45.1         | 0.622         |
|                      | F      | 36 | 17.81    | 42.4         |               |

## 8 Social inclusion

The cognitive approach explains loneliness using two affiliation components: The motivational affiliation component is determined by the intensity of the need and the behavioural component represents the level of affiliation achieved. Optimally, these components should be balanced. A deviation either way indicates that the person may be feeling lonely or bothered by their social surroundings. The tests identified statistically significant differences between hospitalised and abstaining respondents in both affiliation components. Hospitalised respondents are less socially included (behavioural component), but also feel a more intense need to achieve

inclusion (motivational component). It is the other way around in abstainers. Abstaining respondents are more socially included (behavioural component), which helps fulfil their need for affiliation, therefore their motivation decreases. It can be stated that in terms of cognitive approach and based on statistical calculations, hospitalised respondents are lonelier than abstainers. The average x-score values (Tab. 8) show that the differences between behavioural and motivational components in abstainers vs. hospitalised respondents are not significant, but the direction of this differences indicates that the hospitalised respondents may feel lonely.

Tab. 8 U-test – Social inclusion rate

|           |   | N   | x(score) | x $\Sigma$ P | p( $\alpha$ ) |
|-----------|---|-----|----------|--------------|---------------|
| ASI       | H | 114 | 15.54    | 89           | <0.001****    |
|           | A | 86  | 19.12    | 115.7        |               |
| DSI       | H | 115 | 17.59    | 110.1        | 0.016**       |
|           | A | 87  | 15.93    | 90.2         |               |
| ASI – DSI | H | 114 | 115      | -2.05        |               |
|           | A | 86  | 87       | 3.19         |               |

\*\*\*\*  $p_{\alpha} < 0.001$ ; \*\*  $p_{\alpha} < 0.025$

Since abstinence represents total restructuring of one's life, it is assumed that in abstaining respondents the motivational and behavioural affiliation rates will be relatively balanced. It is also justified to claim that besides saturating the need for affiliation, it is also important to balance its components; this way, individual need for social interactions will be taken into consideration, which allows the individual to feel comfortable and avoid disharmony.

## 9 Discussions and research limits

As for the limiting factors in this research, it was impossible to evaluate the differences between different substance-addiction diagnoses or compare the substance-addicted respondents with the non-substance-addicted ones. This resulted from the sizes of individual groups. However, it is assumed that individual groups of substance and non-substance addicted respondents differ in terms of loneliness experienced. It corresponds with Rokach's research (2002) who compared three groups of young adults – MDMA (methylenedioxymethamphetamine, ecstasy) users, users of drugs other than MDMA, and general population of young adults who do not use drugs. The research focused on personality and developmental deficiencies, dissatisfying intimate relationships, moving, separation, social exclusion from. It showed significant differences between all groups within all five factors. In a similar study, Orzeck a Rokach (2004) compared the multi-dimensional experience of loneliness in three groups: detoxifying opiate users, participants in a methadone substitution programme, and non-users. Certain differences were identified between individual groups, but the statistically significant differences in loneliness experienced were identified between detoxifying respondents and those who did not use drugs. The aforementioned studies have shown differences between psychoactive substance addicts, however, the main assumption of the presented research is as follows: the substance addicts experience various kinds of loneliness more than the abstainers regardless of the type of the addiction syndrome diagnosed. A more detailed analysis of loneliness experienced focusing on the individual substance addiction diagnoses may provide interesting results, however, it is not the goal of this research. Non-substance addictions, specifically behavioural Internet-related addictions represent a specific category (Young 1998; Patarák 2016; Patarák 2018). Significant differences may be shown mainly by the non-substance addiction related to use of the Internet in comparison with, e.g. alcohol addiction. The assumption also applies to the fact that alcohol addicts often participate in actual social networks (although pathological) with other addicts. On the other hand, it can be assumed that process addicts (Internet related) tend to form other than physical relationships which may isolate them more; it can reflect in the total scores in some tests. Loneliness emerges as a by-product of excessive Internet use when the individual dedicates inordinately more time to the virtual

relationships than to the real ones; on the other hand, lonely individual use online activities to make contact with other users and communities through the Internet (Morahan-Martin 1999). Using the UCLA Loneliness (Version3), Morahan-Martin, Schumacher (2003) divided 277 university students into those lonely and not lonely. The lonely ones used the Internet to cope with anxiety, get emotional support, look for online friends, or modify negative mood significantly more than their counterparts, which in turn disrupted their day-to-day functioning. Addiction (substance and non-substance) and loneliness are stressful situations, phenomena that are very complex, mutually interconnected and potentially condition each other in human life. Loneliness and addiction often appear simultaneously, and it is hard to tell the cause from the consequence. Loneliness enhances as the addicted behaviour and negative internal experience develop. Substance and non-substance addictions have similar characteristics in terms of their development and symptoms across the individual diagnoses pertaining to the addiction syndrome. Despite their similarities, loneliness accompanying either of them has specific features.

Loneliness is very common experience, the youth and young adults are very familiar with it. This subjective experience is affected by personality, developmental history, life experience, and situational variables. Rokach (2005) studied how drug users undergoing treatment cope with loneliness. In his research, drug users were studied during their stay in detoxifying centres and compared to drug addicts undergoing the methadone treatment programme. These two groups were also compared to a group of young adults in general populations who did not use drugs. Aspects such as coping strategies, acceptance, reflection, self-development, understanding, using the social support network, distancing, refusal, religions and belief, increased engagement in social activities were studied. According to the results, these three groups of populations cope with loneliness in significantly different ways. However, statistical significance was confirmed in two strategies only: self-development/understanding and distancing/refusal. Self-development and understanding cover a group of loneliness (addiction)-managing techniques, which focus on self-reliance, self-care, revitalisation and growth – these are often learned in self-help and psychotherapeutical groups, as well as by accepting help and support from other professionals. Distancing and refusal, i.e. denial may be categorised as passive and negative coping mechanisms. In this research, this strategy include the following techniques: denying that something bad happened, withdrawing, building barriers around oneself, avoiding social interaction, and consuming alcohol. The respondents undergoing therapeutic programmes are purposely led towards self-development, understanding, and self-realisation, which helped them achieve better scores in using these strategies in loneliness management. On the other hand, distancing and refusal as strategies may have been learned in the long run during the drug abuse period, therefore drug users achieved higher statistically significant scores than general adult population. In our research, the activity in interpersonal interactions, adaptability, adaptation ability and speed in new situations as the behavioural affiliation component were examined using the T-98 Social Inclusion Questionnaire (ASI). The respective part of the ASI questionnaire proved that abstaining addicts achieve better scores in social interaction than hospitalised respondents with statistical significance. The abstainers in this research were recruited exclusively from groups that purposely focus on abstinence, therefore they were expected to be more socially included – as was the case in the aforementioned research. A prognostic study focused on a range of social, psychological, and medical variable including loneliness showed that it belongs among most significant negative predictors regarding the success of primary and follow-up treatment (Akerlind, Hornquist 1992). Despite these limitations, this research showed that abstaining addicts who relapsed feel lonelier than their successfully abstaining counterparts (Tab. 4, Tab. 5). Based on a comparison of our results with other studies, it can be stated that loneliness is a high lapse/relapse risk factor.

## 10 Conclusion

Addicted behaviour and loneliness result from a number of biological, mental, social, cultural, but also spiritual factors and it is desirable to perceive it through a holistic-atomistic lens – employ selected theories in main psychological directions, and use ecosystem metatheoretical thinking. Factors affecting the occurrence of addicted behaviour largely correspond with causes of loneliness and its types. These are mostly social and psychical factors, but it can be assumed that loneliness and addiction may share a common denominator on the biological level as well, e.g. increased sensitivity (vulnerable) of the organism to internal and external stimuli. The common social factors that can largely contribute to the emergence of addiction and cause loneliness include dysfunctional family, addiction in family, unsaturated need for social affiliation. Common psychical factors can be found in emotional experiencing, thinking, and behaviour. They include feelings such as inner restlessness, tension, anxiety, frustration, depression, overall dissatisfaction and emptiness. In the context of social interactions, difficulties coping with one's own emotional states can lead to avoiding certain social situations or negative coping mechanisms using drugs. Addicted behaviour and loneliness largely stem from irrational beliefs adopted by people during their lives. These irrational beliefs cause further issues, e.g. decreased self-respect and self-confidence, rigid thinking and behaviour, inappropriate patterns of behaviour, inability to respond flexibly to external stimuli, black and white absolutist thinking, denial and rationalisation of pathological behaviour, etc. The consequences of loneliness often overlap with those of addiction. It is related mainly to exclusion from certain social situations, decreased quality of social support and contacts, and general deterioration of life quality. Loneliness and addictions work together to deteriorate the psychosomatic and somatic health, in extreme cases they may lead to death. A metaanalysis of different approaches to loneliness and empirical studies shows both explicit and implicit correspondence with the etiology of addicted behaviour (Vágnerová 2012; Akerlind, Hornquist 1992; Rogers 1999; Langmeier, Matejček 2011; Perlman, Peplau 1982; Weiss 1985a,b,c).

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## LITERARY TEXT AND ITS INTEGRATION INTO THE EDUCATIONAL CONTENT OF THE SUBJECTS OF ELEMENTARY REALIA

<sup>a</sup>LENKA KARASOVÁ, <sup>b</sup>DANA KOLLÁROVÁ,  
<sup>c</sup>ALEXANDRA NAGYOVÁ

*Constantine the Philosopher University in Nitra, Faculty of Education, Department of Education, Dražovská cesta 4, 949 74 Nitra*

*e-mail: <sup>a</sup>lenka.karasova@ukf.sk; <sup>b</sup>dkollarova@ukf.sk; <sup>c</sup>alexandra.nagyova@ukf.sk*

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**Abstract:** The content of the subjects focused on elementary realia in primary education is formed by science and social studies. These subjects include Elementary Science, Natural Science and Homeland Study. Their core, from the perspective of teaching, is a conceptual process in which it is crucial to teach a pupil to access professional texts while developing logical thinking with an emphasis on the application of knowledge to social reality. The taught topic in the form of professional text is preceded by a pupil's experience with understanding a literary text. The paper brings some results of the realized pedagogical research, which documents to what extent individual teacher strategy can be significant if it integrates or supports science content with literary texts and activating methods with an emphasis on reading comprehension and development of thinking.

**Keywords:** Subjects of elementary realia, individual conception of teaching, reading comprehension, explicit and implicit meaning of the text, development of thinking.

### Introduction

The paper is divided into three chapters and their subchapters. The aim of the introductory chapter is to clarify the specifics of teaching the subjects of elementary realia and the need to support the content of these subjects with literary texts. In the second chapter, we will describe one of the possible individual concepts of a teacher by which we can approach a literary text with an emphasis on reading comprehension and stimulation of critical thinking. We assume here that access to a literary text in the early years of primary education can be a good basis or a starting point for the educational content of science or social studies. A part of this chapter is also a brief introduction of the selected topic, or more precisely the learning content on which the research was focused. It is a curriculum about the forest environment, which is linked to literary texts and control didactic tests aimed at the development of pupils' thinking. Subsequently, in the third chapter, we present the strategy of performed pedagogical research and its results. In the paper, we describe and explain why it is important to deal with a literary text and reading comprehension, and thus to support other teaching content of science subjects through activating methods.

### 1 Subjects with elementary realia and their specifics

Based on the educational standard (2015), the subjects with elementary realia at the primary level of education are Elementary Science (which is taught in Slovakia in the 1<sup>st</sup> and 2<sup>nd</sup> year of elementary school) and based on it, the subjects Natural Science and Homeland Study are taught in the 3<sup>rd</sup> year. The above-mentioned educational standard describes that "Elementary Science creates the knowledge, competence and attitude basis for the two related subjects - Natural Science and Homeland Study. In the homeland area, it focuses on acquiring knowledge about the real social space through familiarization with the functioning of services, self-government and geographical description of the country. In the field of science, it focuses on learning about organisms, inanimate environment and their mutual relations, it acquaints pupils with a real natural space by examining the functioning of selected natural phenomena". Doušková (2001, 2006) states that Elementary Science is rather an educationally oriented subject. We would like to supplement her statement with other subjects of elementary realia because their content and presentation by a teacher enable pupils to perceive the reality and the environment in which they move and live. This allows pupils to learn about

their qualities and potentialities in the process of cognition, helps them to orient themselves in society, develop social relationships, attitudes and cultivate their speech and thinking. The educational content of subjects of elementary realia should be perceived as one complex, in which several scientific areas are consolidated, as Navrátilová (1986) or Černý (1959) point out. This concerns the teaching content (i.e. textbooks or curricula) that is part of our daily social context and corresponds to the current cultural and social changes. A teacher's active and creative approach to learning content should teach pupils to respond flexibly to these changes. The aforementioned subjects should teach pupils to intentionally systematize their knowledge in an integrative and motivating way. Tupý (1980) or Strnad (1970, In Čábalová, Podroužek, 2013), emphasize it in their publications. Teaching the subjects of elementary realia is primarily a conceptual process. It enables pupils to develop and consolidate their knowledge system, not only by acquiring new concepts, but rather their content, scope, relationships and context. The current Innovated state education program (2015) applies a strategy of focusing on key competencies that, according to Doušková (2006), are directed towards cognitive, personal (self-developing) and social competences. A pupil should be able to analyze information, assess its value and use it in a comprehensive, creative way to solve a problem in everyday life. According to Mihálik (1989), this process is built on three interdependent qualities:

- development of specific and operational thinking (based on the manipulation with objects, which develops comparison, evaluation, synthesis),
- formation of demonstrative and visual thinking (thought processes at the level of ideas from experience),
- development of conceptual thinking (acquiring concepts and transforming them into a pupil's speech).

Thus, the process of conceptualization is not based only on the processing of sensory data and their subsequent synthesis and generalization, but also on the detection of logical relationships. Mihálik (1989) recommends logic exercises as suitable tools for teachers. The exercises focus on discovering relationships, creative problem solving, and the area of observation and comparison. They were part of our research.

The focus of the curriculum of these subjects is formed by the synthesis of knowledge about nature and society, regardless of the various cultural, social and political conditions. We focused our research on the educational content of Natural Science in the 4<sup>th</sup> year, specifically on the curriculum about Forest and Forest Environment. It is a topic that has been spiralling since the first year. In the 4<sup>th</sup> year, Natural Science is formed by educational sub-areas: Natural Communities, Man, Inanimate Nature and Exploration of Natural Phenomena. The topic of Forest and Forest Environment is included in the educational sub-area of Natural Communities. Individual areas are further specified by the detailed performance standards to which a pupil is directed and by the content standards, which should direct the activity of a teacher to the processing of educational content. Such a concept of educational content should lead to modern science education, through which the natural science literacy of a pupil of younger school age, as defined in the OECD PISA study (2006), is developed. Nowadays, in science and social education, the emphasis is on the development of a pupil's thinking through activating methods, the core of which lies in exploratory methods. Žoldošová (2011), Doušková, Kružlicová (2012) recommend that pupils should learn through own observation, experimentation, making and verifying assumptions and asking questions. We also recommend including the role and situational games in natural science teaching. It appears that pupils' thinking, behavior and actions towards the closest environment can be significantly impacted by a teacher's thinking and action, and a teaching strategy.

## 2 Potential of a literary text for the learning content of subjects of elementary realia

Work with a literary text at the primary level of education in teaching the subjects of elementary realia has an important position. It is confirmed by the fact that in years 1921 – 1930 and 1953 – 1976 (Navrátilová, 1986), Elementary Science was a part of the subject Mother Tongue. Learning about nature and society was conveyed through reading texts in a reading book. Their content created a space for the creative activity of a teacher, which was supposed to result in the fulfillment of the goals of an integral part of the mother tongue – Elementary Science. As early as in the 17<sup>th</sup> century, J. A. Comenius considered it important in schools to link language teaching to the knowledge of a specific world, as it helps to understand the meaning of words, facilitate human communication, and above all, it creates an area of gradual and cyclical knowledge of the world. A literary text has educational potential, a creative teacher finds in it the impulses for developing the teaching content of the subjects of elementary realia. Since our research is focused on the topic of the forest, we chose forest-related literary texts. The Forest and Forest Environment is a part of all subjects of elementary realia in all years, not only in Elementary Science and Natural Science but also in Homeland Study. We see the added value in a literary text when pupils learn to express themselves differently than in everyday life. In this context, Podroužek (2003) attributes the following functions to a literary text: informative, transformative, consolidative, self-educational and developmental-educational. In order for a literary text to be functionally used in the teaching process, it is necessary to respect the criteria for its selection. For the purposes of teaching elementary realia, Podroužek (2003) states the following criteria: comprehensibility, educational and inspiring content, and interconnection of information with life.

Effective work with a literary text as a mean of teaching pupils about the forest requires not only a suitable choice of text but also functionally selected tasks and questions that stimulate the pupils' thought activity. In our research, we included the questions to explicit and implicit levels. Similarly, the literary text and topic were supported by activating methods, namely role-playing games, which we will further discuss in our paper. Such an approach also depends on the thinking and individual strategy of a teacher. We will just remind that in accordance with Čapek (2015), work with a literary text aims to develop the pupil's ability to read with comprehension, develop their communication skills and analytical evaluation of the text.

### 2.1 Approach to a literary text with an emphasis on comprehension

Understanding the text is a prerequisite for reading literacy. Every year the measurements of literacy PIRLS (*Progress in International Reading Literacy Study*) are made for pupils of the 4<sup>th</sup> grade of primary school. The measurements aim to monitor the level of reading literacy with an emphasis on understanding the text. The evaluation takes into account, or assesses, four levels to what extent pupils can work with the text:

1. *identification* - searching for information in the text,
2. *drawing conclusions* – deducing from part of the text,
3. *interpretation* - integration of context, linking information,
4. *evaluation* – assessment, critical evaluation and analysis.

The first two levels focus on the explicit level of thinking and the second two on the implicit one. Of course, if we want to develop all levels in pupils, we have to ask them questions in the classroom. Zápotočná, Petrová (2015) also point out that, in terms of cognitive processes, the attention should shift away from lower cognitive functions - perception, remembering, towards higher levels of cognitive text processing, through imagination and fantasy towards thinking, consideration and reasoning. In developing the understanding of the text, this should shift from within-text understanding to beyond-text understanding.

The PIRLS International Reading Literacy Study defines reading literacy as "the ability to understand and use written language forms that are required by society or of value to an individual". We see that reading literacy is a phenomenon and at the same time a necessary part of the social communication of each individual. However, the results of the evaluation studies show that not enough attention is paid to this fact in schools. The implicit thinking is a problem for pupils. We agree with Gavora and Zápotočná (2003) who emphasize that a teacher should choose an individual teaching concept, the core of which is a multidimensional approach to promoting reading literacy. In other words, it should be a synthesis of the knowledge of several scientific disciplines in order to present a more comprehensive model of literacy. We are convinced and our pedagogical experience shows that the teaching of subjects of elementary realia must be conceived by integrating the educational areas such as *Language and communication, Man and nature, Man and society* complemented by the area *Arts and culture*.

### 2.2 The importance of activating methods in working with a literary text for social skills

The world of literary fiction is close to the thinking of preschool children and younger schoolchildren. According to Vágnerová (2000), the cause can be found in a children's theme or symbolic game that is built on the same principles. It makes it easier for us to cope with reality. That is why it is necessary to search for the texts that correspond to the possible past or future social experiences of children.

In order to understand learning texts about nature or society that are more informative and operate with facts, it is important that a pupil is able to approach a literary text first. As foreign studies show (Smolkin, Donovan, 2001), children's interest in informative texts has been surprisingly increasing in recent years. It is important to create the literary consciousness of a child, then a pupil, in order to gain an interest in reading, to make them aware that only by reading they can gain new information. Later, by comparison, pupils discover that the language of these texts is different, leading them to compare the information. If teachers correctly and functionally approach a literary or learning text, if they ask and articulate questions at the implicit level, it is a good prerequisite for stimulating critical thinking.

Grecmanová and Urbanovská (2007) explains that it is "the ability to assess new information, to examine it carefully and critically from multiple perspectives, to make judgments about its credibility and value, to assess the importance of new ideas and information for own needs". Hartl (2004) defines it as the ability to assess information and to examine it carefully and critically from multiple perspectives, and to make judgments about its value and credibility. It follows that a critically minded individual makes their own judgments based on how they understood the text, the idea, and compares these conclusions with their own thoughts and experiences of the phenomenon. For this reason, we recommend using roleplay techniques when working with texts. As mentioned above, the basic method of the pedagogical-didactic approach is creative drama, alongside the play in the situation and interpretation. When choosing roleplays and situations in order to support understanding of new concepts and contexts in learning or professional texts, we start from the literary theme, because if we bring the situation out of the real environment, it is uncertain whether all pupils have been confronted with it. But if we support the curriculum with roleplay and play in a situation based on a literary motive, all pupils have the same stimulus and can interpret and justify their reasoning, decision-making and action. We have also implemented this strategy in our research.

In an individual concept, by which a teacher proceeds through roleplaying games and integrates science education with a literary text, we see significant intersections with the development of critical thinking. Klooster's (2000) definition of critical thinking is the evidence. The author defines it in five points - it is independent thinking (presenting own opinion), the

starting point is to get information (necessary for work and argumentation with facts), it starts with a question and a problem to be solved (learning how to solve a problem), reasonable arguments (there are several solutions, but it is necessary to prove the logic of own solution), thinking in society (we read, discuss, communicate). We consider the fourth point to be a very important one, where the argumentation of own opinion is fundamental. We consider it essential because, when reading a literary text, a pupil is able to construct arguments based on own experience through roleplay and thus formulates own opinion. Here we also find a match with the method of interpretation, which is part of the pedagogical-didactic approach of creative drama. This method is also important for the implicit level when reading texts (Kollárová, 2018a), also for making own judgments with particular sentence constructions, for presenting opinions and for gaining confidence in communication (Kollárová, 2018b). These conclusions are also supported by the results of our research VEGA 1/0098/17 Individual Approach and Teaching Strategy in a Context of Teacher's Professional Development.

The foreign studies by Connerly, Tous, Tahriri and Haghighi (2015, In Kosturková, 2016) show that critical thinking skills can be learned. Among other things, the authors found that the discussion has a statistically significant effect on reading literacy. This was also an impulse for our research. Cosgrove's (2011) research has shown that pupils are more likely to use the intellectual experience that is primarily required and practiced by teachers. Similarly, the importance of teaching methods in the teaching process has been confirmed. This is one of the reasons why we would like to appeal to the systematic integration of activating methods into the teaching process, especially to topics relevant to pupils' social skills. One of these topics is Forest and Forest Environment, because it is part of the daily reality of a pupil, and it is linked to thinking about the creation and protection of the closest environment in which a pupil lives.

### 3 Educational research on increasing pupils' knowledge of the forest and forest environment, supported by activating methods and a literary text

The educational standard for Natural Science is conceived to create opportunities for those cognitive activities of pupils that operate with terms such as searching, exploring, discovering, because they are the foundation of knowledge and understanding. In this sense, pupils should not be only passive actors in the classroom, who should only remember and reproduce the subject matter. In the theoretical background, we explained the merits of a literary text to support a learning text. Several authors have emphasized the need to develop an implicit level of thinking among pupils, not only for reading comprehension, but also for using language in a social context. Here we can see intersections in reading literary texts and reading learning texts. As stated above in accordance with Vágnerová (2000), a pupil must first learn to understand a literary text. That is why we emphasized the need to apply activating methods when working with a text, which can help a pupil to clarify some context in the contextual or semantic level of the text so that they can use it in explanation or argumentation.

#### 3.1 Research problem and research objective

The key problem in our pedagogical research was *the justification of supporting literary texts in conjunction with activating role plays in the subject matter of Natural Science*. Based on the research problem, we set the research goal: *To find out to what extent an active approach to a literary text is involved in developing a pupil's independent logical thinking*. The subject of our research was the knowledge of 4<sup>th</sup> grade pupils about the Forest and Forest Environment. Specifically, we were rather concerned with the ability of respondents to think at the implicit level. As we have already mentioned in the theory, the topic of Forest is regularly encountered by pupils in the subject matter of Elementary Science, Natural Science as well as Homeland Study, while the subject matter spirally deepens and

expands at the same time. Based on the educational standards, pupils in the 3<sup>rd</sup> year should be able to *assess the importance of trees (forest, wood) for humans and have experience of observing tree life*. In the 4<sup>th</sup> year, within the educational sub-area *Natural Communities*, we focused on the standards to which our didactic tests (and literary texts) were directed – *to describe the forest as a community of plants and animals that are interdependent, explain the life of animals in the forest, describe the way of life of typical forest community representatives, consider the relationships between plants, animals and the environment*. All respondents completed the topic of the forest. We chose the 4<sup>th</sup> grade pupils for research because they are able to work with the written language code (written language, a language in written form) more accurately. The main objective also implies partial objectives:

- *find out from the written products what the differences in their thinking about the forest are;*
- *identify, analyze and explain possible differences in the perception of pupils and their external interpretation of a literary text depending on the approach of teaching methods;*
- *find out which level of reading comprehension can be influenced by systematic activation methods.*

#### 3.2 Research question and hypotheses

Our research had a quantitative and qualitative methodology. The research question for the qualitative part was: *What are the basic differences in the thinking of pupils whose teachers use activating methods in their conception?* The answer to this question will be sought in the statements or written products of 54 participants.

For the quantitative part of our research, we have built hypotheses, based on the statements we have made in the theoretical background to the research.

H1 If we use activating methods when working with a literary text, pupils will show greater content richness in verbal expression with an emphasis on the implicit level of a literary text.

H2 If we apply the literary text support in science education, pupils will have a greater ability to operate with concepts.

The first hypothesis is related to reading comprehension, to its implicit level, and the second one is focused on the pupil's knowledge and logical thinking in relation to the subject matter about the forest.

#### 3.3 Research file

Based on the research findings, which refer to an important factor - the individual concept of teacher education, we decided to carry out the research in which we chose 4 classes of the 4<sup>th</sup> grade of elementary school. It was a deliberate selection of subjects of quasi-experiment. In two classes (A, B), teachers do not use, or occasionally use, activating methods when working with literary texts. In the other two classes (C, D), teachers actively use roleplays to work with literary texts. We have included classes, or more precisely 14 respondents from each class who achieved the same study results from the subjects *Slovak language and literature, Natural Science and Homeland Study*. When selecting a research sample of teachers, we had to follow the individual teaching strategy of each teacher. None of the teachers has completed their first attestation.

- the teacher of class A - rather does not use activating methods in their teaching practice;
- the teacher of class B - sometimes tries to apply activating methods;
- the teacher of class C - applies activating methods daily in their practice;
- the teacher of class D - applies activating methods on a daily basis (and was the teacher of class C last year).

The research sample consisted of 56 respondents. Despite the same classification, it was shown that the selection of the research sample was complicated by the initial testing. This was the first signal to assume that activating methods, in conjunction with a literary text, will play a role in education aimed at developing the implicit level of thinking.

### 3.4 Methods and research tools

For the purposes of application research and in order to obtain research data, we used natural, or more precisely the field quasi-experiment. The independent variable was the strategy of supporting a professional text (learning text) by a literary text and the dependent variable was the effect of a literary text on the understanding of the science content, with an emphasis on the implicit level of thinking. We used didactic tests of our own construction to measure the level of thinking and expression. However, we can speak more about the projective method, because these were educational written products of the respondents, which were the result of open items. We used the Rating method to evaluate them, while we expressed the qualitative data numerically. At the same time, for the qualitative part of the research, we used open coding for evaluation. The research tools were:

- *initial didactic tests* focused on logical thinking and knowledge about the forest (4 open items);
- *literary texts* from the Reading book for the 4<sup>th</sup> grade with the topic of Forest;
- *a set of activities* or activating methods for work with a literary text;
- *didactic tests* focused on measuring reading comprehension in a literary text (8 open and semi-open items);
- *didactic tests* focused on logical thinking and knowledge about the forest (7 open items).

The activities were designed to individual levels of understanding of the text, which should also stimulate pupils' critical thinking. As we mentioned in the theoretical part, these were roleplay techniques that are part of creative drama.

### 3.5 Organization of research

We described the selection criteria for the research sample, which is related to the initial testing of respondents. The initial testing has already shown that if we do not integrate a literary text in conjunction with activating methods into the teaching of science subjects, we do not support the implicit level of pupils' thinking. However, we continued with the planned research methodology and did not exclude Group A from the research. We asked 4 questions in the test. The questions were focused on the topic of the Forest:

1. *What does not belong to the forest (choose from words);*
2. *What injury can we suffer in the forest;*
3. *Why are trees important to us;*
4. *Write words related to the word forest.*

The evaluation was scaled, with 0 points if the respondent did not answer, 1 point was assigned if they responded but the answer was illogical, 2 points when the answer was partially correct but incomplete, and 3 points were assigned if the respondent answered correctly and logically, or more precisely, with an implicit meaning.

Table 1 Initial testing – pupil's knowledge about the forest

| Question | 1. | 2. | 3. | 4. | %     |
|----------|----|----|----|----|-------|
| A        | 27 | 26 | 20 | 27 | 59.52 |
| B        | 35 | 29 | 29 | 39 | 78.57 |
| C        | 36 | 31 | 30 | 32 | 76.78 |
| D        | 34 | 41 | 32 | 26 | 79.17 |

It follows from the above that Group A is different than the remaining group in the research file. It is the class in which the

teacher does not use activating methods in teaching or working with literary texts. Other groups can be considered comparable. After the initial testing, we proceeded as follows:

- Group A – we supported the subject matter and learning texts with a literary text without activating methods (the intervention consisted of two literary texts with an emphasis on understanding);
- Group B – we supported the subject matter and learning texts with activating methods and a literary text (the intervention consisted of activating methods – roleplays and two literary texts with an emphasis on understanding);
- Group C – we supported the subject matter and learning texts with a literary text without activating methods; (the intervention consisted of two literary texts with an emphasis on understanding);
- Group D – we supported the subject matter and learning texts with activating methods and a literary text (the intervention consisted of activating methods – roleplays and two literary texts with an emphasis on understanding).

After completing the natural science topic of the forest within four lessons, all groups were supported by a literary text and subsequently they were given a didactic test from the natural science subject matter focused on the forest. We obtained written products of respondents in the form of sentence constructions or phrases, which we evaluated both quantitatively and qualitatively.

### 3.6 Research results and their interpretation

As we said, we were interested in the results obtained by respondents in evaluating reading comprehension. We focused on both explicit and implicit levels. Table 2 shows the results documenting the achievement percentages in the testing of the literary text understanding. The first and second columns (a, b) present the results of the explicit level (look up information in the text and draw conclusions from a part of the text) and the third and fourth columns (c, d) of the implicit level (interpret the text idea and evaluate the text with emphasis on the social application). The following table shows the results of both literary texts:

Table 2 Mastering levels of reading with understanding

| Levels | a     | b     | c     | d     | %     |
|--------|-------|-------|-------|-------|-------|
| A      | 48.81 | 15.48 | 35.12 | 34.81 | 33.56 |
| B      | 65.48 | 52.98 | 67.86 | 55.95 | 60.57 |
| C      | 74.36 | 74.36 | 83.33 | 76.93 | 77.25 |
| D      | 77.09 | 82.96 | 92.74 | 80.51 | 83.33 |

It has been shown, that classification may not be decisive for expressing pupils' logical thinking, but it also appears that professional knowledge does not have to reflect thinking when approaching a literary text. It should be noted, however, that respondents who are not taught to use activating methods (A, B) in teaching are significantly reflected in reading comprehension. We see that in Group A, the first level of comprehension, which is finding information from the text, is already problematic, reaching 48.81%. The second level, related to the explicit meaning, is surprising. The respondents did not know or understand that "in two Fridays" means two weeks, or they wrote the exact wording according to the text, so we do not know if they understood, but in this case, we also gave them 2 points. In other groups, the respondents had no problem with this item. What we can see in common with the other three groups of respondents is that they have no problem interpreting the text with own sentence constructions (Level c). Rather, they have a great deal of trouble evaluating the text and have an overview of the text (Level d). This fact is not surprising. However, we see that the respondents who underwent the experimental intervention with both literary text and activating methods did not get above 70%, as compared to groups C and D who have practiced this teaching strategy. Although Group B, with the support of experimental interventions, does not perform as well as the respondents who regularly work with activating methods;

it is positive that this area dominates. Even between the first and second texts at this level of understanding, there is a significant difference from 64.29% to 71.43%. We would like to highlight Groups C and D. They also achieved the highest values at the level of interpretation that relates to the meaning of the entire text. This may be the result of a systematic approach from previous years, supported by the current individual concept of teaching by the current teacher because in this group we did not use the activating methods to the presented literary text. In Group D, the results were close to Group C. This can be attributed to the fact that the present teacher works with the respondents in a similar way to Group C. However, we cannot see a high score in all areas compared to the previous groups. We have also prepared didactic tests for the respondents on the above-mentioned topics focused on the identification of the forest knowledge system related to the following levels:

1. *logical implication* - uncovering relationships between concepts (causal, multipurpose, excluding concepts, revealing common functional relationships between concepts, explanatory relationships);
2. *detecting and solving problems* – forecasting (what could happen), rationale, explanation;
3. *comparison variations* – comparison of characteristics, analytical comparison (to describe based on the perception), comparison of the work of people, specifically foresters.

The following table presents the test results:

Table 3 Knowledge tests from the forest subject matter

| Level | 1.    | 2.    | 3.    | %     |
|-------|-------|-------|-------|-------|
| A     | 48.02 | 46.83 | 34.53 | 43.13 |
| B     | 69.05 | 69.84 | 50.00 | 62.96 |
| C     | 74.36 | 83.98 | 82.05 | 80.13 |
| D     | 83.02 | 85.65 | 83.66 | 84.11 |

In the table, we can see that groups A and B have the lowest values. In these groups, the activating methods in cooperation with a literary text are only partially applied or not applied. In both groups, the respondents had the biggest problems with the level related to comparison, i.e. the application level. On the contrary, the groups, in which the activating methods and work with literary texts are regularly applied in integration with natural or social topics, do not have a problem with the application level, or justification and explanation, but rather the level of uncovering relationships. However, we are talking about slight percentage differences. From the above, it can be seen that the activating methods and the systematic approach to a literary text with an emphasis on its understanding significantly contribute to the development of logical thinking of pupils of younger school age. Even though Group D works with the teacher for a short period of time (September - December), we can see a significant shift in expression. In Group C, in which we did not use the activating methods in our experimental intervention, the respondents also achieved a high success rate. The consequence can be explained by the previous systematic approach of the teacher from Group D and by a follow-up approach that is continuous in the teaching practices. Even when the percentage results are transferred to a possible classification, the success of these respondents is shown. This is also evidenced by the satiety of their written statements. In terms of the scope of the paper, we present only a few.

In the qualitative evaluation of the statements we also took into account the richness of the statements. In groups (C, D), the respondents expressed themselves correctly on the contextual and also the meaning level, mostly by phrases or sentences. In groups (A, B) it was mostly one-word answers. As an example, we will give answers to the question for the explicit level of the literary text - causal relationships. *What caused the rabbit to break his paws?*

Group A – he jumped, fell into a bush, calls loudly from the ground, because he was in the forest;

Group B – because he fell, jumped badly, jumped a lot, rushed, I don't know;

Group C – he jumped and fell, tripped and fell, he was counting the clouds and tripped, he was looking around and fell;

Group D – he didn't look under his feet, he was looking around, he was looking at the clouds, not at the road, he was distracted.

The answers document how respondents think and we can really compare the logic of their statements. In groups A and B, we can see the description of the activity, not the cause. From the implicit level, here are some examples of what title they would give the text. The text was called *Wounded rabbit*.

Group A– Nice rabbit, Beautiful rabbit, Rabbit broke his paws, Help the rabbit;

Group B – Broken paws, Animals in the forest, Help the rabbit, Painful legs, Fracture;

Group C - Help, The rabbit, hedgehog and magpie, Restless bunny, Poor bunny, Desperate animals;

Group D – Broken rabbit, Two broken legs, Friendship, Rabbit and his injury, Forest injury.

Here we can see a shift in the thinking of the respondents, which may be the cause of the individual conception of the teacher. This is also supported by the answers of the respondents, that relate to the knowledge of the forest, namely the level of *detection and problem solving – forecasting – What injury can we suffer in the forest?* The most illogical responses were in groups A and B. They proposed the answers of the following type: *When there is not order. When I speak loudly, a bear comes. Anytime. I do not know. When I trip over when I do not look under my feet.* We dare to say that these answers are the result of a misunderstanding of the question that was directed to the consequence, not the cause. The answers of groups C and D, their ability to work with the implicit level of thinking is confirmed, as they have shown when working with the literary texts. Their responses were in sentences and related to the consequence, but they also justified it: *I can break a finger when I fall down or trip over. I can fall and have the brain concussion. In the evening, we can trip over and sprain the ankle. We can impact the knee when a bear attacks us. I can slip on wet leaves and disjunct the leg.*

We will remark that there were also illogical responses in these groups, when they mentioned a disease and not an injury: *If we do not get dressed, we get flu or eye inflammation. We can get poisoned with mushrooms.*

The respondents expressed their answer related to a disease, not an injury, but expressed with a whole sentence and mainly expressed the consequences related to the forest environment. We will also state the answer of the respondents to another implication – *Which words are related to the word hedgehog?*

Group A – hedgehog, animal, fruit, mammal (the answers repeated, they did not state any other answers);

Group B – needles, mammal, needle, apple, pear, orange, prickly, belly, clew, I do not know;

Group C – prickles, hedgehog, animal, prickly fur, pins, prick, forest, nature, meadow;

Group D – needle, brown prickles, spines, animal, forest, meadow, coniferous tree, autumn.

In the first two groups, we can see a fact that the respondents in their statements rely rather on information from advertising, where the hedgehog bears a lot of fruit. In the two other groups, the answers of the respondents are already based on the knowledge they have about a hedgehog. As it turns out that a literary text and approach to it can be a good support for a learning text and the development of logical thinking, in the following cases we will mention statements to compare groups A, B with C, D. We see the justification in the answers for the question *What is a forest community*. Here we pick from the answers of groups A and B: *foresters working together, a forest group, when there is a company in the forest, who loves the forest, people who care for the forest*. The answers of groups C

and D were: *animals and plants in the forest, it is how we refer to the forest, forest and animals, part of trees, forest element, everything is in the forest together.*

From the results we can conclude that the used interventions can lead not only to a richer expression but what we consider as meaningful, the respondents can deepen the context. In groups A and B, there were predominantly one- to two-word answers or sentences, which were based on children's social experiences, i.e. stable communication patterns that they may have from the home environment. These were often illogical answers. We can say that the participants of Group A tend not to express themselves with a whole sentence. At the end of this section, we would like to state that by the activating approach to a literary text we can have a significant influence on developing the implicit level of thinking of pupils. We can state that both hypotheses were confirmed. However, this process must be systematic; it is not enough to apply it rarely. This is evidenced by the results of Group B. This research has shown how important it is to be able to ask questions and specifically ask questions in the teaching process and be able to use diverse answers for further educational content and discussions. We will emphasize that such teaching is only possible in the environment of trust and encouragement. However, this experience would first and foremost be necessary for students - future teachers in undergraduate training to experience and realize the implications of this integrative-communication approach.

We see a positive finding that the consequences of an individual teacher strategy are long-term (Group C). It is equally positive that even in a short period of time (4 months), the systematic work of this approach will produce results (Group D). The results are a challenge for further education of teachers and the improvement of their undergraduate training with an emphasis on the subject integration and the activating and communicative approach to education.

### 3.5 Discussion

In accordance with the theory, it has been shown that questions that point to the implicit level when working with texts do not have the same answers. This is the consequence not only of the correct questioning of the particular subject matter, but also of the trust of a teacher towards a pupil, especially their support and encouragement not to be afraid to think for themselves. Therefore, at the end of our interpretation of data, we draw attention to the training of teachers in the field of communication and integration. Pupils must not feel threatened by teachers that they will say something wrong which will cause fear or shyness to express themselves again. This comfort and trust can only be created by teachers through their individual strategy and choice of methods. Petlák (2011, 2017) pointed out a similar approach, although in connection with teaching throughout the day, which was based on the findings of research conducted in the field of neurodidactics. The author emphasized that a pupil should not learn under stress at school, but in addition to developing cognitive functions, teaching should also be directed towards developing emotionality, since by linking the two hemispheres, a pupil can remember more, finds the context and has an experience. Kesselová (2008) in her research dealt with the communication aspects of teaching Slovak language and mother tongue and creating textbooks for elementary schools. She noted that the text in textbooks in Slovak tradition has a significant impact on the form of the teaching style. She noted that the language system subject matter was too abstract, uninteresting, reproductive, and unrelated to pupils' real needs in real communication. We agree that language knowledge alone does not improve communication. This has been shown by our research. However, we would like to say that we have a predominance of teachers who favor a communication and experiential learning model, but it often remains enthusiastic and does not fulfill its function. This may be due to the uncertainty in the choice and functional use of the methods mentioned, and teachers are afraid that they will cause discipline disruption. Finding the causes, however, deserves more research. Another argument is its non-systemic nature, teachers apply it more to

diversify teaching, not systematically to develop and change pupils' thinking. We have seen this in Group B. Liptáková (2012) in her publications also talks about the reserves in developing reading literacy. She sees them in the need for a deeper elaboration of didactics, in further education of teachers in the field, in the absence of an integrated approach to the development of reading literacy, which cannot be the goal of only one subject. This necessity has been confirmed by our research. We would add that an important condition is an appropriately chosen literary text, by which we want to support the subject matter, and especially the purposeful and correct asking of questions that support the pupil's individual thinking and speech. An appropriately selected literary text has the advantage that all students have the opportunity to participate in the *simulated reality*. Through correctly asked questions, they can enter it, be protagonists and confront the reality. That is also why we see the importance of integrating roleplays in conjunction with a literary text into the teaching strategy.

### Conclusion

The aim of our paper was to present the results of a possible concept that is part of the teacher's individual concept. It is an approach to a subject matter and learning text supported by a literary text with an emphasis on activating methods. This cross-curricular relationship has proved to be effective in strengthening pupils' implicit thinking in the field of science education, in particular on the forest and forest environment. Of course, several learning texts would deserve similar research, and we cannot generalize the results to the whole science curriculum in the 4<sup>th</sup> year. The importance of research, however, must be seen in the impetus for further exploring of reading comprehension of a scholarly text, preceded by a consistent approach to reading comprehension of a literary text. A pupil should learn to translate information from both genres into a social context by the development of thinking. The focus of the work with the text is to ask questions. However, asking questions about the explicit level of thinking may cause us to develop the pupils' memory more or eventually develop memorizing. It does not mean that even if pupils use different words in the answer than in the textbook, they understood the subject matter. Unfortunately, it is often enough for a teacher as an indicator of a correct answer. It is a literary text that can help us to get to a higher level of understanding, to an implicit meaning, because it conceals a variety of poetic images, comparisons, transferred meanings. By questions directed towards the implicit meaning of the text, we lead a pupil to own language system, to the ability to argue, to form attitudes and a value system. This is important for communicative and social skills, which are a prerequisite for responding to the changes brought about by the cultural and social environment. This teaches a pupil to be confident in communication, not to be unsure whether they said something correctly, in the same way as it is in the textbook, or how the teacher wants to hear it. The prerequisite for the pupil's expression is interest and not to be afraid to express themselves. This is conditioned by trust, challenging questions and encouragement from a teacher. If a teacher asks questions with an implicit meaning, they have to expect diverse answers. These can be an incentive for further learning content, for comparison, justification, argumentation. The wide range of responses creates space for discussion. With this approach we develop not only logical but also critical thinking of pupils. A teacher teaches pupils to think and it is more important than being able to say a textbook material. In this case, a teacher develops memory structures without deeper connections, and we would like to say that it happens even without further motivation to learn, read, find out more information about the topic, compare and evaluate it.

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#### Primary Paper Section: A

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## WOMEN AND MEN: WINE CONSUMPTION HABITS

<sup>a</sup>ENIKŐ KORCSMÁROS, <sup>b</sup>ERIKA SERES HUSZÁRIK

*J. Selye University, Bratislavská cesta 3322., 945 01 Komárno, Slovakia*

*email: <sup>a</sup>korcsmarose@uj.sk email: <sup>b</sup>huszarike@uj.sk*

**Abstract:** Wine consumption shows an upward trend at the beginning of the 21st century. Due to favourable climate conditions, there are several wine regions located in Slovakia famous for wine and wineries recognized on the domestic and international market as well. In our study, we would like to present the wine consumption habits in Komárom district, located in the wine region of Southern Slovakia. Our study addresses an attention to possible differences in wine consumption habits of male and female consumers. We have analysed the data gained from 478 anonymous questionnaires in our primary research. The questionnaire survey took place in February – March 2018. The statistical analysis highlights the fundamental differences of male and female wine consumers.

**Keywords:** wine consumption habits, consumption by gender, Komárno district, Slovakia, primary research.

### 1 Introduction

The alcohol consumption has become more and more homogeneous worldwide over the past decades. It means that beer, wine and distilled drinks are consumed worldwide. We can see that the social composition of consumers differs in case of different alcoholic products, but more and more overlaps can be recognized among the social status of the consumers. The lifestyle differences of consumers are also crucial. There are more wine consumers than regular consumers of beer or distilled drinks. Based on these facts, we can categorize wine as drink for daily consumption (Brunner – Siegrist, 2011).

According to Hajdú István, the age group over sixty can be considered a target group for wine consumption, but the young generation of wine consumers is important as well. Considering the education degree, consumers with both high and low education degree consume wine, but have different wine consumption culture. In terms of settlement types, the wine consumption is the highest in small towns, followed by villages in countryside and the big cities (Hajdú, 2004).

The frequency of wine consumption also greatly affects the amount of wine consumed. According to international trend, the number of frequent wine consumers is shrinking. The experts are conducting extensive marketing research to determine the factors that might influence the wine consumption. Consumers refusing wine drinking fall into two categories. The members of the first group simple do not like the taste or smell of the wine. The members of the second group refuse alcohol consumption, so they oppose excessive drinking of alcoholic beverages (Jaeger – Danaher – Brodie, 2010). Development and acceptance of western patterns of consumption, as well as the place of purchasing wine is extremely dynamic. The expansion of hyper- and supermarkets and the tendency of disappearing small shops is an unstoppable process. This trend is observed on international level as well. The losers in the competition are the small-sized ABC shops. They are not big enough to offer a wide variety of products and not small enough to provide unique services and operate as wine shops (Hajdú, 2005).

### 2 Characteristics of wine consumption

The frequency of wine consumption significantly affects the amount of consumption. The balanced and regular wine consumption is the most sympathetic phenomenon for the wine industry. According to international trend, the number of regular wine consumers is shrinking (Pérez Magarino – Ortega Heras – González Solé, 2011). According to Dula, Mészáros and Rohály, wine consumers can fall into 4 groups based on motivation. Gourmet consumers rank first (18%). This group is mainly formed by senior managers, entrepreneurs and intellectuals. They mostly purchase wine in specialist shops and refuse to buy wine in the hypermarkets. They are relatively critical about their shopping habits. They taste and buy both domestic and foreign

products. They are followed by a group of sophisticated wine drinkers (25%). They are higher income individuals in higher positions, but skilled workers can also be found among the group members. By decreasing age of individuals, more and more consumers fall into this category. They compare the prices of specialist shops to those at the hypermarkets and make their decision based on price comparison. These consumers are attracted by various events and wine festivals. It is important for them to choose the right wine for the right occasion. The group of ordinary wine consumers (32%) can be classified as a heterogeneous group. They consume wine rarely, but if they do, their buying habits follow the routine, so they prefer the brands they have tried and have good experience with. These consumers buy the most wine. The last group is formed by lazy wine consumers (25%). They often replace wine with other alcoholic beverages. They do not respect wine, quality is not a motivating factor for them (Dula – Mészáros – Rohály, 2012).

### 2.1 Wine market in Slovakia

In current territory of Slovakia, winery has a history of over 2000 years. According to archaeologists, the first local wine-growing activity dates back to the Celtic period. The Romans, who created new wine yards played an important role in the local success of wine yards. The industry started a slow and steady development (Matosková-Gálik, 2014).

According to data of the Slovak Statistical Office in 2013, almost 300 wine yards and wine making companies were registered in the country. The size of wine yards in Slovakia is almost 12,000 hectares. About 10, 000 hectares are already producing crops. According to the research of the Slovak Statistical Office, the quantitative indicators of wine production in Slovakia show a steady increase between 2004 and 2013 (Eurostat, 2014).

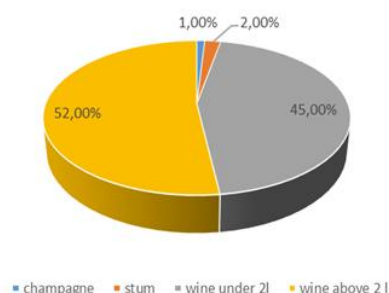
Table 1: Annual wine production in Slovakia

|                      | 2004 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|----------------------|------|------|------|------|------|------|------|
| Wine production (hl) | 451  | 421  | 321  | 348  | 446  | 436  | 586  |
|                      | 502  | 156  | 106  | 354  | 308  | 511  | 266  |
| White wine           | 273  | 234  | 146  | 126  | 172  | 168  | 237  |
|                      | 525  | 797  | 353  | 924  | 123  | 805  | 009  |
| Red wine             | 149  | 174  | 166  | 218  | 268  | 254  | 347  |
|                      | 170  | 877  | 600  | 051  | 987  | 014  | 685  |

Source: own editing according to the data of the Slovak Statistic Office

It can be clearly seen that the production has increased by almost a third, while production of white wine has declined. The structure of the Slovak wine industry is constantly changing and the white wine is increasingly replaced by other types of wine. The Slovak wine industry takes limited part in fruit wine production. The wine export and import of Slovakia showed a varied picture in the past decade. According to data of the Slovak Statistical Office, the exports of wine increased by 103,6% in 2013, while the import almost quadrupled (Matosková-Gálik, 2014).

Figure 1: Slovak wine export projected to different types of wine, 2012



Source: own editing according to the data of the Slovak Statistic Office

Slovakia has 6 wine growing areas, 40 wine growing districts and 603 wine villages. The differences between the regions are determined by the quality of wine and the grape. The six wine regions of Slovakia are the following (Vinohradské oblasti Slovenska, online):

- Lesser Carpathian wine region (Malokarpatská vinohradnícka oblasť)
- Nitra wine region (Nitrianska vinohradnícka oblasť)
- South Slovak wine region (Južnoslovenská vinohradnícka oblasť)
- Central Slovak wine region (Stredoslovenská vinohradnícka oblasť)
- East Slovak wine region (Východoslovenská vinohradnícka oblasť)
- Tokaj wine region (Slovenská vinohradnícka oblasť Tokaj)

The territorial division in Slovakia is quite unique, practically the entire southern region of the country is dominated by wine growing regions, while conditions in the north are not favourable for wine yards. Local wine regions often cover those areas that have no long history in wine growing. Žitný ostrov (Csallóköz) is one of the good examples, since the countryside is flat, conditions are not appropriate for wine yards. The best known wine-region of Slovakia is the historically known Carpathian wine region with Bazin and Modor. The activity of the best known Slovak wine producers is connected to this region. In the southern part of Nitra wine region, dominated by Hungarian population along the river Hron, Vráble and Levice have established a strong wine culture, similarly to the Central Slovak wine region. The eastern part of the country is covered by the East Slovak wine region and the wine region of Tokaj. About half of the vineyards in Slovakia are concentrated in the most ideal wine growing areas of Štúrovo and Strekov. In terms of climate condition and the quality of soil, these areas are proved to be excellent (Borigo, 2009, online).

Figure 2: Wine regions of Slovakia



Source: Vinohradnícke oblasti Slovenska, online

## 2.2 The Hungarian Wine Market

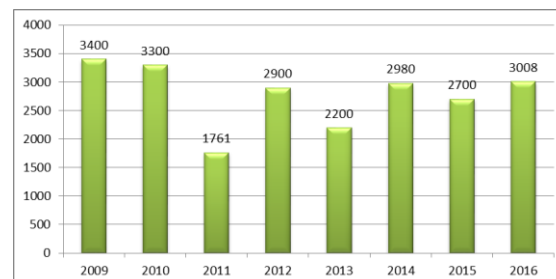
The Hungarian wine and wine culture has a long established history. Due to different types of soil and the appropriate climate conditions, it has always been recognized as a well-known wine producer country in Europe. The wine production and wine culture of the country has been influenced by different historical milestones. The period following the World War II led to a decline in production and so in 1949 collective farms and cooperatives were established. Investments were made into mass production techniques and many poor practices crept in as a quantity was put before the quality. Nowadays, the Hungarian wine growers work on vineyards a bit smaller in size than the average, but can employ experts with excellent theoretical and practical knowledge. This contributes to a key quality of the Hungarian wine. The local wine culture is experiencing the era of Renaissance again, re-occupying its position on the wine map of Europe in the 21<sup>st</sup> century (Ambrus-Csoma-Somlósi, 2003).

Hungary accounts for approximately about 1,9% of the world wine production. It accounts for 2,6% of the EU wine growing areas and 1,1% of the EU wine production. At present, some 180,000 – 200,000 Hungarian families are involved in wine business, nearly the income of 1,9 million people depends on wine-growing. According to statistical data, the vineyards covered 89,6 thousands hectares in 2006. Based on wine production statistics of Hungary (2010-2014), the average wine production reached 2-3 million hectolitres a year (Hegyközségek Nemzeti Tanácsa, online).

It can be declared that the wine growing area in Hungary decreased by 32% between 1992-2006. This fact can be explained by the market and income conditions. Nearly 32,9% of the vineyards are located in Southern Alföld (Southern Great Plain), but the North Hungary region (24,1%) is dominant as well. Southern Transdanubia is represented by 13,4% and Northern Transdanubia by 11,6%. Unfortunately, the location of significant proportion of vineyards is not suitable for quality wine production. In Hungary, 30% of wine produced is considered to be quality wine, the rest enters the market as table wine (Buday-Sántha, 2011).

The Hungarian wine growing is characterized by incredible diversity. Type of the wine is the most important factor regarding the sales. According to territorial distribution of the white wine varieties, the Italian Riesling is ranked the first, followed by Rieslingszilván, Chardonnay, Ottonel Muscat, Hárslevelű, Furmint and Rhine Riesling. Blaufränkisch (Kékfrankos) is the most widespread type of red wine. This is followed in popularity by Zweigelt, Blauer Portugieser (kékportó), Merlot, Cabernet Sauvignon, Franc and Pinot Noir (Gaál – Pardányi, 2006).

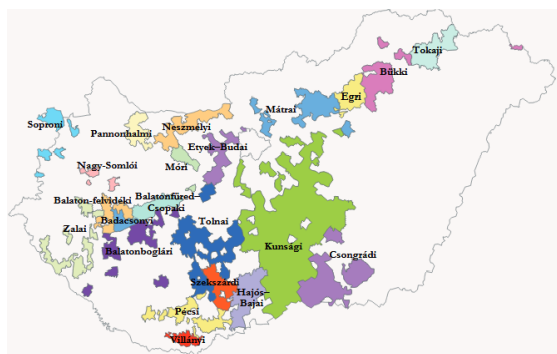
Figure 3: Wine production in Hungary (thousand hectolitres)



Source: own editing according to the data of Hegyközségek Nemzeti Tanácsa

Hungary is located in the heart of the Carpathian Basin. Due to location and climatic conditions, the country has excellent wine-producing regions.

Figure 4: Wine regions of Hungary



Source: Magyarország borvidékei, 2014, *online*

Despite the fact that the area of vineyards has been declining recently, the number of wine regions in Hungary is growing. The wine region classification in Hungary is regulated by law. According to this, a total of 7 wine regions (Balaton wine region, Danube wine region, Eger wine region, Northern Transdanubian wine region, Pannon wine region, Sopron wine region, Tokaj wine region) and 22 sub-regions can be found in the country. Three of them are located in the Great Hungarian Plain, 6 in Northern Transdanubia, 5 in Balaton region, 4 in Southern Transdanubia and the rest of 4 in North Hungary. The privatization of the wine sector that began in 1989 has been completed, but many wine factories have remained state-owned and the Hungarian state remained the stakeholder in the business. Formerly operating under the name of Tokaj Kereskedőház Zrt., Grand Tokaj covers an area of 300 hectare vineyards still in state ownership. Grand Tokaj is a guardian and protector of the national wine making traditions, bearer of the title of a UNESCO World Heritage site and famous for Tokaji Aszú (Ambrus-Csoma-Somlósi, 2003).

### 3 Research Objectives and Methodology

The purpose of this study is to assess the wine consumption habits of residents in Komárom district. Our goal is to conduct a comparative analysis that focuses on analysing the habits of male and female consumers. It is particularly important for us to know, how much the male and female consumers are interested in wine culture; the wines of which country, wine region and what types of wine the consumers prefer; how often, at what price and where do they make their purchases.

The respondents of the survey were made up of adult residents from Komárom district. The questionnaire survey was conducted online and the respondents were the residents living in Komárom district in form of a Facebook online community. This is the reason why our research sample cannot be considered transparent, since reaching the older age group of customers proved to be difficult online. The online questionnaire was sent to 2355 members of the Facebook group. A total of 478 responses were submitted during the two month research period (February-March, 2018). It represents a 20,30% response rate, which is an acceptable ratio for effective data collection in case of similar research. The respondents are rather reluctant to participate in this kind of questionnaire survey, despite ensuring the anonymity of the respondent asked. 58% of our respondents were women, while 42% were male respondents, which is considered to be an appropriate ratio to conduct comparative analysis. MS Excel and SPSS statistical programme were used for analysis.

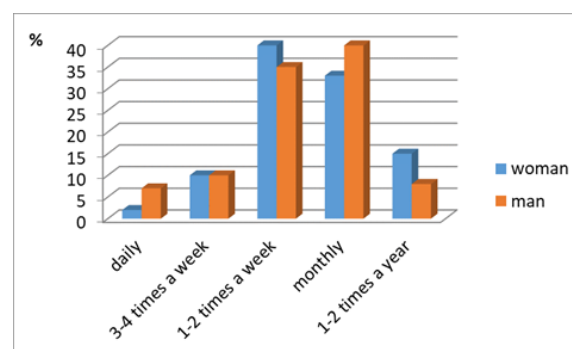
### 4 Research Results

Before introducing the results of the in-depth analysis, we would like to introduce the research sample. 42% of the female respondents are aged 18-25, 32% of them are aged 26-36, 8% represent the age group of 37-47, 16% are aged 48-58 and only

2% belong to the age group over 58. Very similar was the age distribution of male respondents. 36% of the male respondents are under 25, 39% of them are between 26-36, 15% are aged 37-47, 8% belong to the age group of 48-58 and only 2% of them are over 58. Nearly half of the respondents are from Komárom, the rest of them are residents of other settlements in Komárom district. Therefore, our research sample is suitable for conducting comparative analysis of wine consumption of the urban and rural residents, which we have an intention to realize in the future. In terms of education degree of examined group of genders, our sample is proved to be balanced. Very close proportion of respondents (36-35%) have secondary school degree and master degree gained at colleges or universities. The lowest number of respondents are represented by those with low qualification and post-graduate degree. The qualification degree of our respondents determines their income. Among the male respondents, we could observe a higher proportion of respondents with high income. Over 1000 EUR income was registered only with 5% of female respondents, while this ration stood at 23% with men. The average income of female respondents was around 500-600 EUR, while the average income of male respondents was between 601-700 EUR. The Chi-Square Test of gender and income categories shows a significant correlation between the two variables.

In the next part of our study we will analyse the answers provided by male and female consumers about their wine consumption habits. As a first step, we examined the frequency of wine consumption, as well as we were interested in the price category of wine bought by the respondents.

Figure 4: The frequency of wine consumption by gender



Source: own editing based on primary research

The answers received for the question regarding the frequency of wine consumption show no significant difference between the frequency of wine-consumption of male and female consumers. The majority of respondents consume wine once or twice a week or they consume it once a month. The Pearson's Chi-Square value is 16,79 at a significance level of 0,002, indicating a significant relationship between the two indicators. The value of Cramer V and Lambda is 0,19 and 0,03, which indicates a weak relationship between the two variables. Regarding the price category of wine consumed by the respondents, we did not recognize a significant difference between the respondents. A significant ratio of men and women (54 %, 55%) purchase a bottle of wine at 5-10 euros. Only one-fifth of the respondents showed a willingness to pay higher price for a bottle of quality wine.

87% of our respondents regardless to their gender are considered to be conscious customers, since a high ratio of the respondents are paying attention to the place of the origin of wine they consume. The majority of our respondents regardless to gender prefer the consumption of Hungarian wine (female-79%, male 84%). The ratio of female consumers consuming Slovak wine is 67%, while the ratio of male consumers is 63%. Regarding the place of origin of the wine, male consumers showed an interest in wine from the Czech Republic, Austria, Spain, Portugal, Argentina and Chile (12 %, 8 %, 17 %, 17 %, 15 %, 14 %). The

interest of female consumers in foreign wine was negligible. Significant interest was shown in Italian wine, 25% of female and 34% of male consumers like the Italian wine. The Chi-Square Test, which has a value of 0,00 at 0,987 two-sided significance level, indicates that there is no significant correlation between the origin of wine and the gender of the respondents. The most popular Hungarian wine regions were Neszmély, Villány, Eger and Tokaj. The wine from the South Slovak wine region proved to be the most popular among the respondents (average of the sample 3,35).

Table 2: Occasions for wine consumption

| Occasion               | Gender | YES % | NO % | Chi-Sq. test | Level of significance | Cramer V |
|------------------------|--------|-------|------|--------------|-----------------------|----------|
| Consuming at home      | Woman  | 68    | 32   | 0,68         | 0,409                 |          |
|                        | Man    | 64    | 36   |              |                       |          |
| Consuming with friends | Woman  | 83    | 17   | 1,06         | 0,303                 |          |
|                        | Man    | 79    | 21   |              |                       |          |
| As a gift              | Woman  | 83    | 17   | 1,68         | 0,195                 |          |
|                        | Man    | 78    | 22   |              |                       |          |
| To the party           | Woman  | 43    | 57   | 1,83         | 0,176                 |          |
|                        | Man    | 37    | 63   |              |                       |          |
| For cooking            | Woman  | 27    | 73   | 4,83         | 0,028                 | 0,1      |
|                        | Man    | 36    | 64   |              |                       |          |
| To the wine collection | Woman  | 5     | 95   | 10,38        | 0,001                 | 0,15     |
|                        | Man    | 0     | 100  |              |                       |          |

Source: own editing based on primary research

As a result of the research conducted among the male and female consumers, we can assess that regardless to gender the respondents are purchasing wine for consuming at home or with friends, as well as find it a good idea buying a bottle of wine as a gift. Rarely our respondents buy wine to their wine collection or use it for preparing food. By conducting Chi-Square Test, we can identify a significant correlation between cooking/wine consumption and the gender identity, although examining the strength of the correlation between the indicators, a weak relationship can be detected in both cases.

The next question of our research asked the respondents to evaluate 7 factors indicated in our questionnaire regarding their wine consumption habits at home on a scale from 1 to 5 (1-not important at all, 5 – always important). At first, we performed a one-variable analysis, examining the frequency distribution. As a first step, we examined the distribution of answers received for individual statements, using the average, modus and standard deviation indicators. The modus shows the most frequent responses, while standard deviation indicates deviations from the average.

Table 3: Considerations taking into account when consuming wine at home

| Sequence | Considerations                             | Average | Modus | Deviation |
|----------|--|---------|-------|-----------|
| 1.       | Proper temperature of wine                 | 3,67    | 5     | 1,17      |
| 2.       | Proper storage of wine                     | 3,62    | 5     | 1,24      |
| 3.       | Choosing the appropriate wine glass        | 3,49    | 5     | 1,49      |
| 4.       | Quality Control                            | 3,14    | 3     | 1,28      |
| 5.       | Pairing with food                          | 2,67    | 3     | 1,25      |
| 6.       | Aerating of wine                           | 2,43    | 1     | 1,40      |
| 7.       | Order of consuming different types of wine | 2,17    | 1     | 1,26      |

Source: own editing based on primary research

Based on the summary of our results, we can assume that most of the respondents always pay attention to proper temperature and storage of wine and choosing the appropriate wine glass when consuming wine at home. Aerating of wine and the proper order of consuming different types of wine proved to be the least important indicators when consuming wine at home. However, it is also clear from the table that the value of standard deviation is higher than 1, which indicates that our respondents do not share the same opinion regarding the individual statements.

In the next phase of our research, we intended to map whether difference can be detected between male and female consumers regarding the importance of factors set when consuming wine at home. We used averages as a first step to compare the opinion of two groups of our respondents. Significant differences between the genders were detected in choosing the order of wines served and the control of quality considering the sample average. The above mentioned factors are more important for male than female customers consuming wine at home.

In order to determine whether different results between the two groups are really influenced by different opinion about the factors influencing wine consumption at home, we applied the method of variance analysis, which measures the difference of average between the two groups. Examining the conditions of the variance analysis, we can state that our dependent variables are measured on interval scale. By conducting normality tests, we can assume that our dependent variables do not always follow the normal distribution. To assess the homogeneity we applied the Levene's test. As a result of the test we can state that 3 conditions of the homogeneity do not exist in the following: temperature of the wine, order of the wine served and the process of aeration. The ANOVA table contains 4 factors.

Table 4: ANOVA table about the importance of factors to consider when consuming wine at home (gender perspective)

| Factors                | F     | Sign. |
|------------------------|-------|-------|
| Appropriate wine glass | 1,44  | 0,230 |
| Proper storage of wine | 0,00  | 0,956 |
| Pairing with food      | 0,05  | 0,827 |
| Quality control        | 15,49 | 0,000 |

Source: own editing based on primary research

The table clearly demonstrates the significance levels related to responses. It can be concluded that different importance by male and female respondents was dedicated to control of quality. Similar importance regardless to gender of respondents was dedicated to choosing the appropriate wine glass, appropriate storage of wine and matching the food with wine.

#### 4 Conclusions

At the beginning of the 21<sup>st</sup> century, wine and wine consumption continues to play an important economic role not only in Europe and worldwide but in Slovakia and Hungary as well. Consumption of high quality wine is no longer a privilege of the affluent since quality wine has become accessible for a wider scope of consumers. The consumption of wine has democratized since various events, festivals and the increasing number of wine tasting clubs offer a numerous possibility for wine tasting. There has never been such an enormous, diverse and high-quality supply in the history of wine culture.

According to the results of the primary research conducted in Komárno district it can be concluded that significant difference between the wine consumption habits of male and female consumers cannot be detected. Most of the consumers consume wine 1-2 times a week or on monthly basis. Regarding the price of wine bought by consumers, no significant differences can be recognized between male and female customers. The respondents pay 5-10 EUR for a bottle of wine. Regardless to gender, majority of the respondents are considered to be

conscious buyers since they find important the origin of wine they buy. It is likely that due to the geographical position of the district and closeness to the Hungarian border, consumers prefer consuming Slovak and Hungarian wine. Male consumers of the survey are proved to be open in choosing wine with different origin, while female customers seemed to be more reserved. Our respondents, regardless to gender prefer professional attitude to wine consumption, which is explained by the fact that they care about the proper temperature and storage of wine, as well as they pay attention on proper choice of wine glass and choosing the appropriate wine to food served. Aeration and serving order for wines are those aspects the customers can learn more about.

In order to provide a full analysis of the research data, we plan to conduct a comparative analysis about the wine consumption habits of rural and urban consumers. It is necessary to bear in mind that Komárno district, the research was conducted in is a part of one wine region, so there can be more amateur wine makers or respondents related to wine making business. The opinion of these respondents would provide further interesting field of questions related to wine consumption habits of the residents in the region.

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Primary Paper Section: A

Secondary Paper Section: AH

## EMPLOYMENT OF FOREIGNERS IN THE SLOVAK REPUBLIC

<sup>a</sup>EVA GRMANOVÁ, <sup>b</sup>JÚLIA KOSTROVÁ

<sup>a</sup>Alexander Dubček University in Trenčín, Faculty of Social and Economic Relations, Študentská 3, 911 50 Trenčín, Slovakia

<sup>b</sup>Alexander Dubček University in Trenčín, Faculty of Social and Economic Relations, Študentská 3, 911 50 Trenčín, Slovakia  
email: <sup>a</sup>eva.grmanova@tuni.sk, <sup>b</sup>julia.kostrova@tuni.sk

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**Abstract:** The current demographic development in Slovakia is characterized by the fact that the share of the post-productive component of the population in the population is increasing and thus the economic burden on the productive component of the population by the post-productive population is also increasing. Changing the structure of the population changes the labour market. There is a decrease in the size of the workforce. Its gradual decrease may lead to a shortage of employees in some areas. It can be eliminated by increasing the number of employed foreigners. Their distribution within individual regions of the SR is different and thus the contribution of employed foreigners to national income is also different in individual regions. The aim of this paper is to determine the specifics of the development of the number of employed foreigners in Slovakia at the national level and then at NUTS III level.

**Keywords:** labour market, immigration, working immigrants, employment of foreigners, regional disparities

### 1 Introduction

Constant changes in the development of society are a natural phenomenon caused by the influence of several factors. Demographic change is one of the most important factors causing change in society (Kostrová, Škrovánková, Bulko, 2017). It is currently being observed from several aspects. Migration is one of the most important. Migration is not a phenomenon of today, although it has been spoken more often than in the past years. As the economic, social and demographic situation evolves, migration also evolves and changes. In Slovakia, experts and researchers are increasingly focusing on migration issues, mainly due to changing demographic indicators on the labour market and the free movement of labour within the EU group.

According to Skibiński, Rączaszek (2017) demographic processes in recent years have had a significant impact on changes in the labour market, in particular on supply and demand. In accordance with Fraňková (2015) the EU labour market faces several challenges, including an aging population that has an impact on labour supply and rapid technological development linked to the demand for a skilled labour force. For this reason, there is a need to identify and respond to labour shortages that can affect economic growth. The lack of labour caused by the aging of the population is also reported by Krajňáková and Vojtovič (2017).

Considering all the negative and positive effects of international migration, migration can be seen as an important factor affecting the level of socio-economic development of the source and target countries. It is precisely in the current turbulent period that the pressure on countries' ability to adapt their individual components of socio-economic development through flexible migration policy is growing (Ondrušek, 2010).

Slovakia is a country that becomes interesting for immigrants from other countries, but on the other hand it is a country from which residents leave to work abroad (Vojtovič, Tupá, 2016). Significant contribution to labour force immigration is the significant development potential of the economy and society (Tupá, 2016).

The contribution of the National Research Council (1997) is devoted to the economic benefits of emigration. This is closely related to the extent to which natives and immigrants are similar and whether immigrants are replacing or supplementing homeworkers in the workplace. If immigrants have the skills to replace the skills of some domestic workers, these domestic workers lose from immigration. If immigrants have skills that

complement the skills of other domestic workers, these home workers will gain from immigration. At the same time according to the National Research Council (1997) can be derived the impact of aggregate domestic economy. As long as immigrants substitute for some natives, the larger the loss to those natives, the greater the benefits of immigration to the aggregate domestic economy.

According to National Research Council (1997), it can be stated that the gains and losses of immigration are closely linked. If immigrants replace some natives, the greater the loss of these natives and the greater the benefits of immigration to the overall domestic economy. If the wage of domestic unskilled workers did not fall, no domestic worker (unqualified or qualified) would not gain or lose, and there would be no net domestic profit from immigration.

According to Borjas (2005), if we want to accurately measure these economic gains from immigration, it is necessary to list all possible channels through which immigration transforms the economy. Immigration changes the prices of goods and services, job opportunities for workers, number of jobs in households and number of jobs in immigrant enterprises.

To what extent are immigrants participating in the country's changes in national income can be estimated by comparing GDP if the state had no immigrants (that is, there would be no changes in their immigration revenues) and GDP, which is also affected by immigration.

Immigration surplus, according to Borjas (2005) expresses the relationship:

$$\frac{\text{immigration surplus}}{\text{GDP}} = -\frac{1}{2}sep^2, \quad (1)$$

where  $s$  is labour's share of national income;  $e$  is the elasticity of factor price for labour (that is, the percentage change in the wage resulting from a one percent change in the size of the labour force); and  $p$  is the immigration share, the fraction of the workforce that is foreign born.

Migration and mobility are closely linked to regional disparities (Zudelova, Urbancikova, 2015; Niraula, Valentin, 2019). The aim of each economy is that the development in the individual regions of the national whole is directed towards convergence, in order words to reduce the differences in individual regions. In the Slovak Republic, several authors have already focused on regional differences from different perspectives (Kostrová, 2018; Kordoš, Krajňáková, 2018; Privara, Rievajova, Dziura, 2018; Masarova, Koiso, 2017).

### 2. Aim, Data and Research Methodology

The aim of this paper is to determine the specifics of the development of the number of employed foreigners in Slovakia at national and regional level. The regional level is analyzed at the NUTS III level. Sub-goals are:

- 1) to find out whether the number of employed foreigners is converging in the regions,
- 2) determine the specifics of employment of foreigners in individual regions,
- 3) determine the relationship between the number of employed foreigners and GDP based on data in individual regions of the SR,
- 4) estimate the value of Immigration surplus share in GDP in individual regions of Slovakia.

A beta convergence method was used to analyze the convergence of the number of employed foreigners in individual regions of the SR, including regression analysis and correlation diagram.

Analysis of the employment of foreigners in the SR was based on statistics from the Central Office of Labour, Social Affairs and Family. Central Office of Labour, Social Affairs and Family (2019) pursues employed foreigners in three categories:

- employment of third-country nationals with a work permit,
- employment of EU / EEA citizens with an information card,
- employment of third-country nationals with an information card (without a work permit).

The analyzed period is 2012 to 2018. Thus, the initial values of the indicators are 2012 values. The size of the labour force was ascertained from data from the Statistical Office of the Slovak Republic (2019).

### Beta convergence and correlation diagram

To determine the convergence, respectively divergence regions in terms of the analyzed indicator, there are several methods. One frequently used method is the beta convergence method.

According to Minařík, Borůvková and Vystrčil (2013), this method assumes that if regions that showed low values at the beginning of the period show faster growth than regions that showed higher values at the beginning of the period, they converge.

Procedure for beta-convergence is as follows:

- Determination of the period in which is searched for convergence, respectively divergence.
- Find the value of the analyzed indicator in the first year of the period (initial values  $y_1$ ) and indicator values at the end of the period for all regions ( $y_T$ ).
- The average growth coefficient is calculated from the obtained data ( $\bar{k}$ ).

The geometric mean is used for its calculation

$$\bar{k} = \sqrt[T-1]{k_2 k_3 \dots k_T} = \sqrt[T-1]{\frac{y_2}{y_1} \frac{y_3}{y_2} \dots \frac{y_T}{y_{T-1}}} = \sqrt[T-1]{\frac{y_T}{y_1}} \quad (2)$$

In the next step, the regression method is used. The linear regression function parameters are determined based on the values obtained. The dependent variable is the logarithm of the average growth coefficients and the independent variable is the logarithm of the initial values.

The evaluation is performed based on the monotony of the linear regression function (based on the regression coefficient) and the determination coefficient. If the linear regression function is decreasing, the tendency towards convergence is predominant. If the linear regression function is increasing, the tendency to divergence is predominant.

In case of high values of the determination coefficient (approaching 100%) we speak of highly proven convergence, respectively divergence. In the case of low values (approaching 0%), the determination coefficient is the result of the convergence analysis respectively divergence is little proven.

To divide the regions into groups according to their tendencies to move away from others, respectively to delay behind others is used a graph called a correlation diagram. It is a point graph where the dependent variable is the logarithm of the average growth coefficients and the independent variable is the logarithm of the initial values.

In the first group, there are regions that have above-average values of both dependent and independent variables. They tend to move away from others. In the second group are the regions with below-average initial values of average and above average growth rates. They show a tendency to move to the first group. In the third group, there are regions that show sub-average values of both dependent and independent variables. They tend to delay behind others. In the fourth group there are regions with

above-average initial values and below average growth coefficient. Thus, to a group in which there are regions that tend to delay behind others (Minařík, Borůvková, Vystrčil, 2013).

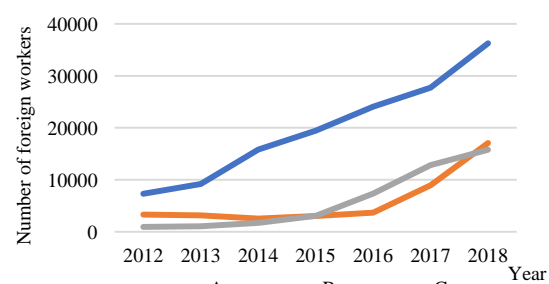
## 3 Research results and discussion

### 3.1 Development of the number of employed foreigners in the SR

The current demographic development, especially the development of the number of births and the prolongation of life expectancy, leads to changes in the age structure of the population. These changes affect many areas. Last but not least, they cause changes in the labour market. Nowadays, many employers are aware that their company may be at risk of labour shortages. They are looking for solutions to this problem. Some employers in the Slovak Republic adopted short-term solution with the admission of foreigners into employment. This is evidenced by the growing trend in the number of employed foreigners in Slovakia. In 2012, 11,547 foreigners worked in the SR and accounted for approximately 0.5% of all workers. In 2018, 69,116 foreigners worked in the SR and accounted for about 2.7% of all workers. The number of employed foreigners thus increased in the analyzed period by 5.99 times. However, their share in the total number of employed is significantly below the average of employed foreigners in the EU. Since the employed foreigners are monitored by the Central Office of Labour, Social Affairs and Family in the three categories, it is possible to follow developments and changes in the structure based on these three categories.

The number of employed foreigners from 2012 to 2018 is shown in Graph 1. In the whole analyzed period, the most employed were EU / EEA citizens with an information card. In 2012, employed EU / EEA citizens with an information card accounted for about 63.3% of all employed foreigners. The second largest group of employed foreigners were third-country nationals with a work permit. Third-country nationals with an information card (without a work permit) were employed least. In 2012, foreigners from third countries with works permits formed approximately 28.7% and employed foreigners from third-country with an information card (without a work permit) formed approximately 8.0%.

Graph 1 Number of foreign workers in the Slovak Republic



Note: A - employment of EU / EEA citizens with an information card; B - employment of third-country nationals with a work permit; C - employment of third-country nationals with an information card (without a work permit)

Source: Central Office of Labour, Social Affairs and Family – statistics (data are from December of the relevant year)

The growth rate of the number of employed foreigners in the three categories was different. The biggest growth rates were achieved by foreigners from third countries with an information card (without a work permit). Their number increased by 17.10 times. The least increased the number of employed foreigners from the EU/EEA with an information card. Their number increased by 4.96 times. Differences in growth rates in these three categories led to a significant change in structure. In 2018, the proportion of employed foreigners from the EU / EEA with an information card was lower than in 2012 and accounted for about 52.5% of all employed foreigners. Thus, although the number of foreigners from the EU grew, its relative share of the

total number of foreigners employed declined. Nevertheless, in 2018, the share of EU / EEA employed foreigners was greater than the share of employed foreigners from third-countries together. The largest number of employed foreigners from the EU was from Romania. One reason is the fact that foreigners from Romania are willing to work for lower wages. In 2018, employed foreigners from third countries with a work permits accounted for around 24.7%.

We can conclude from this that in 2018, compared to 2012, the share of employed third-country nationals with a work permit was slightly reduced. The largest number of employed third-country nationals with work permits was from Ukraine and from Serbia. Employed of third-country nationals with an information card (without a work permit) accounted for approximately 22.8% in 2018. Thus, the relative share of employed foreigners in the SR increased only for foreigners from third countries with an information card (without a work permit). This may be because foreigners from third countries have lower wage requirements than EU staff. Table 1 shows the proportion of employed foreigners in the individual categories in 2012 to 2018 in the total number of employed foreigners.

Table 1 Share of employed foreigners in % of the total number of employed foreigners in the Slovak Republic

|   | 2012  | 2013  | 2014  | 2015  | 2016  | 2017  | 2018  |
|---|-------|-------|-------|-------|-------|-------|-------|
| A | 63.34 | 68.51 | 78.79 | 76.08 | 68.55 | 56.04 | 52.47 |
| B | 28.67 | 23.58 | 12.71 | 11.88 | 10.50 | 18.06 | 24.69 |
| C | 7.99  | 7.90  | 8.50  | 12.05 | 20.95 | 25.90 | 22.84 |

Note: A - employment of EU / EEA citizens with an information card; B - employment of third-country nationals with a work permit; C - employment of third-country nationals with an information card (without a work permit)

Source: own processing based on Central Office of Labour, Social Affairs and Family – statistics (data are from December of the relevant year)

From the above, we can conclude that the trend in the number of employed foreigners and the trend in the number of employed foreigners in the individual analyzed categories is growing. In the analyzed period, the fastest growth was in the category of employed foreigners from third countries with an information card (without a work permit). Their share in the total number of employed foreigners increased. In the other two categories, the share of employed foreigners has fallen. Despite the fact that the share of employed foreigners in the EU has decreased, it is still greater than 50%.

### 3.2 Convergence of the number of employed foreigners in the regions of Slovakia

Regions in Slovakia differ significantly in the number of employed foreigners. The most job opportunities are in the Bratislava region and therefore the most foreigners are employed in this region. In 2012, 39.41% of all employed foreigners were employed in the Bratislava region. By 2018 their share had not changed significantly. It was 40.89%. The structure of employed foreigners in the Bratislava region in individual categories has changed significantly.

The share of employed foreigners from the EU / EEA in the Bratislava region in the total number of employed foreigners in Slovakia increased significantly from 2012 to 2018. While in 2012 their share in the total number of employed foreigners from the EU / EEA in the whole SR was 37.2%, in 2018 it was already 47.4%. The share of employed foreigners from third countries in the Bratislava region decreased. Thus, we can conclude that the share of employed foreigners in the total number does not change significantly in the Bratislava region. However, their structure has changed. As many as 47.4% of all employed foreigners from the EU work in the Bratislava region.

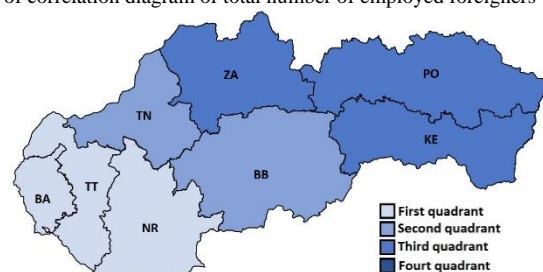
The smallest number of employed foreigners was at the beginning and at the end of the analyzed period in Banská Bystrica region. There was also the smallest number of

employed foreigners from the EU / EEA in this region. The smallest number of employed foreigners from third countries with the information card (without a work permit) was in the Prešov region. The smallest number of employed foreigners from third countries with work permits in 2012 was in Banská Bystrica region and in 2018 in Prešov region.

In all regions of SR, more foreign men were employed than foreign women. In 2018, this trend was the same, but in Prešov region the number of employed foreign women was higher than employed foreign men. Thus, we can summarize that in Slovakia are predominantly employed foreign men.

The number of employed foreigners in individual regions of Slovakia showed a tendency towards divergence between 2012 and 2018. The coefficient of determination of the regression function was 10.12%. The regression coefficient was 0.0189. From this we can conclude that the results of the divergence analysis are poorly demonstrated. For this reason, we built a correlation diagram and divided the regions into 4 groups. Based on this, we have constructed a map (in Microsoft Excel) with the division of regions into groups. Figure 1 divides the regions of the Slovak Republic into four quadrants, respectively according to the results into three quadrants.

Figure 1 Distribution of regions of Slovakia according to results of correlation diagram of total number of employed foreigners



Note: BA – Bratislava region, TT – Trnava region, NR – Nitra region, TN – Trenčín region, BB – Banská Bystrica region, ZA – Žilina region, PO – Prešov region, KE – Košice region

Source: own processing (2019)

In the first quadrant of the three regions, namely from other regions in the number of employed foreigners moved away mainly regions - Bratislava, Trnava and Nitra. The increase in the number of employed foreigners was mainly related to the increase in job opportunities. A large proportion of foreigners were employed in industry and construction in these regions. The number of employed foreigners in these regions showed above average logarithm of initial values and also above average logarithm of average growth coefficient. In these three regions, the number of employed foreigners is growing fastest. Regions are moving away from others. On the other hand, the below average logarithm of the initial values and also the below-average logarithm of the average coefficient of growth of the number of employed foreigners were in the Žilina, Prešov and Košice regions. These three regions were behind the others in the number of employed foreigners. They have the slowest growth in the number of employed foreigners.

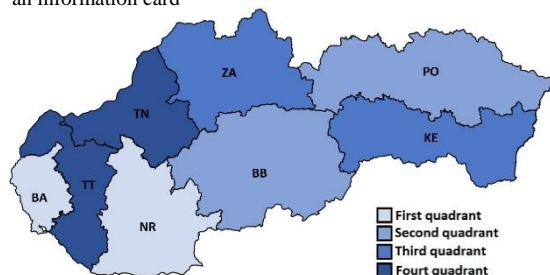
### 3.3 Convergence of employed EU / EEA citizens with information card in SR regions

The number of employed foreigners from EU / EEA countries in individual regions of Slovakia showed a tendency towards divergence between 2012 and 2018. The coefficient of determination of the regression function was 10.48%. The regression coefficient was 0.018. From this we can conclude that the results of the divergence analysis are poorly demonstrated.

For this reason, we constructed a correlation diagram. Based on this, we have constructed a map with the division of regions into groups (Figure 2). There were two regions in the first quadrant, so the number of foreigners employed by the other regions was mainly due to two regions - Bratislava region and Nitra region.

The number of employed foreigners from EU / EEA countries in these regions showed above average logarithm of initial values and also above average logarithm of average growth coefficient. On the other hand, the below average logarithm of the initial values and also the below-average logarithm of the average coefficient of growth of the number of employed foreigners from the EU / EEA had the Košice and Žilina regions. In particular, the Košice region significantly lagged behind the growth in the number of employed foreigners from the EU / EEA.

Figure 2 Distribution of regions of Slovakia according to results of correlation diagram of employment of EU / EEA citizens with an information card



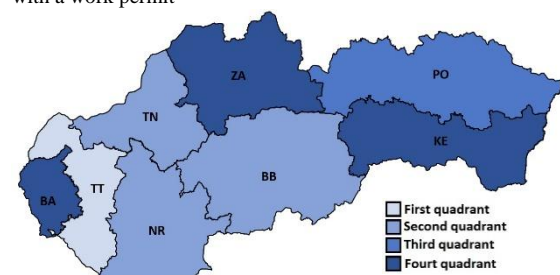
Note: BA – Bratislava region, TT – Trenčín region, NR – Nitra region, TN – Trenčín region, BB – Banská Bystrica region, ZA – Žilina region, PO – Prešov region, KE – Košice region

Source: own processing (2019)

### 3.4 Convergence of employed third-country nationals with work permit in SR regions

In contrast to the number of foreigners from the EU / EEA, the number of employed foreigners from third countries with work permits in individual regions of Slovakia showed a tendency towards convergence between 2012 and 2018. The coefficient of determination of regression function was 19.11%. The regression coefficient was -0.041. From this we can conclude that the results of the convergence analysis are little proven. For this reason, we built a correlation diagram. Based on this, we have constructed a map with the division of regions into groups (Figure 3).

Figure 3 Distribution of regions of Slovakia according to results of correlation diagram of employment of third-country nationals with a work permit



Note: BA – Bratislava region, TT – Trenčín region, NR – Nitra region, TN – Trenčín region, BB – Banská Bystrica region, ZA – Žilina region, PO – Prešov region, KE – Košice region

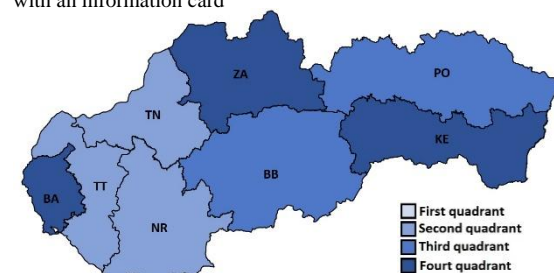
Source: own processing (2019)

There was one region in the first quadrant, the Trenčín region was moving away from other regions in the number of employed foreigners with work permit. This region had above average logarithm of initial values and also above average logarithm of average growth coefficient. The Bratislava region had a smaller average coefficient of growth in the number of employed foreigners from third countries with a work permit than the average coefficient of growth in the number of employed foreigners from third countries with work permits in Trenčín region. On the other hand, the below average logarithm of the initial values and the below average logarithm of the average growth coefficient were in the Prešov region.

### 3.5 Convergence of employed third-country nationals with an information card (without a work permit) in SR regions

The number of employed foreigners from third countries with an information card (without a work permit) in individual regions of Slovakia showed a tendency towards convergence. The coefficient of determination of regression function was 1.17%. The regression coefficient was -0.019. From this we can conclude that the results of the convergence analysis are little proven. For this reason, we built a correlation diagram. Based on this, we have constructed a map with the division of regions into groups (Figure 4). There was no region in the first quadrant. The above-average logarithm of the initial values and the below-average logarithm of the average growth coefficient were in the Prešov and Banská Bystrica regions. So there were two regions in the third quadrant. They tend to lag behind the number of employed foreigners from third countries with an information card.

Figure 4 Distribution of regions of Slovakia according to results of correlation diagram of employment of third-country nationals with an information card



Note: BA – Bratislava region, TT – Trenčín region, NR – Nitra region, TN – Trenčín region, BB – Banská Bystrica region, ZA – Žilina region, PO – Prešov region, KE – Košice region

Source: own processing (2019)

The analysis carried out shows some of the region's specificities, which are summarized in Table 2 below.

Table 2 Characteristics of NUTS III regions

| 1. Bratislava region (BA)   |
|---|
| - region with the largest number of employed foreigners   |
| - region, which is the most distant to other regions in the total number of employed foreigners, mainly employed citizens of EU / EEA countries with an information card  |
| 2. Trenčín region (TT)  |
| - the region that is the most remote from the other regions in the number of employed third-country nationals with a work permit  |
| 3. Trenčín region (TN)  |
| - a region with below average initial value and above average growth rate in the total number of employed foreigners  |
| 4. Nitra region (NR)  |
| - belongs to the regions that are diverging to other regions in the total number of employed foreigners   |
| - region with above-average start-up value and above-average growth rate mainly in employed EU / EEA citizens with information card   |
| 5. Žilina region (ZA)   |
| - region with above-average start-up value and below-average growth rate for employment of third-country nationals with work permits and for third-country nationals with an information card (without work permit) |
| 6. Banská Bystrica region (BB)  |
| - region with the lowest number of employed foreigners  |
| - region with below average start-up value and above-average growth rate in employment of EU / EEA citizens with information card and also in employment of third-country nationals with work permit                |
| 7. Prešov region (PO)   |
| - the region with the smallest number of third-country nationals with an information card (without a work permit)   |

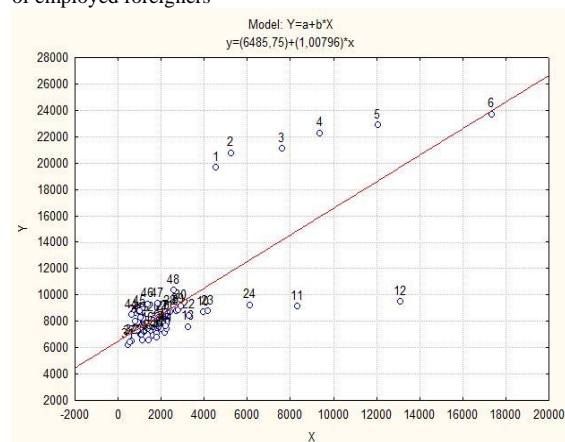
- a single region, below average start-up value and below-average growth rate for employment of third-country nationals with work permits
8. Košice region (KE)
- the region that is lagging behind the other regions in the total number of employed foreigners, mainly in the employment of EU / EEA citizens with an information card

Source: own processing

### 3.6 The relationship between regional GDP and the number of employed foreigners

In the period 2012-2017, we investigated the relationship between regional GDP and the number of employed foreigners in the regions of Slovakia (Statistical Office of the Slovak Republic, 2014; Statistical Office of the Slovak Republic, 2018). Regional GDP data for 2018 weren't available during processing. The relationship between regional GDP and the number of employed foreigners is shown in Figure 5.

Figure 5 The relationship between regional GDP and the number of employed foreigners



Source: own processing (2019)

X is the number of employed foreigners, Y is regional gross domestic product, at current prices in mill EUR. Based on the regression analysis, we can conclude that there is a moderately strong correlation between the number of employed foreigners and GDP in NUTS 3 regions of the SR in 2012-2017. The correlation coefficient is 0.752. The determination coefficient is 56.56%. Thus, 56.56% of the total variability is explained by the model.

The figure shows the relationship between GDP and the number of employed foreigners. However, it does not allow to determine to what extent the change in GDP was affected by employed foreigners in the SR. To estimate the share of GDP generated by the employment of foreigners, we will use an estimate based on a comparison of GDP if the state had no immigrants (there would be no changes in their immigration revenues).

Based on the relation (1) and assuming that as Borjas (2005) we consider that labour's share of income is not significantly changing and is 0.7 and that the factor price elasticity remains unchanged and is -0.35, we can calculate the Immigration surplus share in GDP. The Immigration surplus's share of GDP is shown in Table 3.

Under these assumptions, we can conclude that the largest values of Immigration surplus's share in GDP in individual regions of Slovakia did not exceed 0.043%. Share of the immigration surplus on GDP was the largest in 2012 in the Trnava region. The second largest share of the surplus of immigration in GDP in 2012 was in the Bratislava region.

In 2017, the highest share of Immigration surplus in GDP was Bratislava region. The second largest share of Immigration

surplus in GDP in 2017 was in the Trnava region. The smallest share of Immigration surplus in GDP at the beginning and end of the analyzed period and at the same time its smallest growth was in the Prešov region. The share of Immigration surplus in GDP in the Prešov region was almost 41 times smaller in 2012 than in the Trnava region.

Table 3 GDP change 2012, 2017 in NUTS 3 regions of Slovakia

| 2012                   | p (%)  | p <sup>2</sup> | -0.5 0.7<br>-0.35 p <sup>2</sup><br>(%) |
|------------------------|--------|----------------|---|
| Bratislava region      | 3.8597 | 14.89751       | 0.0182                                  |
| Trnava region          | 5.4795 | 30.0254        | 0.0368                                  |
| Trenčín region         | 1.4071 | 1.979892       | 0.0024                                  |
| Nitra region           | 2.3904 | 5.714084       | 0.0070                                  |
| Žilina region          | 1.0715 | 1.148183       | 0.0014                                  |
| Banská Bystrica region | 0.9509 | 0.904297       | 0.0011                                  |
| Prešov region          | 0.8724 | 0.761059       | 0.0009                                  |
| Košice region          | 0.9081 | 0.824723       | 0.0010                                  |
| 2017                   | p (%)  | p <sup>2</sup> | -0.5 0.7<br>-0.35 p <sup>2</sup><br>(%) |
| Bratislava region      | 5.8825 | 34.60323       | 0.0424                                  |
| Trnava region          | 5.7061 | 32.55939       | 0.0399                                  |
| Trenčín region         | 2.5254 | 6.377583       | 0.0078                                  |
| Nitra region           | 2.7628 | 7.6333         | 0.0094                                  |
| Žilina region          | 1.3292 | 1.766766       | 0.0022                                  |
| Banská Bystrica region | 1.1942 | 1.426014       | 0.0017                                  |
| Prešov region          | 1.0307 | 1.062426       | 0.0013                                  |
| Košice region          | 1.1309 | 1.278876       | 0.0016                                  |

Note: p - the share of foreigner workers from total number of employees in %  
Source: own processing (2019)

### 4 Conclusion

From the above we can conclude that the trend of the number of all employed foreigners is growing. In the period 2012-2018, the fastest growth was in the category of employed foreigners from third countries with an information card. Their relative share also increased significantly. In the other two categories: employed foreigners from the EU / EEA and employed foreigners from third countries with permits, their development grew but their share fell. However, the share of employed foreigners from the EU / EEA has been prevalent throughout. There is a clear difference in the employment of foreigners by sex in the SR. In the analyzed period, foreign men were employed to a much greater extent.

The fastest growing number of employed foreigners is in Bratislava, Trnava and Nitra regions. These regions are moving away from others. In the Bratislava and Nitra regions, the fastest growth was in the number of employed foreigners from the EU / EHP. The number of employed foreigners from third countries with the granted permission was the fastest growing in the Trnava region.

The slowest growth is in the number of employed foreigners in Žilina, Prešov and Košice regions. These three counties were behind others. The growth in the number of employed foreigners from the EU was the slowest in the Košice and Žilina regions. Above all, the Košice region significantly lagged in the number of employed foreigners from the EU. In the Prešov region, the number of employed foreigners from third countries with permission granted was the slowest growth. The increase in the number of foreigners from third countries with the information card was the slowest in the Prešov and Banská Bystrica regions.

By using beta convergence, we can conclude that the number of employed foreigners from third countries with permits in individual regions of Slovakia showed a tendency towards convergence. The total number of employed foreigners and the number of employed foreigners from EU countries showed a tendency to divergence. However, these trends were of little significance. The development suggests that the number of employed foreigners from third countries with permits in SR

regions has the greatest tendency to convergence, i.e. the convergence of regions in individual regions. On the contrary, the number of employed foreigners from the EU has the greatest tendency to divergence, i.e. the widening of differences in the regions of Slovakia.

There is a moderately strong correlation between the number of immigrants and GDP in individual regions of the SR between 2012 and 2017.

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#### Primary Paper Section: A

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## INVESTMENT INCENTIVES IN COUNTRIES OF THE VISEGRAD GROUP

<sup>a</sup>SYLVIE KOTÍKOVÁ, <sup>b</sup>PETR BLASCHKE

*Technical University of Liberec, Faculty of Economics,  
Voroněžská 13, 460 01, Liberec 1  
email: <sup>a</sup>sylvie.kotikova@tul.cz, <sup>b</sup>petr.blaschke@tul.cz*

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The aim of this paper is to analyse the structure of the public investment aid within the Visegrád Group countries, i.e. in four Central European economies – the Czech Republic, the Slovak Republic, Hungary and the Republic of Poland (V4). The evaluation of the investment incentives is based on pre-selected criteria: the definition of the investment incentive and its legal regulation; the investment support structure and investment conditions. Based on a comparative analysis, it was found that Hungary uses the most different structure of investment incentives in an attempt to dynamically change the economy structure towards sectors with high added value. All countries strive to reduce regional disparities and support the development of peripheral areas, but the setting of investment incentives in the Czech Republic does not correspond to the current situation on the local labour market.

Keywords: Investment, Investment Incentives, regulations, Visegrad countries,

### 1 Introduction

The granting of public support – investment incentives – is often associated with support of the inflow of foreign direct investment (FDI) into the host economy, although domestic economic entities may also be applicants. At present, public support is seen as one of the major localisation factors of long-term capital inflows into the host economy. In this case, investment incentives represent a factor reducing the lack of domestic capital generation. On the other hand, they cause so-called incentive redistribution from companies having no relief or not drawing any kind of public support, towards their recipients. For this reason, investment incentives cause significant market distortions. The positive as well as negative impact of investment incentives is multiplied if an investment incentives factor attracts a capital-driven investor to the host economy. That is the reason why the opinions of the professional public on this topic significantly differ.

The effort of this paper is to contribute its finding and conclusions to the ongoing discussion in the broader regional context of the Visegrád Group countries in order to better evaluate and understand the benefits and effectiveness of the highly debateable investment incentives.

### 2 Literature review

FDI is a phenomenon that has been becoming increasingly vigorous in today's globalised world and affects the host economy on many levels (Zamrazilová, 2008). Blomström and Kokko (1997) define the following basic motivation factors for placing FDI in a selected host region:

- Ownership – a bargain purchase (e.g. production capacity abroad which results in the unit price being significantly lower than if it was acquired in the company's home country).
- Localisation – advantageous geographical location (e.g. with regard to reduction of transport costs and possibility of expansion to new markets).
- Business barriers – solving export-related problems (expensive licensing). The basic aim is to move production inside a certain territory protected by customs and non-tariff measures.
- Local benefits – lower tax burden, available raw materials or cheap labour.

In contrast, Schwarz (2007) divides the factors that may arouse investors' interest in locating their investment in a particular country, into natural (natural conditions, location, wage level, language), and legislative (taxes, subsidies, regulation) factors being independent of each other.

Besides the above-mentioned motivation factors which should be reflected in the reduction of production costs, there are also investment incentives which influence the investment decisions of companies and thus represent an integral part of FDI issues. The incentives are special benefits provided usually by the government or the unit of self-government to specific economic entities in order to support the volume of their investment in a particular territory (e.g. areas with high unemployment, or low living or economic levels). These benefits may be provided directly or indirectly. Direct support includes, for example, subsidies for the acquisition of fixed assets; indirect support includes, for example, tax reliefs (Srholec, 2004).

Schwarz (2007) defines investment incentives as selective state aid to selected investors that meet certain criteria. Thanks to the incentives IP, two groups of entities can be distinguished in the economy – investors being subject to general rules, and investors who benefit from investment incentives. In terms of both the economic impact and the burden of other taxpayers, it is irrelevant whether the incentive is in the form of a direct grant or a tax relief.

The intensity of support that can be considered, among other things, one of the tools of competition between countries, is also important for economic entities that do not achieve it, as investment incentives can act as a motivator of investment (a stimulating factor for companies granted investment incentives) but on the other hand, it can also repulse them (a deterrent factor for companies that do not receive the support). The more generous investment incentives are, the greater disadvantage it is for a company that did not meet the conditions and did not receive the support. It is likely that such a company will not invest in the host country. The increasing competition among countries in the area of investment incentives and the effort to attract large investments can completely eliminate smaller investments (Schwarz, 2007).

Although the purpose of investment incentives is quite clear – to influence companies' decisions, convince them to locate their investments and to attract them to a particular territory, the question is whether this is really happening. In particular, many American critics argue that investment incentives (including tax reliefs) play an absolutely minimal role in companies' investment decisions and their expansion into foreign markets (Thomas, 2007).

This statement is supported by, for example, LeRoy (2005), who states that the tax burden accounts for only about 1.2% of the company's costs (an empirical survey conducted on a sample of American companies), which is in comparison to other costs (labour, material, marketing, overheads, transport, etc.) absolutely marginal.

According to Zamrazilová (2010), all interventions into the market mechanism are dangerous, i.e. also the granting of investment incentives to foreign investors, which, in her opinion, have greatly distorted the supply side of the Czech economy. Investment incentives have been concentrated in the highly pro-cyclical sectors (automotive, electrical engineering), which dynamically support economic growth if the economy is doing well, but are even more aggressive and damaging to the economy at times when it is not doing well, in periods of crises.

The risk of market distortion is also highlighted by Schwarz (2007), who believes that investment incentives undermine the competitiveness of small and medium-sized enterprises (SMEs), as they are mainly focused and support large (foreign) companies, which then benefit at the expense of SMEs. Investment incentives are focused on creating new jobs, however, in the long run it is possible to evaluate the extent to which the beneficiaries were able to reduce the local unemployment rates or if they rather headhunt employees from

other companies of the same or another sector, resulting in an unchanged unemployment rate.

Blažek (2019) points out that the aim of investment incentives granting is not only to support the FDI inflow into the host regions, but the public interest is also the realisation and subsequent use of positive effects resulting from the localisation of FDI and foreign presence in the regions. One of these effects is the development of innovation activities and the implementation of local businesses in international business networks.

According to the theory of global production networks, the key actor is the state, which by means of appropriately chosen institutional tools can create a suitable environment for the creation of global production networks and the development of the position of individual entities – multinational corporations (MNCs) including their customers and suppliers (Blažek, 2018).

Blomström and Kokko (2003) focus on the above-mentioned positive spillovers, which they consider to be an important reason for using investment incentives, but conclude that these effects do not occur automatically but require a minimum level of technological maturity and workforce qualification in a home business. Therefore, investment incentives should not target only large foreign companies but they should also focus also on domestic businesses to be better prepared to absorb and exploit potential spillovers.

Kotíková (2019) adds that a significant multiplication of the positive benefits of FDI may occur in a situation where domestic companies operating in the host business environment are able to both take on technology transfer and develop their own innovation activities.

While most studies have dealt with different FDI effects on different sectors within a single host country, Blomström et al. (1994) examined the relationship between spillovers and the host country's economic development in a comprehensive study involving 101 national economies. The study suggests that spillovers are most often concentrated in middle-income developing countries, while no spillovers have been reported to occur in the poorest developing countries. FDI represents a potentially significant source of spillovers and an instrument of economic development, but requires a certain minimal level of maturity and infrastructure in the host environment to effectively absorb these effects.

According to Schwarz (2007), investment incentives have become a popular government measure, mainly because it allows to emphasise the government merit and its significant contribution, inter alia, to economic growth and growth in payments collected on social and health insurance and, conversely, decline in unemployment and reduction in unemployment benefits. Therefore, investment incentives can be described as an effective marketing tool by which the government supports selected economic entities and creates the impression that it supports competitiveness and entrepreneurship in its territory.

However, in addition to the positive effects, granting of investment incentives is also subject to criticism, as it is a tool that affects market allocation of resources and thus distorts the market. Therefore, literature often argues whether this kind of public support is an effective or inefficient tool and whether its influence on a market mechanism is desirable.

For example, Tomšík (2006) also considers it not to be a very effective tool that leads to sub-optimal allocation of resources. According to him, investment incentives are a kind of compensation to an investor who, in order to receive the incentive, must invest more capital or employ more workers than he wanted, etc., which ultimately reduces his profit. From this perspective, investment incentives can be seen as a kind of additional tax imposed on foreign investors, which has no positive impact on economic development.

Blomström (2002) mentions the fact which represents, in his opinion, the most fundamental argument against investment incentives. It is (as mentioned above) that spillovers do not occur automatically with the arrival of FDI in the host country, but largely depend on the conditions and capabilities of domestic companies, which must be able and willing to learn from foreign companies presented in the region, and also invest in their own new technology.

Other pitfalls associated with investment incentives and the reason why they may not be economically efficient include the risk of attracting FDI elsewhere than they would have been placed without incentives. If the unfavourable conditions for which a foreign investor would not have come to the area, if he had not been motivated by the IP, still persist after the incentive expires, there is a high risk that the investor will leave and invest somewhere else (UN, 2004).

The above-mentioned risk of temporary activity or willingness of the company to remain in the territory is confirmed also by Keller (2006), according to whom, only positives are emphasised when assessing the efficiency and impacts of investment incentives on the Czech economy, but certain obvious risks associated with the presence of MNCs in the host region are concealed.

Also, the increasing asymmetry between rich and poor countries is dangerous – it is much more difficult for poor countries to provide interesting investment incentives because rich countries can afford to offer more attractive conditions, and so they get the investment at the expense of the poorer country. When fighting for the investment with the richer country, the poorer country can be pushed into offering overly expensive investment incentives (UN, 2004).

Investment incentives are also criticized by Keller (2006), who thinks that they are particularly willing to help MNCs that are trying to relocate their production to countries with cheap labour and, on the contrary, sell their products in countries with high purchasing power. Through incentives, MNCs externalise their costs, i.e. e.g. subsidising workforce (retraining), building infrastructure or selling land for a symbolic price.

Also, the creation of artificial tax havens for investors, which directly reduce the flow of means to the treasury and drain the funds that might otherwise be used in the social sphere, has a detrimental effect on public budgets. Even through a popular argument promoting investment incentives is their positive impact on employment, they usually do not create enough new jobs, so the unemployment rate is still rising or stagnates and the recipients work as a stabiliser, as it must be taken into account that the investment incentives recipients create new jobs that are logically very attractive to local workers. Due to savings and the compensation of costs granted by public support, these newly created jobs are attractive and they are often occupied by workers from other, local businesses. Again, another level of demand redistribution can be seen. The total number of new jobs created in the businesses supported by investment incentives is not automatically equal to the reduced number of unemployed people. Therefore, it is necessary to undervalue the impact of investment incentives.

Schwarz (2007), who, in his study on investment incentives in the Czech Republic, analysed, among other things, the cost-effectiveness of investment incentives, concluded that while investment incentives contributed to reducing unemployment, it is a very costly tool because the cost of creating one job by means of investment incentives averages around CZK 1.6 million, but in the case of some companies, they reach the amount of up to CZK 15 million. The highest costs per one newly created job were reported in the Karlovy Vary and Zlín Regions (CZK 3.4 and 3 million), while the lowest ones in the Hradec Králové Region and Prague (CZK 0.8 and 1 million).

Moreover, the level of promised investment incentives does not correspond to the number of new jobs promised. The

inefficiency of the investment incentives system is intensified by the fact that thanks to investment incentives, the most new jobs have been created in the Central Bohemian Region, which has been reporting a very low unemployment rate in the long term, and in this respect it is a completely problem-free region. There is a lack of a tool that would motivate investors to allocate their investments to regions with higher unemployment rates – diversification of public support seems insufficient.

### 3 The system of investment incentives in the Czech republic

The issue of investment incentives in the Czech Republic is currently regulated by Act No. 72/2000, on investment incentives, which follows the European Union's regulation for providing regional investment support and employment and education support. The main objective of the provided investment incentives is to support economic development and create new jobs in the Czech Republic.

According to the law, investment incentives in the Czech Republic include the following:

- income tax discount,
- transfer of land including related infrastructure at a discounted price,
- material support for the creation of new jobs,
- material support for retraining or training of employees,
- material support for the acquisition of tangible and intangible fixed assets for strategic investment,
- exemption from real estate tax in preferential industrial zones (i.e. government-approved industrial zones designed to promote balanced and dynamic economic development in the Czech Republic).

An entrepreneur (either a natural or legal person) must meet the following general conditions in order to be supported by investment incentives:

- realisation of the investment project in the Czech Republic,
- environmental friendliness of activities, constructions or equipment,
- commencement of works related to the realisation of the investment project not before the date of submission of the intent to obtain the incentive.

The above-mentioned general conditions must be fulfilled within three years after issuing the decision promising the incentive. Other conditions vary depending on the area of the investment action. The law distinguishes between investment into production (manufacturing industry), technology centres and centres of strategic services, within which support has been extended also to data centres and call centres (MPO, 2016).

The investment in production expects investing into an area of the manufacturing industry, creation and then filling of at least 20 new jobs and commencement of production. This kind of investment also assumes the acquisition of tangible and intangible assets of at least CZK 100 million, with at least half of this amount being spent on the acquisition of machinery for production purposes, which was purchased at market price and was not produced more than 2 years before its acquisition.

The above-mentioned amount of CZK 100 million can be reduced to a half if the investment project in production is realised in an area with an unemployment rate that is min. 50% higher than the average unemployment rate, in the territory of the state-supported regions or in preferential industrial zones (Ostrava - Mošnov, Most - Joseph, Holešov).

Investment in technology centres also assumes the creation and filling of at least 20 new jobs and the acquisition of tangible and intangible assets. However, in this case, the limit is set at only CZK 10 million, with at least half of the amount being spent on the acquisition of machinery (see the conditions above).

Investment in centres of strategic services assumes creating a minimum number of new jobs, as follows:

- min. 20 new jobs in case of software creation centres and data centres,
- min. 70 new jobs in case of repair centres and centres of shared services,
- min. 500 new jobs in case of customer support centres.

The permissible intensity of public support must not exceed 25% in all cohesion regions of the Czech Republic (Prague, the capital city, is the only exception, with zero investment aid). The current system of investment incentives favours SMEs – the permissible level of public support is increased by 20% for small enterprises and by 10% for medium-sized enterprises.

As of 31 March 2019, a total of 1,221 investment projects worth EUR 31,688.62 million were supported in the Czech Republic. These supported projects created 194,832 new jobs. Table 1 below provides an overview of five countries whose business entities implemented the largest amount of investment projects supported by investment incentives in the Czech Republic (sorted in descending order by number of projects, total investment value and number of newly created jobs).

Table 1: Overview of promised investment incentives (as of 31 March 2019)

| Country of origin | Number of projects | Value of investment (in mil. EUR) | Newly created jobs |
|-------------------|--------------------|-----------------------------------|--------------------|
| Czech Rep.        | 660                | 13,189.82                         | 60,772             |
| Germany           | 176                | 4,888.04                          | 38,475             |
| Netherlands       | 58                 | 2,458.30                          | 24,192             |
| Japan             | 51                 | 2,027.69                          | 15,619             |
| USA               | 35                 | 726.65                            | 6,327              |
| Total             | 1,221              | 31,688.62                         | 194,832            |

Source: own construction based on CzechInvest, 2019

The advantage of investment incentives in the Czech Republic is that they take into account both MNCs and SMEs. Current setting of investment incentives is still trying to reduce the unemployment rate, more precisely a macroeconomic problem that the Czech Republic had been facing for many years.

However, at present, the value of this macroeconomic indicator is reaching its historical low – according to Eurostat, the general unemployment rate in the Czech Republic fell to 2.1% in December 2018 (the EU average at that time was 6.6%, with 70% of the EU countries below this average) and thus reached its lowest level since January 2000.

In the rating of EU countries based on the value of unemployment rate, Germany, Poland and Hungary achieved worse results than the Czech Republic. Therefore, there is a manipulation space for investment incentives modifications in favour of high-tech industries with higher levels of robotics and automation, where new jobs are created primarily for highly skilled workers (BusinessInfo, 2019).

However, such a modification of the investment incentives setting would put pressure on the disproportion between the offer of educational fields and the demand on the labour market, non-reflection of which would logically be negatively reflected in the macroeconomic indicators of the labour market. Therefore, it is clear that the adaptation and legislative changes related to the investment incentives concept should be reflected in the discussion with the Ministry of Education and other key players in the education system.

### 4 The system of investment incentives in the Slovak republic

The investment support in Slovakia is regulated by Act No. 57/2018, on regional investment aid. The beneficiary of this investment aid may be a natural or legal person established for the purpose of doing business that has its registered office

or place of business in the Slovak Republic and is registered in a trade or business register. Through investment incentives granting, the Slovak government is trying to attract significant investment and create hundreds of new jobs mainly in less developed regions.

According to the law, investment incentives in Slovakia have the following forms:

- subsidies for the acquisition of tangible and intangible assets,
- income tax discount,
- contribution to newly created jobs,
- transfer of immovable property or its lease at a price below its actual value (or the value being set by an expert opinion).

The permissible intensity of public support in three Slovakian regions is set at 25% of eligible costs and in four regions at 35%. Like Prague in the Czech Republic, in the case of Slovakia, the Bratislava Region is completely excluded from investment aid.

Moreover, also in the case of Slovakia, there are some supported areas defined, into which the investor has to invest in order to be allowed to apply for public support. These areas include projects aimed at industrial production, technology centres, a combination of both of those, or at business service centres.

In the case of investment in industrial production, the minimum amount of investment, the share of new technological equipment in the total costs, and the number of newly created jobs, which depends on the unemployment rate in a particular district, are set.

Also, as in the case in the Czech Republic, it is possible to observe favouring of SMEs – if the applicant for an investment incentive is an SME, the minimum value of the investment and the requirement for a minimum number of newly created jobs are halved.

If the investment goes to technology centres, there is again a requirement for a minimum amount of investment (starting at EUR 100,000) and the creation of a minimum number of new jobs (ranging from 10 to 50). In addition, there is a requirement for a minimum multiple of wages to be paid to new employees. The same conditions must be met when investing in business service centres.

## 5 The system of investment incentives in Hungary

Also in Hungary, investors can use a wide range of public support forms. By means of investment incentives, the Hungarian government seeks, in particular, to streamline business processes and the competitiveness of SMEs. For this purpose, it provides returnable and non-returnable investment incentives designed to facilitate and attract FDI to Hungary, as well as to boost the reinvestment of domestic businesses. The main types of investment incentives include the following:

- tax incentives,
- cash subsidies (from EU funds or from the Hungarian government),
- low-interest loans,
- obtaining land for free or at a discounted price.

The advantage of income tax relief can be used for a period of 13 years starting after the completion of the investment, and for each tax period can reach the amount of up to 80% of the payable corporate tax (state aid ceilings in each region need to be taken into account). An application for this investment incentive must be submitted to the Ministry of Finance before the investment starts, but if the investment exceeds EUR 100 million, its support is subject to the government as well.

Also in the case of Hungary, obtaining the tax incentive requires meeting one of the following two conditions:

- min. value of the investment is EUR 11.3 million and min. 50 new jobs are created,
- min. value of the investment is EUR 3.7 million and min. 25 new jobs are created – only in the so-called “preferred regions”.

The second of the above-mentioned conditions is almost identical to the one that concerns the investment in production in the case of the Czech Republic, where it is necessary to create min. 20 new jobs and the value of the investments must be at least CZK 100 million (i.e. a little less than EUR 4 million).

In addition, the Hungarian government provides an individual cash subsidy (VIP cash subsidy) based on the value of assets or the number of newly created jobs. The conditions vary depending on the region to which the investment is oriented and can be divided into the following three groups:

- min. value of the investment is EUR 5 million and min. 50 new jobs are created (valid in three most preferred regions),
- min. value of the investment is EUR 10 million and min. 50 new jobs are created (valid in 12 preferred regions),
- min. value of the investment is EUR 20 million and min. 100 new jobs are created (valid in four developed regions).

In order to make Hungary one of the European innovation centres, another form of public support focused on technology-intensive investments was introduced in 2017. Basically, it is a VIP cash subsidy whose role is to support capacity expansion and the introduction of technologically demanding investments without the commitment of the investor to create new jobs.

Companies that currently employ at least 250 people in Hungary and are considering a technology-intensive investment can gain a VIP cash grant of 3/4 of the maximum state aid provided in the region. However, in this case the investor must invest at least EUR 20 million and achieve at least a 30% increase in sales and/or labour costs within four years.

Another form of Hungarian public support is focused on supporting projects within the research and development (R&D) activities of large enterprises and the establishment of R&D centres. The maximum state aid intensity in this case is 25% of the value of the investment across the whole country, which must reach at least the amount of EUR 3 million (invested in R&D projects) over a period of 1 – 3 years during which the number of R&D staff must increase at least by 25 employees. Eligible costs may include the cost of the realized project, staff costs, depreciation, or material costs.

The maximum intensity of public support is more markedly different from the previous two V4 countries, ranging from 20 to 50% of eligible costs (20, 25, 35 and 50%). However, also in the case of Hungary, there are some areas which are excluded from the investment support – some parts of central Hungary as they are closest to the European average in terms of economic development.

Moreover, the level of public support decreases as the value of the investment increases, i.e. an investment worth over EUR 50 million. For an investment between EUR 50 million and EUR 100 million, only half of the above-mentioned rates can be applied; an investment exceeding EUR 100 million is subject to about one-third of the rates.

The basic objective of the above-mentioned and described forms of investment incentives is to transform the Hungarian economy from “made in Hungary” to “invented in Hungary”.

## 6 The system of investment incentives in Poland

Poland, the last of the Visegrád Group countries, also provides investors with various forms of public support. The Act of 10 May 2018, on support for new investments, amends the instruments of tax relief that are newly available across the whole Polish territory for companies making new investments, regardless of whether it is a public or private one. For the purposes of state aid, the term "new investment" means the following:

- setting up a new business,
- increasing the production potential of an existing business,
- diversification of production by introducing new products,
- fundamental change in the existing production process of an existing enterprise.

In Poland, as well as in other V4 countries with which Poland is competing for new investment projects, income tax relief is clearly the most widespread and among investors the most popular tool used in the field of public support. Reducing the tax burden is thus a clear incentive to attract new investment projects to the Polish territory.

The maximum tax relief in Poland ranges from 10 to 50% of eligible costs, while 50% tax relief can be achieved in four regions in the east/northeast of Poland, 25% relief in three regions, and 35% relief in the rest.

As in the case of the Czech Republic and Slovakia, also in Poland SMEs are favoured – in their case the tax advantage may be increased by 10 or 20%. On the contrary, unlike the remaining three V4 countries, the tax relief also applies to investments made in Warsaw, the capital city, and its surroundings (10%).

Eligible costs may include the acquisition cost of land, costs associated with the purchase, development or upgrading of fixed assets (e.g. machinery), costs related to the acquisition of intangible assets (e.g. software, licenses, etc.), or two-year labour costs of newly recruited employees.

The period for which the above-mentioned tax relief is granted depends on the intensity of public support in the area and is the same for all companies regardless of their economic activity or size. It is a predetermined period of time ranging from 10 to 15 years. Tax reliefs of 10, 20 and 25% are usually granted for 10 years, 35% reliefs for 12 years and 50% reliefs for 15 years.

The investment incentive applicant's investment must meet and is evaluated according to certain quantitative and qualitative criteria. In Poland, there is no requirement to create a certain minimum number of new jobs, but the quantitative criterion is the minimum amount of investment that is derived from the unemployment rate in the area (the higher the unemployment rate is, the lower the required minimum of invested costs are) and the size of the enterprise. The following table 2 gives a detailed description of the quantitative criteria.

Table 2: Polish investment incentives – quantitative criteria

| Unemployment rate<br>in the district | Minimum amount of eligible costs<br>(in million PLN) |                   |  |                  |
|--------------------------------------|--|-------------------|--|------------------|
|                                      | Large enterprise                                     | Medium enterprise | Small enterprise<br>R&D projects<br>Business services sector | Micro enterprise |
| < 60% of national average            | 100  | 20                | 5  | 2                |
| 60 – 100%                            | 80   | 16                | 4  | 1.6              |

|            |    |    |      |     |
|------------|----|----|------|-----|
| 100 – 130% | 60 | 12 | 3    | 1.2 |
| 130 – 160% | 40 | 8  | 2    | 0.8 |
| 160 – 200% | 20 | 4  | 1    | 0.4 |
| 200 – 250% | 15 | 3  | 0.75 | 0.3 |
| > 250%     | 10 | 2  | 0.5  | 0.2 |

Source: own construction based on Polish Investment & Trade Agency, 2019

Among the monitored qualitative criteria, which may favour the investor, it is possible to mention e.g. performing own activities in the area of R&D, doing business in a certain sector (e.g. quality food, hygiene products, medicines and medical products, telecommunication and information services, means of transport, etc.), export orientation (achieving a certain volume of export), employee care programmes, etc.

## 7 Conclusion

It can be stated from the performed comparative analysis that public support is quite similar in all four Visegrád Group countries. This conclusion stems from the geographical position (foreign investors perceive the V4 countries as a single market, or the region of Central Europe) and also from a common historical development. However, it is clear that Hungary and Poland are more focused on support of R&D (compared to the other two Visegrád Group countries), and therefore have a comparative advantage in this area. At present, investment incentives in the Czech Republic are primarily focused on creating new jobs.

However, it is questionable whether this setting can be considered effective due to current labour market development, where the unemployment rate is well below its natural level and the Czech Republic is the country with the lowest unemployment rate within the EU.

Compared to the other three Visegrád Group countries, the Czech Republic is losing in the area of support for newly created jobs, as Slovakia, Poland and Hungary offer the possibility to include part-time and seasonal workers (in full-time equivalents) to some extent (KMPG, 2018).

All the economies are trying to reduce regional disparities by earmarking the most economically successful regions out of regional granting, or favouring peripheral regions. Thus, investment incentives help to disperse investment activities and it is a matter of further research to determine whether this dispersion reduces or does not reduce the final benefits of localised investments (e.g. reducing spillover effects due to the higher technology gap between domestic and investment incentives recipients, which can be expected in peripheral areas).

Regarding the investment incentives system, the Czech Republic, the Slovak Republic and the Republic of Poland favour conditions for SMEs. Hungary focuses on attracting strong foreign investors in the field of innovations. In general, Hungary has the most distinctive investment incentives system, including, in addition to fiscal and material support, a form of returnable low-interest loans. Hungary's effort to transform its economy from "made in Hungary" to "invented in Hungary" is enhanced by a special form of investment incentives – VIP cash subsidy without a commitment of the investor to create new jobs.

Similarly, Poland has no investment conditions associated with min. number of new jobs created, and it is also the economy which provides the longest tax holidays (15 years) to the investors. Hungary provides the second longest ones (13 years).

Slovakia, in addition to the standard investment conditions such as the size of the investment and the nature of the industry, resorted to the requirement for the min. amount (multiple) of wages. This step creates constant pressure to build new technology centres, where companies can offer above-standard financial rewards to their employees (in contrast to production

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#### Primary Paper Section: A

#### Secondary Paper Section: AH

# QUASI-ELECTORAL CONSTRUCTIONS OF THE RUSSIAN COMPETITIVE MODEL FOR ELECTING THE HEAD OF THE MUNICIPALITY AND THE PROBLEM OF CIVIC ACTIVISM IN EXERCISING THE RIGHT TO PARTICIPATE IN LOCAL SELF-GOVERNMENT

<sup>a</sup>ANDREY G. KUZMIN, <sup>b</sup>SERGEY G. SOLOVEV, <sup>c</sup>ELENA V. TITOVA

*South-Ural State University (National Research University),  
Lenina Avenue, 76, 454080, Chelyabinsk, Russia  
email: "kuzminag@susu.ru"*

**Abstract:** The article is devoted to understanding the content of the quasi-election design of the competitive model for electing the Head of the municipality and its impact on civic engagement in the realization of the right to participate in local self-government. The laws of the constituent entities of the Russian Federation, adopted on the basis of federal laws, give preference to the model of formation of local governments that abolishes direct elections of heads of municipalities and thereby reduce their responsibility to the population and implore the constitutional right of residents of the municipal formation to directly participate in elections. The nature of relations between public authorities at various levels is changing: local governments are built into the vertical of state power and become agents of this local authority. Depriving the heads of municipalities of direct legitimacy obtained directly from voters reduces their political influence and reduces the crucial role of the population to zero. The key theoretical and practical problems associated with the substantive and procedural aspects of the existing mechanism for filling the position of the head of the municipality as a result of being elected by the representative body of the municipality from among the candidates represented by the competition commission based on the results of competition are considered. A set of legal measures aimed at improving the content of the analyzed legal structure is proposed.

**Keywords:** election of the Head of the municipality, competitive election model, competition commission, civic activity, participation in local community affairs.

## 1 Introduction

The Russian national model of local self-government is designed and at the same time includes both elements of a single all-Russian system of democracy and belonging to the institutions of civil society, as well as a number of elements of government with its characteristic centralization regime. The variety of meanings is reflected not only in the theory of municipal law, but also in the actual difference in legal statuses of different types of municipalities, different models of the system of local governments depending on the type of municipal formation and the establishment of dependence of the type of electoral system on the type of municipal formation. The consequence of attributing a territory to a specific type of municipality (urban or rural) are very significant differences in the extent of constitutional and other rights and freedoms of citizens, as well as levels of social and legal activity and self-organization of the population. Local self-government is a deeply democratic institution that encourages citizens to participate in the management of the affairs of society, gives the population the right to independently decide issues of local importance, which largely ensures their political rights.

In accordance with the amendments made by the Federal Law of February 3, 2015 N 8-FZ "On Amendments to Articles 32 and 33 of the Federal Law" On Basic Guarantees of Electoral Rights and the Right to Participate in the Referendum of Citizens of the Russian Federation "and the Federal Law" On general principles of the organization of local self-government in the Russian Federation", the Russian municipal legislation has received a fundamentally new way of filling the position of the head of the municipal entity as a result of being elected by the representative body of the municipal entity from among the candidates submitted by the competition committee on the results of the competition.

Noting the novelty of this method, it should be noted that a similar legal procedure was previously used in relation to the head of the local administration. However, due to the fact that the construction of the legal status of the head of the municipality, as the highest official of the municipality with its own authority to resolve local issues, is much more complicated, the application of the competitive procedure for the head of the municipality causes an ambiguous reaction in the environment

both theorists of municipal law and practitioners of local self-government [1-6].

The main reason for the controversial opinions regarding the analyzed legal structure is the presence in its content of a wide range of legal problems, primarily generated by the extraordinary legal nature of the procedure introduced for the competitive election of the head of the municipality, combining in its content both competitive and elective principles. Taking into account the above, as well as the fact that over the past three years of practical application of this legal structure in various municipalities of Russia, contradictory practices have been accumulated that require their own scientific understanding and systems analysis, a detailed examination of the problematic aspects of the legal procedure for the election of the head of the municipality is of undoubted scientific interest. Of concern is the problem of actual mechanisms for the implementation of citizens' voting rights, which are significantly different from the ideology of free elections, which provides additional material for assessing the phenomena under consideration.

## 2 Methods

Based on the analysis of the elaboration of the theoretical platform and the experience of the practical application of the legal construction of electing the head of the municipality according to the results of the competition, an attempt has been made using dialectical, logical, historical, formal-legal, comparative-legal methods of scientific cognition legal aspects. Based on the identified problematic issues, as well as the needs of municipal practice, it is proposed to suggest ways to improve the legal construction of the election of the head of the municipality based on the results of the competition, contributing to the improvement of its functioning.

## 3 Results

Turning to the consideration of the problematic aspects of the legal construction of the election of the head of a municipality by the local representative body from among the candidates submitted by the competition commission based on the results of the competition, first of all, one should start with the fact that the clear terminological apparatus used to construct any legal construction represents the basis for its subsequent trouble-free application.

However, for the description of this legal construction in paragraph 5 of Part 2 of Art. 36 of the Federal Law N 131-FZ, it was not the term "appointment to a post" that was used for more than ten years to refer to a largely identical substitution procedure based on the results of a competition for the position of head of a local administration, but a combination of two different industry terms was used:

- 1) the term "election", which assumes the filling of a post as a result of elections using the appropriate electoral procedures regulated by electoral legislation;
- 2) the term "competition", which traditionally involves filling a position as a result of a selection made by an authorized body on the basis of established criteria, using the procedures regulated by labor legislation.

At the same time, the analyzed competitive procedure of "electing" the head of the municipality essentially implies the selection of candidates based on the assessment of professional competences, presentation of additional qualification requirements to these persons (special education, special work experience...), which is not consistent with the general requirements established in respect of candidates for the position of head of the municipality, as an elected official. In this regard, the Supreme Court of the Russian Federation naturally indicated

that the legal status of the head of the municipality is one regardless of the method of his election; therefore, the requirements for candidates for the named electoral office must be the same [7].

To eliminate this contradiction in Art. 36 of the Federal Law N 131-FZ stipulates that a citizen may be registered as a candidate for the position of the head of the municipality who, on the day of the competition, does not have in accordance with Federal Law No. 67-FZ of June 12, 2002 "On Basic Guarantees of Electoral Rights and Rights to participate in the referendum of citizens of the Russian Federation" restrictions on passive suffrage for election as an elected official of local self-government. Further, in the text of this article, the legislator used streamlined language, suggesting that the requirements for vocational education and (or) professional knowledge and skills can be stipulated by the conditions of the competition and are preferable for the head of the municipal entity to exercise authority to resolve issues of local importance. In accordance with this provision, the provisions on holding a competition for filling the position of the Head of a municipality issued at the municipal level fix various lists of documents required for applicants to submit to the position of head of the municipality, which consolidate the above requirements to the respective candidates.

Obviously, such an approach of the legislator formally removes the problem associated with the various requirements for candidates for the position of head of the municipality (depending on the established method of electing the head or the requirements of the competition regulations of a particular municipality). However, in essence, this systemic problem has both remained and remains, since the competition commissions in selecting candidates took into account and will first take into account the presence of professional competencies of candidates for the position of head of the municipality and their compliance with established additional qualification requirements, since it is obvious that existing requirements of the electoral legislation imposed on the head of the municipality do not provide the level of professionalism required for effective leadership municipality in modern conditions. Moreover, in the conditions of economic instability, getting an unprepared person to the post of head of a municipality can lead to serious problems in the functioning of both the municipal economy system and the system of municipal bodies and officials.

Also, it is necessary to point out the fact that if we proceed from the principle of autonomy of local self-government within its authority, enshrined in Art. 12 of the Constitution of the Russian Federation, the competitive selection for the position of the head of the municipality, as part of the procedure for electing the highest official of the municipality, should be considered the prerogative of the local community, which naturally raises the question of the legality of the normative consolidation of art. 36 of the Federal Law N 131-FZ of the obligation to involve representatives of state authorities in the competition commissions.

In addition, many questions raise the status, order of formation and functioning of the competition commission, as a body formed to conduct a commission examination of the professional qualities of applicants, evaluate their abilities to successfully solve the problems of a specific territory and give an opinion on the compliance of the identified qualities of applicants to the qualities required to occupy a position heads of the municipality.

In this case, it should be noted that the federal legislator in Art. 36 of the Federal Law N 131-FZ defined only general requirements for the formation of a competition commission, giving the municipalities more freedom in rule-making in this matter. Based on the analysis of the relevant Provisions adopted in the municipalities, it should be stated that at the municipal level, the legal consolidation of the status of the analyzed tender commission is extremely superficial, which naturally raises many questions:

- 1) The current practice of appealing the decisions of the competition commissions [8] naturally arises the question of in what capacity should the competition commission be viewed: as a municipal body, assuming the existence of a relevant Regulation and Regulation, or as a specialized commission created by a local representative body?
- 2) The presence of different approaches to determining the composition of the competition commission implies the question of whether representatives of the municipal community (public chambers, honorary citizens, councils of veterans...) should be represented on the composition of the competition commission (and in what proportion)?
- 3) The lack of clear approaches to the recruitment of the competition commission determines the question of whether it is advisable to include in the composition of the competition committee municipal employees who later will be subordinate to the elected Head of the municipality?
- 4) Different approaches to the mechanism of the competitive procedure (testing, interviewing, etc.), as well as the vagueness of the criteria for evaluating candidates [9] implies raising the question of the feasibility of developing a single mechanism for the competitive procedure and uniform criteria for evaluating applicants for the position of the Head of the municipality, objectively taking into account the management potential of the candidates, their professional experience and the elaboration of the submitted municipal development programs.
- 5) The lack of certainty of the procedural aspects of the implementation of the competitive selection for the position of Head of the municipality implies raising the question of the appropriateness of the normative enshrining of the obligation to observe the principle of transparency in the implementation of reports, answers to questions and other presentations of relevant applicants.
- 6) The existing practice of turning competitive selection into a "decorative" procedure, which involves the use of a competitive commission as a filter for "dropping out" strong candidates that are not inconsistent with regional authorities and conducting pre-agreed candidates, raises questions about the feasibility of developing regulatory mechanisms that exclude the practice of unjustified restriction of the choice of deputies of the local representative body as a result of the presentation of the only candidate [10] or special prepared pairs of candidates, including a "strong" candidate, and it is certainly a weak competitor.
- 7) The diverse practice of municipalities in the matter of determining the list of documents necessary for submitting to the competition commission candidates for the position of Head of the municipality raises questions about the need for unification of the list.

Natural concerns are also caused by the fact that the existing competitive system for electing the head of the municipality not only prevents citizens from directly electing the mayor, but also excludes the possibility of the population initiating the voting procedure for its recall, as it is under such an election procedure (which cannot be put into one row with a classic electoral order of filling a specified position) cannot be considered as an elected Head of a municipality subject to the application of an existing the Review procedures [11].

#### 4 Discussion

Having cited the above problems arising from the established municipal practice of holding a competitive procedure for filling the position of the head of a municipal entity as a result of being elected by the representative body of the municipal entity from among the candidates submitted by the competition commission based on the results of the competition, attention should be paid to the fact that the analyzed procedure changes the existing ideas about traditional ways to fill positions in the system of local self-government (election, appointed No, competition).

The election of the Head of the municipality according to the results of the competition cannot be assessed as an election in

the traditional sense. However, this legal procedure also cannot be attributed to the classical competition. In this regard, the legal construction of the election of the Head of the municipality based on the results of the competition requires serious attention from both the scientific community and the federal legislator, which should manifest itself in more detailed regulation of its content at the federal level.

If we proceed from the problems identified in the law enforcement practice of municipalities in the preparation of this publication, then we can suggest the following ways to improve the content of the analyzed legal framework:

First, in order to exclude the conjuncture approach to determining the composition of the competition commission, we should move towards consolidating the status of the competition commission in the municipal legislation, formed to evaluate candidates for the position of head of the municipality, not as a temporary commission formed by the local representative body, but as an independent public expert body acting on the basis of its own position and formed for a long time (4-5 years).

Secondly, in order to unify the accumulated municipal practice for the selection of candidates for the position of Head of the municipality, it makes sense to add to Art. 36 of the Federal Law N 131-FZ, the norms fixing a single list of documents submitted to the competition committee, the principles of the competitive selection procedure, as well as clearly defined criteria for evaluating applicants for the position of Head of the municipality.

Thirdly, in order to reduce the number of conflict situations, to unify the main procedural aspects of the work of the competition commission, it is advisable to fix in the Federal Law N 131-FZ the basic principles of organizing the work of the competition commission for selecting candidates for the position of the Head of the municipal entity, in particular, assuming that the position of chairman is mandatory commission by the representative of the municipality, the publicity of all procedures (including the announcement of the candidates' programs and answers to the questions of the commission's members), as well as the opportunity to participate in the discussion of the programs of candidates of all registered candidates for the position of Head of the municipality.

Fourthly, in order to optimize the composition of the competition commission for the selection of candidates for the position of the Head of the municipality in relation to the function performed, it is proposed to be fixed in Federal Law N 131-FL:

- mandatory quota of members of the public,
- a ban on the inclusion of municipal employees and other employees of local governments,
- optional inclusion of representatives of regional state authorities.

Fifthly, in order to ensure the proper implementation of the passive electoral right of registered candidates for the position of the Head of the municipality, it makes sense to stipulate in the Federal Law N 131-FZ the obligation of the competition commission to select candidates for the position of the Head of the municipality to submit to the representative body of the municipality to candidates for the position of the head of the municipality of all candidates registered with the competition commission with the application in conclusions on the compliance of each candidate with the established requirements for vocational education and / or professional knowledge and skills.

## 5 Conclusion

Summing up the study, it should be noted that the municipal elections as a form of direct democracy, through the vote of residents, allow the head of the municipality to acquire the highest legitimacy and trust of the population. The offensive spread of the rejection of direct elections harbors the threat of

devaluation of the idea of public participation in the affairs of society and the state.

At present, the legal structure of filling the position of the head of the municipality as a result of being elected by the representative body of the municipality from among the candidates submitted by the competition commission according to the results of the competition raises many questions, both substantive and formally legal. Obviously, it is the result of the efforts of the legislator, who tried, while preserving democratic approaches to the nature of the Head of the municipality, to integrate it more firmly into a single vertical of the Russian public executive.

It is indisputable that the municipal scientific community is not at all pleased with the fact that this embedding, as usual, was carried out without a corresponding preliminary broad scientific discussion and analysis (which, incidentally, is not exclusively Russian practice) [12, 13]. In this regard, the direction of development of research on the considered issue is predicted both in the analysis of the actual and legal validity of such embedding, and in the direction of creating additional legal structures that improve the content of the procedure for the competitive election of the head of the municipality and correctly enter it into the existing system of Russian municipal law.

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**Primary Paper Section: A.**

**Secondary Paper Section: AD, AG, AP**

# SUBJECTIVE WELL-BEING OF STUDENTS ATTENDING THE SPECIAL VOCATIONAL SCHOOL FOR CHILDREN WITH PHYSICAL DISABILITIES: GENDER DIFFERENCES

<sup>a</sup>PETRONELA LADECKÁ, <sup>b</sup>DAGMAR NEMČEK, <sup>c</sup>TERÉZIA HARČÁRIKOVÁ

<sup>a</sup>Comenius University, Faculty of Education, Department of Special Education, Račianska 59, 81334 Bratislava, Slovakia

<sup>b</sup>Comenius University, Faculty of Physical Education and Sports, Nábr. arm. gen. L. Svobodu 9, 814 69 Bratislava, Slovakia

<sup>c</sup>Comenius University, Faculty of Education, Department of Special Education, Račianska 59, 81334 Bratislava, Slovakia  
email: <sup>a</sup>petronela.ladecka@fedu.uniba.sk,

<sup>b</sup>dagmar.nemcek@uniba.sk, <sup>c</sup>terezia.harcarikova@fedu.uniba.sk

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**Abstract:** The aim of the paper is to identify the level of subjective well-being of students attending the Special vocational school for children with physical disabilities with consideration of their gender. The next aim is to determine the relationship between the dimensions of subjective well-being male and female students. The research group consists of 130 students attending the Special vocational school for children with Physical disabilities (19.03±2.57 years). Students were divided into groups based on the gender differences (87 male students, 43 female students). We used the standardized Berne questionnaire of subjective well-being (BSW-Y) to determine the level of positive and negative dimensions. We recorded gender differences in the sample of our students. Our findings indicate that there are some differences between the genders in consideration of their state of the subjective well-being. The data were statistically tested by the Kolmogorov-Smirnov test used to test the normality of distribution. The Mann Whitney-U test was used to determine differences between samples. Pearson correlation coefficient was used to determine the strength of the relationship between selected variables.

**Keywords:** well-being, high school students, physical disability, gender differences

## 1 Introduction

Subjective well-being (SWB) encompasses a major life goal and an important tool for optimal flourishing and functioning (Carr 2004; Fredrickson 2009; Gable and Haidt 2005). SWB is consisting of high positive affect (positive moods), lower negative affect (negative moods), and high satisfaction from life (Headey and Wearing 1991). Busseri et al. (2012) showed that these components are linked to positive psychological, physical and interpersonal functioning. Pacesova et al. (2018) and lot of other authors in their studies on SWB have examined adults, whereas research on adolescents' SWB is only in its infancy (Keyes 2006; Ronen and Seeman 2007). As for gender differences most of the studies on adolescent coping did not find differences between the genders regarding actual response to traumatic events or the kinds of coping mechanisms adolescents used (Coleman and Hagell 2007). Although developmental psychologists pinpoint the fact that both age and gender are essential components to be considered in examining the adolescents' well-being. The exact way in which these demographic factors affect adolescents is not yet sufficiently clear (Casey et al. 2011; Gogtay and Thompson 2010; Steinberg 2013). Gelhaar et al. (2007) found that older children may be more affected by exposure to emotional events than younger children. The aim of our current study was to analyze the level of general SWB, SWB dimensions and compare the SWB between boys and girls with physical disabilities

## 2 Research and research methods

The research sample consisted of 130 high school students with different physical disabilities (19.03±2.57 years) attending four years of study in Special vocational school for children with physical disabilities, Mokrohájska Street 1, Bratislava, Slovakia. Students were divided into groups based on the gender differences (n=87 male, n=43 female). This survey was conducted to determine the dimensions of the subjective well-being. We used the Berne Wellbeing questionnaire (BSW-Y) originally developed by Grob et al. (1991) and in the Slovakia standardized by Džuka (1995). The questionnaire structure consists of two main components of well-being, i.e. cognitive and emotional dimensions. The questionnaire is comprised of

five dimensions which measures individual areas relating to subjective well-being. The responses to the questions and items use 6-point Likert scales. The questions are plotted on five scales of dimensions (Džuka, 1995):

**Dimension 1 – positive attitude to life:** which measures the habitual aspect of subjective well-being, i.e. relatively stable personal characteristics. This scale, thus represents a cognitive evaluation of one own's life contentment. At the same time, it is considered the main component of the subjective well-being of the cognitive nature. A higher score means higher general life satisfaction.

**Dimension 2 – Problem awareness:** which measures the negative aspect of the current subjective feeling of the individual. A higher score means higher occurrence of problems.

**Dimension 3 – Physical problems and reactions:** which also measures the negative aspect of subjective feeling. Together with the previous dimension. These are not considered an integral part of the subjective well-being. Nonetheless they can be an important areas for experiencing physical problems

**Dimension 4 – Self-evaluation:** which maps self-esteem through expressing an attitude to oneself. Person who acquires a high score on this scale has a positive attitude to himself/herself i.e. has a positive self-evaluation.

**Dimension 5 – depressive mood:** which registers levels of negative content of the researched individual's mind and habitual ways of experiencing of that individual. Higher score shows that habitual psychological problems are typical for this person.

The data were statistically tested by the Kolmogorov-Smirnov test used to test the normality of distribution. The Mann Whitney-U test was used to determine differences between samples. Pearson correlation coefficient was used to determine the strength of the relationship between selected variables. Effect size (Ellis, 2010) was used to determine the magnitude of the difference between groups and was calculated by using the coefficient  $r$  ( $r \geq 0.5$  – strong relationship;  $r \geq 0.3-0.5$  – medium relationship;  $r \geq 0.1-0.3$ ).

Each participant or their legal representative was voluntary provided with written informed consent before participating in our research.

## 3 Results

Data evaluation looked at the relationship between respondent's average scores in the positive (Positive attitude to life and self-evaluation) and negative (Physical problems. Depressive mood and Problems awareness) dimensions of personal well-being into consideration of their gender.

The dimension of Positive attitude to life is made up of items which are determining the individual's view of their future, their life enjoyment, the life pleasure and the like.

Nonsignificant results were found in the dimension of positive attitude. The average score for male students was 4.22±1.05 points, while female students scored 4.18±1.03 points. The difference between the average scores for the sample is 0.04 points in favor of male students. These differences were non-significant.

The groups' results in the negative dimensions of personal wellbeing were also analyzed. The Problem awareness dimension includes items on students' concerns about people around them, their own interpersonal relationships, their work, their health, their aging, their partner and their finances. There was found a higher average score among female students

(2.78±1.22 points) than among male students (2.24±1.03 points). The difference between the two groups' average results is 0.54 points, which is significant at the 5 % level ( $U=1402$ ;  $p=0.02$ ;  $r=0.23$ ). The dimension for Physical problems includes items related to somatic problems such as levels of pain, fatigue, loss of appetite, presence of illness, dizziness or heart palpitations. In this dimension female students had a higher average score (2.07±0.69 points). The average score for the group of male students was 1.82±0.67 points. The difference between the two groups' average results is 0.25 points, which was statistically significant at the 5 % level ( $U=1477$ ;  $p=0.05$ ;  $r=0.18$ ).

In the Dimension of self-evaluation were reached following results. In this dimension male students achieved a higher average score (4.34±1.24 points) with comparison with female students (3.93±1.44 points). Those differences of 0.41 points were not statistically significant.

Table 1. Gender differences of SWB dimensions

| Dimension of wellbeing | Gender | Mean±SD   | Median±SD | Mann-Whitney U | p-value |
|------------------------|--------|-----------|-----------|----------------|---------|
| Positive attitude      | boy    | 4.22±1.05 | 4.33±1.09 | 1855.00        | 0.94    |
|                        | girl   | 4.18±1.03 | 4.17±1.06 |                |         |
| Awareness of problems  | boy    | 2.24±1.03 | 2.00±1.07 | 1402.00        | 0.02*   |
|                        | girl   | 2.78±1.22 | 2.86±1.48 |                |         |
| Physical problems      | boy    | 1.82±0.67 | 1.75±0.46 | 1477.00        | 0.05*   |
|                        | girl   | 2.07±0.69 | 2.00±0.47 |                |         |
| Self-evaluation        | boy    | 4.34±1.24 | 4.67±1.54 | 1557.50        | 0.12    |
|                        | girl   | 3.93±1.44 | 3.67±2.06 |                |         |
| Depressive mood        | boy    | 2.57±1.06 | 2.75±1.11 | 1683.00        | 0.35    |
|                        | girl   | 2.43±1.14 | 2.25±1.30 |                |         |

Legend: \*  $p \leq 0.05$ ; \*\*  $p \leq 0.01$

Furthermore we analyzed the relationship between the SWB dimensions in relation to gender of participating students with physical disabilities. Among male students there was a negative correlation between scores for the positive attitude and awareness of problems (1 % statistically significant), physical problems (5 % statistically significant), self-evaluation and depressive mood (both 1% statistically significant). Another negative correlation was found in scores of physical problems

The Dimension of Depressive mood is made up of items on activity levels, interest in other people, general interests and the like. Male students had higher scores (2.57±1.06 points) in comparison of female students (2.43±1.14 points). The difference was 0.14 points. This difference was non-statistically significant (Table 1).

and positive attitude (5% statistically significant). A negative correlation was also between depressive mood and positive attitude, self-evaluation (1% statistically significant). A positive correlation at the 1% significance level was found between scores in the dimension of self-evaluation and positive attitude. There is also a significant positive correlation between depressive mood and physical problems (1% of significance level) in Table 2.

Table 2. Relationship between SWB dimensions of male students

|                       | Positive attitude | Awareness of problems | Physical problems | Self-evaluation | Depressive mood |
|-----------------------|-------------------|-----------------------|-------------------|-----------------|-----------------|
| Positive attitude     | 1                 | -0.28**               | -0.27*            | 0.60**          | -0.48**         |
|                       |                   | 0.01                  | 0.01              | 0.00            | 0.00            |
| Awareness of problems | -0.28**           | 1                     | 0.44**            | -0.23*          | 0.38**          |
|                       | 0.01              |                       | 0.00              | 0.03            | 0.00            |
| Physical problems     | -0.27*            | 0.44**                | 1                 | -0.20           | 0.33**          |
|                       | 0.01              | 0.00                  |                   | 0.07            | 0.00            |
| Self-evaluation       | 0.60**            | -0.23*                | -0.20             | 1               | -0.30**         |
|                       | 0.00              | 0.03                  | 0.07              |                 | 0.01            |
| Depressive mood       | -0.48**           | 0.38**                | 0.33**            | -0.30**         | 1               |
|                       | 0.00              | 0.00                  | 0.00              | 0.01            |                 |

Legend: \*  $p \leq 0.05$ ; \*\*  $p \leq 0.01$

In the sample of female students, there were several significant relationships between the dimensions. A positive correlation was found between self-evaluation and positive attitude (1% significance level). A significant positive correlation was found between scores of depressive mood and awareness of problems, physical problems (5% significance level). Another positive correlation was found between dimensions of physical problems and awareness of problem at 1% of the significance level (Table 3).

#### 4 Discussion and conclusion

Carried out research probe allowed us to monitor the status of SWB among the tested group of students. Analysis of research data indicated several important facts. We can assume significant gender differences in several dimensions relating to SWB. There was significantly higher occurrence of problems and higher negative aspect of subjective feeling in female students in

comparison with male students. We also observed statistically significant correlations between the dimension in male and female students. Our research also found a significant link between the level of Positive attitude and Self-evaluation, between Problems awareness and Physical problems in female students. In group of male students there were several significant results in relationship between measured dimensions of Problem awareness and Physical problems, between Positive attitude and Awareness of problems, Depressive mood and Self-evaluation and between the Depressive mood and Awareness of problems,

Monitoring of those areas of well-being could serve as a prediction for future statement of life attitude. Similar research should be done with consideration of different attributes and disabilities.

Table 3. Relationship between SWB dimensions of female students

|                       | Positive attitude | Awareness of problems | Physical problems | Self-evaluation | Depressive mood |
|-----------------------|-------------------|-----------------------|-------------------|-----------------|-----------------|
| Positive attitude     | 1                 | -0.06                 | 0.09              | 0.64**          | -0.30           |
|                       |                   | 0.72                  | 0.56              | 0.00            | 0.05            |
| Awareness of problems | -0.06             | 1                     | 0.55**            | -0.18           | 0.39*           |
|                       | 0.72              |                       | 0.00              | 0.24            | 0.01            |
| Physical problems     | 0.09              | 0.55**                | 1                 | -0.28           | 0.35*           |
|                       | 0.56              | 0.00                  |                   | 0.07            | 0.02            |
| Self-evaluation       | 0.64**            | -0.18                 | -0.28             | 1               | -0.23           |
|                       | 0.00              | 0.24                  | 0.07              |                 | 0.14            |
| Depressive mood       | -0.30             | 0.39*                 | 0.35*             | -0.23           | 1               |
|                       | 0.05              | 0.01                  | 0.02              | 0.14            |                 |

Legend: \*  $p \leq 0.05$ ; \*\*  $p \leq 0.01$

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#### Primary Paper Section: A

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# THE INFLUENCE OF MULTIETHNIC SOCIETY'S EDUCATIONAL AND CULTURAL COMPONENT IN THE SOUTH OF UKRAINE: HISTORICAL ASPECT

<sup>a</sup>LAPUNOVA V. A., <sup>b</sup>FEDOROVA O. V., <sup>c</sup>PRYLADYSHEVA L. M., <sup>d</sup>KANAROVA O. V., <sup>e</sup>SEVODNEVA K. O.

<sup>a-c</sup>Department of Pre-school Education and Social Work, Bogdan Khmelnytsky Melitopol State Pedagogical University, 72312, 20 Hetmanska Str., Melitopol, Zaporizhia Oblast, Ukraine  
email: <sup>a</sup>lapunova001@gmail.com,

<sup>b</sup>helenafedorova25@gmail.com, <sup>c</sup>pryladysheva\_lidiia@uker.net, <sup>d</sup>olga\_mdpu@ukr.net, <sup>e</sup>sevodneva11@gmail.com

**Abstract:** The relevance of the whole prejudice is summed up by the satural values of culture and living in the surrounding region of Ukraine as a warehouse part of the historical process. The Priazoviya, as one of the regions of Ukraine's population, is the basis of geological, geographical, historical, economic, encyclopedic vocabulary, the main warehouse of the population of the Azov region population, some of which are Ukrainians, Bulgarians, and others was revealed. The same goal was determined by the region's simple space and its specificity changed the form of the national holy society. The lord of voluntary and imaginative migrations of the people felt as if they were completely blessed, the culture and traditions on the territory were reunited. The powerful moved of human streams, the resettlement of different nationalities representative, formed the multicultural character of the Priazov region. The base of the whole region even far away in the great waters of the Dnieper Sea and the Sea of Azov – all the whole rivers did not empty the land of the whole region. Actions, as it were at the other half of XVIII – the cob of the XX century. In the South of Ukraine, they have seized the license for the fake development of the country. The most important aspect of the region development is given this research work. In this way, Ukraine, as a multicultural storehouse has a perspective for formulating a dialogue with other representatives through a prism of a perfect life.

**Keywords:** educational component, cultural component, multiethnic society, education, nationality, national school

## 1 Introduction

Any society cannot be perfect without intellectual and spiritual development, so the public education transformation is an extremely important step for the entire nation. The educational space always has a variety of different assets and experiences, which certainly have historical roots and are a legacy of previous historical times. The formation and development of schools in the territories of different regions (the area is 603 628 km<sup>2</sup>) and the diverse cultural and national composition of the Ukraine region significantly influenced the movement and further development of education in it. (1) The achievements of the most modern world successful countries, their experience in the field of education have led us to study along with world experience, domestic – Ukrainian.

The learning is aimed at studying and analyzing the educational experience of the past, the impact on it of different peoples' cultures, who inhabited Ukraine in the late XVIII – first half of the XIX centuries, and an assessment of the Ukrainian education traditions and pedagogical thought in general and in certain regions of the state in particular.

## 2 Materials and Methods

The research work is found on the local lore principle, which deals with the cultural approach, namely the study of educational and social processes and phenomena. The leading method of research is the method of pedagogical historiography, which makes it possible to analyze and summarize a considerable amount of factual material. The study attempts to systematize and structure the educational development in a particular region – Southern Ukraine. The research is based on regional and local archives.

## 3 Results and Discussion

It will be important for our research to turn attention to the main concepts. Let's turn to the definitions of the study. Thus, in the historiographical dictionary the following interpretation of the term "historiography" such as a) special historical discipline that studies the history of the development of historical knowledge, historical thought, historical science; 2) scientific discipline; 3) synonymous with historical works, historical literature in

general. (2) Within our research work, we consider historiography as a scientific method that performs the following functions: research into the development of historical knowledge, and historical science; study and analysis of the history of a particular region, spheres of human activity (subject historiography); studying the history of elaboration of certain scientific problems (problematic historiography) and identifying perspective directions for further historical and pedagogical research. From pedagogical studies, historiography deals with the definition of a range of scientific, archival, legislative materials on the development of Ukrainian education, analysis of its status and leading prerequisites for formation, coverage of Ukrainian national school development, consideration of pedagogical thoughts, ideas of theories and more.

According to N. Gupan, (3) historiography – "is a systematic analysis and generalization of a huge quantity of literature, published in a particular field of scientific knowledge, to illuminate the process of the development of science and appropriate methods of study of a certain, quite large in time, historical period."

The other view, historiography was very clearly expressed by V. Iconnikov in 1891. The scientist emphasized in the "Experience of Russian Historiography" that the subject of historiography is the constant critical study of literature and all sources, in their constant development. (4)

The pedagogical historiography, as noted by Ukrainian researcher L. Berezovskaya, (5) is a sphere of scientific knowledge that studies the development of historical and pedagogical science and its laws; pedagogical thought in a particular historical period. In the context of historical and pedagogical studies relating to particular regions of Ukraine, the researcher proposes to apply the conceptual construct "pedagogical regional historiography".

The modern state of education is in some ways related to the past and based on the critical use of historical experience in the evolution of educational content context. That is why scientists are trying to build a holistic history of pedagogical thought development, to comprehend its specific features and achievements, to bring into the circulation of new humanistic ideas, revealing the potential of many humanist educators, which are now overlooked by researchers. Research on the formation and development of education in Ukraine, the problem of the development of Ukrainian pedagogical thought in the second half of XIX – early XX century. Many Ukrainian scholars have devoted their works, including M. Galiv, (6) O. Dubasenyuk, M. Levkivsky, O. Mykhaylychenko, (7) G. Ponomarev, (8) I. Repko, (9) S. Rusakova, (10) and others.

The combination of historical heritage and modern achievements pedagogical science contributes to the complex reflection of the historical and pedagogical experience and outlines the prospects of its use in modern conditions. The events that took place in the second half of XIX – early XX century. In the south of Ukraine were of great importance for the further region's development, and had an impact on the formation of education throughout the country. From different provinces of Ukraine and Russia to the South were displaced state and landed peasants – Ukrainians and Russians, founded their settlement Greeks from the Crimea, appeared villages of Dukhobors. On the island of Khortytysia and Khortytysa tract, on the Molochna river, the land was given to the first foreign colonists – the Mennonites. The Germans were settled next to them. (11)

So, at the end of the XVIII century wealthy classes of Ukrainian society, understood the importance of providing a good education for their descendants. Boys were sent to boarding schools or gymnasiums, often trying to invite foreigners, for lack of money to the students who were taught the skills and basic

rules of arithmetic. The girls found it sufficient to learn to read and write, so education for them was not respected.

The children were sent to large cities of that time, such as Katerynoslav, Kharkiv or others for study. Thus, in 1770 a battalion school was opened in Alexander's Fortress, where soldiers' children from 7 to 15 years were trained. A special room was set aside for the students. Control of the students' knowledge, for whom a special program was created. There was included: to study the order of military service, military statutes, literacy, arithmetic, to learn the basics of drumming and playing the flute – was assigned to the commandant of the fortress. At the same time, 15–20 children attended school. The school existed until the early XIX century. (11)

On November 5, 1804, the charter of educational institutions was proclaimed, which completely changed the movement of education. Among the articles were those related to the Alexander region. (12)

The article 83 of this Statute stated that there should be at least one county school in each provincial and county town. It must be supervised by a ninth-grade warden unless he is a senior. Article 119 affirmed the need to have at least one parochial school in the parish of each town. Such a school was entrusted to a parish priest and one of the most honorable inhabitants of the city. The main purpose of the school was to prepare youth for county schools (if parents want further children's education) and to provide rural children with the necessary knowledge to increase their morale, to deprive them of prejudices that not only interfere with work but also contradict the faith. The article 120, enshrined the subjects taught in schools: singing, writing, the first acts of arithmetic, the main principles of the God law, reading with a book on rural household explanation. There must be at least one teacher to teach these subjects. Generally, schools should be located near churches, in the middle of a town or village, and maintained at the expense of parishioners, which was regulated following Articles 165 and 162, respectively. (13)

It is after these orders that the first significant changes in education begin to occur in the Zaporizhia region. The first schools, county schools (March 12, 1808, in Alexandrovsk), a parish school, a boarding house of noble girls are opened. At that time, 113 children were enrolled in these educational institutions. In the 1940s, perhaps for the first time in the Russian Empire, the landlord of Alexander County, D. Gnedin, opened in his estate a public school for serfs, which was the first step in the development of public education. (14)

One of the regions of Ukraine's educational space peculiarity, namely the Azov region, is largely due to the progressive activity of local governments – zemstvo. It began to be active from 1864–1866, active development was accompanied by the formation of a system of different nationalities' cultural and educational institutions. It was completely changed people's views on culture and education.

The historic era of the XIX – early XX centuries is characterized by a time of rapid change that has forever changed the educational and cultural space. The formation of the ethnic composition of the Azov Sea, the emergence of new traditional cultural features within it occurred in the conditions of a powerful movement of human flows associated with the resettlement of different peoples' representatives to these lands. (15)

Tatars, Indo-Iranians, Scythians, Sarmats, Khazars, Polovtsians, Huns, Slavs, Pechenegs influenced the formation of culture, the formation of education in southern Ukraine and directly shaped the multicultural character of the region. The location of this region between the large reservoirs of the Dnieper and the Azov Sea is very advantageous, so the land has never been empty. The nomadic tribes, the conquerors of the new lands, retained their own culture and traditions, which also influenced the formation of the educational and cultural movement. It is also known that each settlement had an elementary school, which was maintained

at the expense of the settlers, and was taught in their native language.

It is known that the outlook of the peoples who lived in the territory of Tavriya province was diverse, it combined the values of official religions, as well as pagan representations, mystical symbols, and rituals.

Czech immigrants came to the territory of the Northern Azov region from the Perekopsk area (Crimea). They left their land because of the land unsuitability, they received for cultivation and cultivation of grain. Thus, in the XIX century, the Czech colony Czechohrad (now Novgorodkivka) was founded on the territory of the region, founded by Bohemian settlers, where a school was built, in which children were taught Czech and Russian, mathematics and the law of God. Most of the population was Catholic or Lutheran (one of the oldest Protestant movements in Christianity). Today, both the Ukrainian and Czech languages are taught in the village.

Czech migrants quickly adopted the traditions of the local population. These were both religious traditions and secular holidays. In particular, Czechs have embraced wedding traditions, such as the bride's ransom. to preserve in the form of spiritual songs and national customs. But it was noted that the Czechs managed to preserve their indigenous traditions in the form of spiritual songs and national customs. (16)

Another important factor in the development of the education system on the territory of the region in the second half of the XX – beginning of the XX centuries was the establishment of Greek settlements located in the territory of Mariupol.

It consisted of 24 Greek colonies settlers who occupied more than a third of the entire county population. Later, once a small settlement, it became a city. The enjoyment of their ethnic privileges, such as the right to public and denominational self-government, aided the Greeks in social life and economic activity.

The Greek community was given some administrative, socio-economic and cultural isolation among other colonial settlements, which helped it to preserve its traditions both in culture and in education. However, the state reforms of the 1960s forced the Greeks into interethnic contacts – multi-ethnic pedagogy. O.A. Bondarchuk (17) development of education in the Zaporizhia region (end of XVII-XIX centuries).

It is also possible to distinguish the German Protestant socio-cultural space. He occupied the lands of the Northern Azov region, in particular in Berdyansk and Melitopol of the Tavria region. The settlers were characterized as punctual, industrious and religious. The peculiarity was that each settlement had its elementary school, where teaching was predominantly in German.

In the XVI-XVII centuries, first religious schools appear in the Melitopol region. It has influenced the development of the education and culture of the Azov and Melitopol counties in particular. The active activity of the Mennonites, a Protestant movement from Germany, allowed them to create the first private homes of study. Education in such institutions was quite expensive, so it could be afforded by some of it. The peculiarities of teaching religion in such institutions did not suit many, especially local authorities. (18)

As we said, at the Khortytsia island, on the Molochna river, the land was given to the first foreign colonists – the Mennonites. It was next to them settled the Germans. The Mennonites were mainly engaged in agriculture, animal husbandry, silkworms, owned small factories and workshops. The Mennonites gave special importance to the upbringing and education of children. They considered writing as essential to the individual's diverse development. These people have always been distinguished by hard work, social lifestyles, moral and ethical norms, which have already been instilled in children by a child.

It is a well-known fact that in 1881 a collection of spiritual special songs of the Mennonites was published. He numbered 834 hymns by 90 thematic categories, few of them are: the existence of God, the attributes of God and the Trinity; the spiritual categories of the Gospel (invitations, repentances, conversions, regenerations), general, the songs reflect the doctrinal foundations of the faith and practices of the church. Each hymn performed by the Mennonites had a metric explanation for the performance of its text. (19)

The high level of education of the Mennonites, and especially their compulsory study of singing, the children's participation in the choir, the presence of a choir in each educational institution – all these laid the foundation for the development of the choral culture of the Mennonites ethno-confessional community. (20)

Later, in the middle of the XIX century from Belorussian and Ukrainian provinces, 285 Jewish families were founded in Zaporizhia territory for the establishment of trade and crafts. From the very first days, Jews began to actively spread their doctrine, and most importantly, they found a connection with the local population. The Jews were well-educated, transferring their experience in housekeeping and domestic life, gradually involving the locals not only in their material but also in their spiritual culture. Also, of great help to ordinary peasants was the fact that heresies helped them to study writing and reading. Jewish parents, in principle, did not send their children to attend church and parish schools. The Jews, at their own expense, created their primary educational institutions. The first such school was opened in Orikhov.

The Karaimes also made a great contribution to culture and education. They completely changed the culture of the Azov Sea after the mass migration from Crimea during and after the Crimean War of 1853–1856. They were distinguished by the brightness of their traditions and identity. From birth, Karaimes have taught their children to respect their neighbors, always to listen to their thoughts. However, the 70s of the XIX century completely changed the life of the Karaimes, rumors spread about the introduction of conscription and Russification. This was the reason why Karaimes were resettled in Canada and the United States.

Representatives of the Bulgarian ethnic group from Southern Bessarabia and Northwestern Bulgaria settled in the Primorye Lands. There were 47 colonies. And it was founded by the

settlers, which were in Berdyansk and Melitopol counties. Another specific feature of the Bulgarian population is that they settled in small groups between the villages of the Azov. At the time of the resettlement, the Bulgarians were quite wealthy and hard-working. They had a high level of agricultural culture, were well versed in animal husbandry, had folk crafts (forging, carpentry, weaving). However, the Bulgarians also brought with them their national Orthodox school, which had ancient traditions and contributed to the preservation of the Bulgarian language and culture. The Bulgarians have always valued education and promoted their children. They spared no money for opening schools and kept schools in their colonies decently. The indigenous population of the Bulgarians is still preserved in the Azov region, and they still honor their roots and place the learning process high. (21)

The Bulgarian communities living in the Melitopol district managed to establish primary education with the assistance of county zemstv. And at the beginning of the XX century in seven Bulgarian villages, there were two or more (Inzivka had three) zemsky schools. According to 1897, on average 852 boys and 114 girls attended schools in the school (in different colonies these numbers ranged from 50% to 100% among boys and from 9% to 60% among girls). At the same time, the average in Berdyansk district was 60% among boys and 27% among girls, respectively. Thus, Bulgarian children were more fully enrolled in primary education than in the whole country.

The pupils had the opportunity to study many different subjects that were to help them in later life. Among such subjects were: God's law, pedagogy, didactics, Russian language, literature, mathematics, hygiene.

Another feature of the gymnasium was that the subjects taught were both theoretical and practical, which is still relevant in modern education today. (22)

It is interesting that in 1865, 47 Bulgarian colonies were created in Berdyansk and Melitopol counties with a population of 34,251,000 people. Therefore, they took care of their education at once and in their new homeland, and they put their original educational traditions into schools that were opened in the region. The Bulgarians still try to keep their traditions in their schools today.

All of the above is supported by the Census of 1897 (Table 1).

Table 1. National Population of Northern Azov Rural (According to the Census of 1897)

| Nationality | Berdyansk district | Melitopol district | Mariupol district | The southern part of Alexanderivsky district |
|-------------|--------------------|--------------------|-------------------|--|
| Ukrainians  | 40,87              | 50,3               | 30,2              | 67,7   |
| Russians    | 27,2               | 28,4               | 24,6              | 24,3   |
| Germans     | 9,8                | 8,6                | 10,8              | 4,9  |
| Bulgarians  | 14,9               | 1,2                | 0,6               | -  |
| Greeks      | 0,6                | 0,5                | 28,8              | 0,2  |
| Jews        | 6,03               | 9,7                | 4,9               | 2,3  |
| Moldavians  | 0,2                | 0,3                | -                 | 0,1  |
| Poles       | 0,1                | 0,8                | -                 | 0,2  |
| Others      | 0,3                | 0,2                | 0,1               | 0,3  |

So, we can conclude that the national composition of the population was distributed as follows: Ukrainians – 116064 people (40,87%); Russians – 77,243 people (27,2%); Germans – 27971 people (9,8%); Bulgarians – 34,197 people (14,9%); Jews – 17130 people (6,03%); Greeks – 1574 people (0,6%), the rest of the population were Moldovans, Poles, Czechs, Armenians, Gypsies and other nationalities (only 0,6%).

Staying in close association with Ukrainians, Russians, Germans, Bulgarians, Greeks, Poles, Jews, Turks, Tatars, Karaites and other peoples in the Azov region has forever changed the ethnic portrait of the national school. The needs of that time required the renewal and accelerated development of schools, general and special education in the region. (23)

The North Azov region borders are intersecting those territories of modern Zaporizhia and Donetsk regions, where in the second half of the XIX and early XX centuries there was a compact residence of different people. It is here that from ancient times there were large-scale historical events, displacement of peoples, which influenced the entire historical process of culture and education.

The peculiarity of the region is that different cultures were born, evolved and disappeared here, affecting the historical fate of the region. The ethnic composition of the population testifies to the "color" of the region in socio-economic and cultural spheres. An example is the development of the Greek community of Mariupol. The Greek rural communities were reliable language

carriers and guards of the ethnic features, spiritual and material cultures, morality, and outlook.

As a result of active colonization processes, many foreign settlements were formed, which, according to the words of the prominent teacher M. Korf, were "morally prevailed" in the region. The settlements brought with them the peculiarities of their national cultures with a mentality, which were in the aggregate of concepts, ideas, and images formed within the ethnocultural community, and through communication, processes remained in the people's minds. (22)

Northern Azov region of the late XIX – early XX centuries was the territory, the multi-ethnic population resided in the area as a result of forced migration voluntary. This is what has affected the socio-cultural space in the region.

Northern Azov region of the late XIX - early XX centuries was the territory in which the multi-ethnic population resided in the area as a result of forced migration voluntary. This is what has affected the socio-cultural space in the region.

There were two socio-cultural spaces in the North Azov region – Orthodox and Protestant. Orthodox included Ukrainian-Russian, Bulgarian, Greek, Protestant-German. Socio-cultural spaces had a significant impact on economic processes as well as directly on social and pedagogical, namely the development of school education.

The constant migration flows of Ukrainians and Russians from other provinces formed the Azov region ethnic composition. If we take, the specific data of the All-Russian Census of 1897, which showed that within Alexander, Berdyansk and Melitopol counties lived: 39255 people who were born in Ukraine, 34092 – European part of modern Russia.

Also, I would like to point out that today Ukraine supports all initiatives to restore the traditions and culture of the region's indigenous people. Unions of different communities are happy to hold traditional holidays that don't allow one to forget one's own culture and history, and which are integral to building the future.

#### 4 Conclusion

The research work of the North Azov Sea district, as an independent and integral historical and geographical area, which differed from other specifics of geo-geographical, historical, political and cultural development is relevant and interesting for the education of today.

The processes of origin and development of regional education systems in Ukraine were conditioned by the socio-economic and political conditions of that time.

The southern region differs from other regions of Ukraine by the specific features of the cultural and educational society. Particular features were due to geopolitical and ethnocultural traits that were the result of major migration processes. Multilingualism, a large number of peoples who have lived and still live in the territories of southern Ukraine, have forever changed the development of education in the region.

The educational process in the schools of southern Ukraine at the end of XIX – XX centuries had common features. It was aimed at the education of children in a moral and religious spirit, the development of the child's thinking, individual cultural color, which united different nationalities. During their studies in schools, they tried to follow their traditions and customs clearly, as cultural heritage was highly valued.

Peoples who lived close by and had differences in traditions tried to implement their principles in education and upbringing. National elementary schools in southern Ukraine at that time remained rational, religious, and taught children how to live and sustain in a harsh living space. And most importantly, all schools, different peoples were taught to live together in the cultural diversity of the people's southern region of Ukraine.

Also, the education of the south of Ukraine is small, and most importantly still has a pronounced regional and multicultural character. Thus, it can be said that in the second half of the XIX and early XX centuries a new type of education and culture was formed, which outlined the social and spiritual face of Ukrainian education. The diversity of peoples and their traditions, which have lived and still live on the lands of southern Ukraine, are still being felt in the region's education and culture today.

The above suggests the peculiarity of the educational space of the Southern region of Ukraine in the second half of the nineteenth century, which was determined by the synthesis of humane, subject-practical and multicultural pedagogy.

Religious: Orthodox - Ukrainians, Russians, Bulgarians, Greeks, as well as Protestant - Germans was a powerful unifying feature of education, including schools in the Southern Region, as well as some Jews and Muslims left behind, which undoubtedly had an impact on those who lived. in this territory.

The problems of the purpose and objectives of the region's education were driven by historical, economic, socio-political and national factors.

An adequate combination of classical heritage and modern achievements of pedagogical science contributes to historical and pedagogical experience comprehensive reflection and outlines the prospects of its use in the modern world.

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**Primary Paper Section: A**

**Secondary Paper Section: AB**

# ŠTEFAN KRČMÉRY AND HIS CONTRIBUTION TO ADULT EDUCATION AND ENLIGHTENMENT ACTIVITIES IN INTERWAR SLOVAKIA

\*MARTINA LENHARTOVÁ

Department of Andragogy, University of Presov in Presov,  
Faculty of Humanities and Natural Sciences, Ul. 17 novembra 1,  
Prešov, Slovakia  
Email: \*martina.lenhardtova@unipo.sk

The paper is a part of the research task VEGA no. 1/0303/17 "Adult Education in Slovakia in the Conditions of the Existence of Czechoslovakia (1918–1938)".

**Abstract:** Štefan Krčméry was a Slovak poet, literary historian and critic, publicist and translator. He served as a Secretary of *Matica slovenská* and renewed the publishing of *Slovenské pohľady*. Krčméry contributed to the improvement of *Matica slovenská*'s enlightening, cultural, educational, scientific, and literary activities through his organizational, editorial, scientific and literary endeavours. Štefan Krčméry was one of the signatories of Martin's Declaration adopted on 30 October 1918.

**Keywords:** Štefan Krčméry, biography, public enlightenment activities, Czechoslovak Republic.

## 1 Introduction

The establishment of the Czechoslovak Republic presented Slovaks with a challenging opportunity for their national and cultural advancement. Štefan Krčméry, Secretary of *Matica slovenská* and "a leading advocate of modern Slovak identity" (Vanovič, 2006, p. 66) brought a fresh note of optimism and a vision of the hopeful future. Known for his extensive knowledge, Krčméry was a man of extraordinary talents and an ardent advocate of the Slovak affairs (Krčméry, 1995).

## 2 Biography

Štefan Krčméry was born on 26 December 1892 in Mošovce. In 1896, the Krčméry family moved to Jasenová na Orave, where Krčméry also completed his primary education. He spent four junior years of his comprehensive secondary education in Banská Bystrica. From 1907 to 1911, Krčméry attended the Evangelical Lyceum in Bratislava. It was here where Krčméry had gradually built his circle of friends with whom he shared his enthusiasm for the culture of their own nation. He studied a lot and was interested in issues concerning literature and philosophy. Krčméry composed poetry and wrote down his verses in notebooks in both Slovak and Hungarian (Katuščák, 1979, p. 21). In 1911–1915, he studied at the Evangelical College. Upon the completion of his studies, Krčméry served as a chaplain in Krajné, later, in 1917, in Bratislava (Zelenková, 2006, p. 95).

From 1918 to 1919, he edited *Národné noviny* [The National Newspapers] in Martin (Bakoš, 1996, p. 169). He wrote editorials, formulated the principles defining the strategies of political, national, and cultural work, composed verses about freedom, and organized various other activities (Katuščák, 1979, p. 55). In 1919, Krčméry was appointed First Secretary of *Matica slovenská* and remained in the office until 1932. His editorial work for magazine *Včelka* [The Bee] in 1925–1927 was equally important (Holéniová, 1973, p. 50). From 1922 to 1932, Krčméry was a contributing editor-in-chief of *Slovenské pohľady* [The Slovak Views] (Bakoš, 1996, p. 169) as a literary critic, historian, glossarist, and publicist. He inspired several authors to engage in their own writing, among others Janko Alexy and Ján Hrušovský (Holéniová, 1973, p. 50). He worked for other magazines too, e.g. *Slovenský ochotník* [The Slovak Amateur Performer] (1925 – 1927), *Naše divadlo* [Our Theatres] (1928), *Knižnica slovenských pohľadov* [The Series of the Slovak Views] (12 volumes) (Zelenková, 2006, s. 97).

Krčméry was most productive from 1914 to 1922. For his writing endeavours, Krčméry sought inspiration in traditional Slovak patriotism, folk poetry and his own personal life. His debut collection entitled *Keď sa sloboda rodila* [When Freedom Was Born] was published in 1920. It was followed by

*Herbárium* [Herbarium] (1929), *Piesne a balady* [Songs and Ballads] (1930), *Oslobodenie* [Liberation] (1932), *Pozdrav odmlčaného básnika* [Greetings from the Silenced Poet] (1944) (Bakoš, 1996, p. 169). In *Matica slovenská*, Krčméry devoted his time and energy to literary history. His most important books about literary history include *Prehľad dejín slovenskej literatúry a vzdelanosti* [The Concise History of Slovak Literature and Culture] (1920), *Ludia a knihy* [People and Books] (1928), *Moyses a Kuzmány* [Moyses and Kuzmány] (1928, co-authored with Eugen Klementis), *Zo slovenskej hymnológie* [Slovak Hymnology] (1936), *Stopäťdesiat rokov slovenskej literatúry* [150 years of Slovak Literature] (1943) (Holéniová, 1973, p. 49). Krčméry translated from French, English, and Hungarian. The collection of his translations was published under the title *Z cudzích sádov* [From the Distant Orchards] (1944). He translated a selection of Slovak poetry into Hungarian under the title *Anthológia Szlovák Költökből* (1925) (Bakoš, 1996, p. 169). From the so-called *organizational books* we can name *Päť rokov Matice slovenskej* [Five Years of Matice slovenská] (1919 – 1923), *Tri roky Matice slovenskej* [Three Years of Matice slovenská] (1924 – 1926), *Rok Matice slovenskej* [One Year of Matice slovenská] (1927, 1928, 1930) (Zelenková, 2006, p. 97).

Štefan Krčméry was one of the most versatile figures of Slovak culture. He eagerly engaged in organizational and cultural activities and greatly influenced the future direction not only of *Matica slovenská*, but also of the Slovak culture as such. Krčméry ranks among the most prominent cultural-enlightenment workers. He wrote articles, gave lectures at conferences for librarians and enlightenment workers, organized theatre life, etc. (Bakoš, 1996, p. 169).

He was a member of the committee of *Muzeálna slovenská spoločnosť* [The Slovak Museum Society], *Spolok slovenských spisovateľov* [Slovak Writers Association], *Spolok slovenských umelcov* [Slovak Artists Association] and a deputy chairman of *Ústredie slovenských ochotníckych divadiel* [The Central Office of Slovak Amateur Theatres] (Zelenková, 2006, p. 97). Krčméry was an excellent chess player, great speaker with acting talents, a musician, and a painter (Holéniová, 1973, p. 53).

Krčméry travelled a lot. In 1920, the Ministry of Education provided him with a scholarship to support his study stay in France. In Paris, Krčméry gave lectures on Slovak literature at Institut d'Etudes Slaves and studied history of French literature at the Sorbonne University. He was also interested in the history of fine art. Krčméry spent some time in Geneva and in Provence. He visited Marseille, Nice, Monaco, Monte Carlo, Venice and Yugoslavia (Holéniová, 1973, pp. 47–48).

Krčméry lived for others. His personal engagement and never-ending care for the needs of the greater group from the various positions he held throughout his life: as the Secretary of *Matica slovenská*, the editor of *Národné noviny* [The National Newspaper], *Slovenský týždenník* [The Slovak Weekly], *Slovenské pohľady* [The Slovak Views], *Slovenský ochotník* [Slovak Amateur Performer], *Včelka* [The Bee], and *Roky Matice slovenskej* [The Years of Matice slovenská], the writer, literary critic and historian, art theorist (lectures, study stays, presentations of art values, popularisation of national literature, publishing, tension in Czech-Slovak relations, unresolved issues concerning politics, culture, literature and art, etc.) took its toll. As it soon became apparent, Krčméry's fountain of energy proved not to have been bottomless. Medical problems of various intensity became his everyday reality (Tatár, 2015, pp. 13 – 14).

Štefan Krčméry died on 15 February 1955 in Pezinok.

### 3 Štefan Krčméry for the nation

From the time Krčméry first came to Martin as an editor of *Národné noviny*, he showed a great interest in all issues concerning the Slovak nation. He helped prepare the first assembly of the restored *Matica slovenská*, and greatly contributed to shaping its profile in the 1920s and early 1930s (Eliáš, 1974, p. 118). Together with Miloš Vančo, Krčméry drafted the 1919 Statutes of *Matica slovenská*. On 15 February 1919, they published the Statutes in *Národné noviny*, following the ministerial ordinance no. 1 issued on 1 January 1919 on restoration of *Matica slovenská*'s activities (Holéniová, 1973, p. 43). From his position of the *Matica slovenská*'s Secretary, Krčméry basically managed the institution and was in charge of almost all of its varied activities (Eliáš, 1974, s. 118). With that said, we must not undermine the work of Škultéty as the administrator of *Matica slovenská* (Holéniová, 1973, p. 44).

The central principles of *Matica slovenská* formulated by Krčméry in his Statutes' proposal in 1919 were: *Matica slovenská* was to be a national cultural institution whose main role was to "unite all those who share the feeling of pride and love for the Slovak nation, so they could work together in order to improve the level of education among Slovaks and hence improve material wellbeing of the whole Slovak nation". *Matica slovenská* was to become an association of an apolitical nature and was to unite all Slovaks regardless of their religious beliefs or political preferences. In practice, however, the political indifference proved an unrealistic concept. Being a central cultural institution, *Matica slovenská* surely had some power to influence politics. Almost all political parties tried to sway *Matica slovenská* in their direction (Eliáš, 1974, p. 118).

As an editor of *Národné noviny*, Krčméry supported the political platform of *Slovenská národná strana* [Slovak National Party]. The level of cultural awareness determined his political opinions and preferences. He promoted united Czechoslovak Republic and ruled out any form of Slovak separatism. Krčméry advocated for Slovak language as an official language and supported Slavic mutuality. He rejected Czechoslovakism and engaged in long disputes with those who promoted it (mainly Pražák) and those who attacked Slovak language and culture, degraded Slovak standard language into a dialect, and in comparison to the Czech culture viewed the Slovak culture as provincial (Holéniová, 1973, pp. 44-45).

In his activities concerning popular education, Krčméry encouraged national education and raising national awareness. He came against the constant attacks of promoters of Czechoslovakism who called for the united Czechoslovak nation (Holéniová, 1973, p. 45).

Krčméry always pictured *Matica slovenská* as a leading Slovak institution instrumental in the development of science and cultural enlightenment. Its status of a central institution was to be secured not only because of *Matica*'s long tradition, but also because of its contribution to the cultural and scientific development (Holéniová 1973, p. 46). According to Krčméry, *Matica slovenská* was to become a nationwide enlightenment association with a program reaching to the furthest villages (Eliáš, 1974, p. 120). "*Matica slovenská ought to have members in every municipality, and branches in every small town and village. These branches should establish a public library and a choir in every municipality, organize theatres, prepare popular lectures aimed at the education of the masses and many more...on condition that the organization is branched out to the municipal level just like Slovenská národná rada [Slovak National Council] is*" (Krčméry, 1919, p. 1). "*In our educational activities we honour the memory of prominent figures from individual regions and always start from there. We strive to evoke a familiar feeling of love towards one's nation and state from the attachment one feels towards their home region*" (Krčméry, 1926, pp. 627 – 628).

Krčméry got personally involved in the enlightenment activities: 28 May 1922 he gave a presentation on the role of enlightenment

work at the meeting of the local branch of *Matica slovenská* in Nitra; 3 to 6 June 1922, he attended a congress of the enlightenment workers in Prešov, where he unveiled a commemorative plaque for Hviezdoslav on 4 June; 11 March 1923, he gave a presentation entitled "Compassion and enlightenment bring glorious future" at the assembly of the local branch of *Matica slovenská* in Kremnica; 19 October 1923, he participated in the meeting of the preparatory committee for social and cultural work in Slovakia held in Prague; 23 May 1926, he gave a lecture entitled "How can the popular education in Slovakia contribute to the correct understanding of statehood and to a substantive solution to Czech-Slovak relations?" at the congress of the enlightenment workers in Turčianske Teplice; 28 July 1926, he gave a presentation on enlightenment work in Slovakia at the international congress of librarians held in Prague (Katuščák, 1979).

When enlightenment activities are concerned, Krčméry based his approach on Štúr's understanding of popular education. "...a nation can create only when it recognizes the abilities and talents that are truly alive within that nation. Popular education's task is to liberate people, allow them to grow freely and prepare them in the self-conscious spirit for their life purpose" (Krčméry, 1926, p. 479). For Krčméry, the popular education also involved making culture accessible to everyone. He emphasised the role of Slovak amateur theatres recognizing that there had been a great interest in theatre among Slovaks. Krčméry acted like an intermediary between *Matica slovenská* and *Ústredie slovenského ochotníckeho divadelníctva* [The Central Office of Slovak Amateur Theatres]. He served as a deputy chairman there. From 1925, Krčméry was an editor of *Slovenský ochotník* [Slovak Amateur Performer], which was later renamed *Naše divadlo* [Our Theatre] (with Krčméry as the editor). Krčméry engaged in professional theatre too. From the establishment of the Slovak National Theatre he represented *Matica slovenská* in its administration and was responsible for extending the Slovak repertoire (Holéniová, 1973, p. 50).

In *Matica slovenská*, Krčméry was in charge of organizing various activities concerning collection, research, publishing, and promotion. He did so in cooperation with *Matica slovenská*'s scientific and local departments. He fostered collaboration with other cultural associations, encouraged the collection of verbal folk art, sought and educated literary talents and encouraged older writers. By doing all that, Krčméry helped to create favourable conditions for the development of literature and cultural life. For instance, Krčméry collaborated with Martin Kukučín, Vladimír Hurban Vladimírov, Ladislav Nádaši, Terézia Vansová, Sidónia Sakalová and others (Katuščák, 1979, p. 87).

For Štefan Krčméry, the establishment of Czechoslovakia was an opportunity for national and cultural advancement of Slovaks. He expressed his opinions and convictions in challenging times when it was no longer the existence or nonexistence of our nation that was at stake, but rather its dignified status in the context of a new union with the Czech nation (Tatár, 2015, p. 71). He was one of the leading figures of *Matica slovenská* fighting for the Slovak national and cultural identity against the pressure from the representatives of the Czechoslovak state who were trying to incorporate *Matica slovenská* into the frame of the state policy promoting united Czechoslovak nation and one common Czechoslovak culture (Vašš, 2013, s. 104). Štefan Krčméry emphasised *Matica slovenská*'s role in national emancipation as one of its primary activities and worked hard towards the development of Slovak language and culture – the two fundamental attributes of the Slovak nation.

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**Primary Paper Section: A**

**Secondary Paper Section: AB**

# GENERAL SOCIAL VALUES IN NATIONAL SECURITY STRATEGIES OF THE RUSSIAN FEDERATION AND GERMANY

<sup>a</sup>DMITRY A. LIPINSKY, <sup>b</sup>VICTORIA V. BOLGOVA,  
<sup>c</sup>ALEKSANDRA A. MUSATKINA, <sup>d</sup>ALEKSEY V.  
 AZARKHIN, <sup>e</sup>ALEKSANDRA P. KOROBOVA

<sup>a,c</sup>*Togliatti State University, 14 Belorusskaya Street, Togliatti,  
 445667, Russia*

<sup>b,d,e</sup>*Samara State University of Economics, 141 Sovetskoi Armii  
 Street, Samara, 443090, Russia*  
*email: "Dmitri8@yandex.ru"*

**Abstract:** The article offers the analysis of the national security strategies of Russia and Germany regarding the establishment of social values and humanism along with the foreign policy interests. The authors emphasize the interconnection of external and internal threats to national security due to the globalization processes. The common features of the two countries' national security systems include ensuring the rights of a man and a citizen and the existence of a social and humanistic orientation. The strategies differences are conditioned by different social and economic development of the two countries.

**Keywords:** human rights, strategy, national security, comparative analysis of strategies, global threats.

## 1 Introduction

Nowadays, the notion of "national security" is widely used in the international relations and scientific language, including the legal sciences. It is believed that the US President Theodore Roosevelt was the first to use it in the political context in the 1901 State of the Union Address that focused on solving social tasks and the fight against corruption and monopolies that were most urgent at that time due to the economic crisis in the USA [1]. The national security priorities are subject to change. They depend on specific historical and political environment that exists at a certain stage of the state's development. At the same time, it should be emphasized that national security has deep historical roots and is predetermined by the state's spiritual, economic, political and other traditions. A formal document such as a national security concept or strategy is a result of existing internal and external relations the state has.

National security concepts or strategies of any state are based on normative legal acts that contain the official opinions on the state's role in the world, its national values, interests, and threats. Among such documents are "National Security Strategy" (USA, Russia, Ukraine, etc.), "White Paper" (UK, Germany, France, China, Japan, etc.), National Security Policy (Canada, Turkey), "White Paper for International Security and Defense" (Italy), doctrines (for instance, the Military Doctrine of the Russian Federation), national security laws (Kazakhstan), and other legal acts. These acts are the basic ones as they define the basis for the state policy, principles and mechanisms for the realization of national security aims. A difference in the names of the normative documents does not change their essence – they all represent the conceptual basis that defines the state's activity as a whole as well as that of the government, ministries and departments responsible for ensuring national security. When working out and adopting normative legal acts aimed at developing the statements contained in the national security concept, lawmakers are guided by the directives set in these documents. National security concepts reflect how the state and community interact to achieve common goals.

A legal definition of national security was first given in the US law "The National Security Act of 1947" dated July 26, 1947 [2], that defined it as "the integration of domestic, foreign, and military policies relating to the national security so as to enable the military services and the other departments and agencies of the Government to cooperate more effectively in matters involving the national security". The notion of national security has changed many times since it was first introduced and it was filled with different content depending on political, economic, and social conditions. Along with that, representatives of different sciences work up the notion of "national security".

Thus, according to Walter Lippmann "A nation is secure to the extent to which it is not in danger of having to sacrifice core values if it wishes to avoid war, and is able, if challenged, to maintain them by victory in such a war" [3]. Politicians and state officials also make impact in the development of this notion. For instance, Harold Brown, former US Secretary of Defense, wrote that "national security is the ability to preserve the nation's physical integrity and territory; to maintain its economic relations with the rest of the world on reasonable terms; to preserve its nature, institution, and governance from disruption from outside; and to control its borders" [4]. Scientists suggest exploring national security through "threats" and "values" categories. In 1962, Arnold Wolfers pointed out that "security, in an objective sense, measures the absence of threats to acquired values, in a subjective sense, the absence of fear that such values will be attacked" [5]. Over the time, when analyzing the notion of "national security", the need to expand its content to preserve historical, religious, political, and cultural self-identity of the nation was brought in focus [6]. There was an awareness in the limited nature of the national security concept based only on external threats. It became clear that the focus on military security resulted in ignoring more dangerous threats [7].

Scientists emphasize that the notion of "national security" should be expanded integrally in several dimensions, in particular, political, economic, social, and ecological aspects. Another dimension to expand the concept of national security is the horizontal one "downwards from the state to individual citizens and another one – upwards from the state to the biosphere, i.e., in the vertical dimension. An integral dimension in national security is political responsibility for its provision" [8].

In the light of modern realities, legal security is seen as actual. It involves democratic values, providing the citizens with the right to participate actively in political processes as well as the national security management. Security includes both the protection of human rights and freedoms by the state and the legal possibilities the subjects have to defend the rights and freedoms provided to them [9, 10]. Experts in international law consider personal and humanitarian security to be the leading reference point in international relations [11].

Having carried out a short review of the notion of "national security", it is necessary to emphasize that the purpose of this research is comparison of the national security concepts not from the position of defense, politics or geopolitics but based on how cultural, historical and humanistic values are reflected in them. The choice for comparison of the national security strategies of the two countries: Germany and Russia, is not accidental and results from a number of reasons. Firstly, both states are from the Roman-German legal family. Secondly, being aware of its responsibility for starting the Second World War, Germany carries out the concept of antimilitary policy and is not a nuclear power, and Russia, which has nuclear weapons, carries out non-aggressive external politics, keeps to defensive doctrine and advocates non-proliferation of nuclear weapons in the world. Thirdly, the collective principle is strong both in Russian and German mentality that is bound to be reflected in the normative acts related to national security. Fourthly, the states are connected with each other by cultural and historical roots.

## 2 Methods

The article's design (idea) is to identify the general and distinguishing features of the national security systems of Russia and Germany in order to implement the positive experience of the two countries and other states into strategic program documents providing national security of the two countries as well as other countries striving to develop the humanitarian component of their strategies. To achieve the research purpose, a complex of scientific methods was used. The national security strategies were investigated with the help of the dialectical

method that enabled the authors to look at the strategies in their dynamics and development in interconnection with the existing social relations. Based on this principle, the similarities, differences and contradictions between Russian and German national security strategies were identified. It was also used to detect their nature and conditionality by cultural, historical, political and other values. The historical and historical legal method allowed to demonstrate the dynamics and changeability of the national security strategies, their dependence on a specific historical environment, social, economic, and political factors existing in a certain period of the state's development. The comparative legal method was widely used in the research to carry out the comparison and reveal similarities, differences, common and specific features that exist in the humanitarian and social orientation of the national security concepts of Russia and Germany. Furthermore, the comparison was made between different legal systems that are part of the common Roman-German legal family. The formal legal method was the basis for the exploration of the legal norms provided for in the strategies of the two states without their connection with politics, economy, and ideology. It was used to study the special features of the normative acts providing different aspects of the national security, their intersystem and external interrelation as well as the hierarchy of the sources of law that exist in the system.

### 3 Analysis

#### 3.1 Analysis and Discussion on the Main Social Values of the National Security Concept of Germany

Nowadays, Germany is one of the most developed European countries in political, democratic, social, and legal aspects. It can be stated that it holds leading positions in Europe. It is a state with a relatively low corruption level, developed democratic institute and civil society. The reunification of GDR and FRG influenced greatly on the modern national security concept. Main principles of national security were put forward by the Federal Ministry of Defense Volker Rühe in the Defense Policy Guidelines soon after the Berlin Wall's fall. He made emphasis on protection of Germany from external threats; partnership nuclear-weapon state, allied ties with NATO countries; equal-right partnership with European countries and USA; influence on democratic processes and international institutions in other countries [12]. Therefore, the analysis of the document shows that an accent is made on external policy without taking into account possible internal threats.

When Angela Merkel came to power, considerable changes in the national security strategy were introduced. Thus, a modern doctrine of the Germany's national security has been formed during her administration that is described in the White Paper on Security Policy and the Future of the Bundeswehr (hereafter referred to as White Paper). Its main priorities include preservation of rights and freedoms with democracy; wellbeing of citizens and their protection from dangers; ensuring sovereignty and integrity of Germany; prevention of regional crises and conflicts that can impose a threat to the country's security; repel terrorism; withstand global challenges; facilitate respect to human rights and strengthening international order on the basis of international law; facilitating the development of free trade. The White Paper emphasizes that national security is oriented towards a comprehensive approach and emphasizes that it is impossible to guarantee security only by means of military forces [13].

The White Paper is not the only document defining the national security strategy. It is pointed out that the federal government's concept called Civilian Crisis Prevention, Conflict Resolution and Peace Consolidation is adopted in the development of the White Paper. The role of Bundeswehr is not limited to the defense policy implementation; it involves also interagency facilitation, assistance in the elimination of the consequences of natural disasters, particularly the severe ones. The document notes the interrelation of external and internal threats. It is noteworthy that the White Paper speaks of the need to integrate

humanitarian instruments in resolving crises and ensuring national security.

The document analysis showed that despite its accent on the Bundeswehr's role in ensuring national security much attention is paid to such values as human rights and rights of citizens; ensuring rights and freedoms of a man and citizen; inviolability of democratic institutions. It indicates a certain change in the security strategy that is seen not only in the light of the state interests but also those of its citizens. To a large extent, the White Paper has a framework character and serves as a basis for other normative acts that regulate national security in particular the 2011 Defense Policy Guidelines, the Bundeswehr Concept and Cyber Security Strategy. The security ensuring system of the Federal Republic of Germany has a systemic character and is based on such notions as "interest", "values", "risk", and "threat". It is noteworthy that the protection of German citizens is of a top priority and is carried out only by military and physical protection but also by rights and freedoms of a man and citizen. Thus, it can be concluded that democratic values provided for in different normative legal acts are the main object of security.

The underlying principles of the security policy of the Federal Republic of Germany are made of "value-based ideas about democracy, the legal state, and human rights" [14]. The German Basic Law (Constitution) has a significant influence on the formation of the national security strategy and, in particular, the fact that it enshrines the human rights as the highest values, which serves as the basis for the national identity. Therefore, it is no accident that cybercrime, serious crimes and organized crime, violence and crime among youth are listed as threats on the website of the Ministry of the Interior of Germany [15].

National security is the aggregate of many systems where the division into internal and external threats is conditional. Therefore, the existing system of measures is simultaneously aimed at minimizing both internal and external threats. Germany recognizes the idea of the security indivisibility which essence is rather simple: internal security is provided by ensuring external security and external security is provided by the internal one.

As it was noted earlier, the German Basic Law has an impact on the formation of the national security concept. Thus, Article 20 says that "Mindful also of its responsibility towards future generations, the state shall protect the natural foundations of life and animals by legislation and, in accordance with law and justice, by executive and judicial actions, all within the framework of the constitutional order". Article 73 determines the exclusive competence of the Federation in respect to protection of the basis of the free democratic regime and land (safeguard of the Constitution). The German Basic states the domination of human rights, legal and social character of the state; Article 1 establishes inviolability of human dignity and the state's duty to respect and protect it.

Legal values enshrined in the Basic Law influence the government activity. Thus, the website of the German Ministry of Internal Affairs says, "social security is one of the most important objectives of the internal policy. It includes security of citizens from violence, crime and terrorism as well as the protection of the Constitution. People can develop freely personally and professionally only in a society without threat of crime".

The Basic Law for the German Federal Republic states that "every person shall have the right to free development of his personality insofar as he does not violate the rights of others or offend against the constitutional order or the moral law" (Article 2). Thus, the social character of national security is visible. At the same time, Germany focuses on participation of civil society institutions in its provision. The White Paper defines civil society as the state's partner in the implementation of national security, which conditions the development of public-private partnership through the implementation of different programs for the safeguard of law and order where citizens are one of the

subjects in the process aimed at ensuring their interests and the interests of the state.

By involving the civil society institutions in the provision of national security, the state does not waive responsibility from itself. Protection of rights and freedoms of the citizens are one of its top priorities and responsibilities. The Basic Law emphasizes that the Federation has exclusive legislative power with respect to defense and protection of the population. The Federation and the Länder cooperate concerning "protection of the free democratic basic order, existence and security of the Federation or of a Land (protection of the constitution)" (Article 2). It is noteworthy that the German legislator uses the "constitutional protection" term, which not all constitutions of developed countries contain.

In the meantime, the civil society institutions are actively involved in working out strategic decisions regarding national security. Researchers point out that "research and analytics non-governmental centers make up an integral element of the system for developing internal policy solutions in European countries. The main task for the experts specializing in this field is to inform state officials about strategic aspects of external policy development" [16]. Furthermore, according to the Basic Law of Germany human rights are directly applicable. The civil control has a multilevel character and is combined with intrastate control.

The classical forms of control involve the activity of censorship-based media, public organizations and unions, universities and their associations. At the same time, parliamentary control over the executive power is well established. The check and balance system acts to provide for national security. Let us consider some of them. According to the Basic Law, "the Bundestag and its committees may require the presence of any member of the Federal Government" (Article 43); a Parliamentary Commissioner for the Armed Forces is appointed in order to safeguard basic rights and assist the Bundestag in parliamentary oversight (Article 45-b); the Federal Chancellor is elected by the Bundestag without debate based on the proposal of the Federal President (Article 63); The Bundestag may express a lack of confidence in the Federal Chancellor by electing a successor by the majority of its members (Article 67).

The right to education and freedom and the freedom of scientific work are enshrined in the Basic Law of Germany, which causes attention to the social and cultural elements in the system of national security. Thus, the priority of education programs for the members of the military is emphasized in the White Paper. However, the social and cultural aspects of national security are not only in education of the military servants but also in the development of science, medicine, and high tech industries [17]. The fundamental principles of the Basic Law of Germany facilitate the development of science. In particular, it states the following: arts and sciences, research and teaching shall be free (Article 5); legislation that promotes research at the federal level (Article 74).

Globalization processes have intensified the flows of migrants, which resulted in the need for establishing a dialogue with them. It cannot be achieved only by means of government instruments, therefore, civil society institutes are involved in the realization of cultural and education programs with the Muslim world, which is gradually becoming a part of the German world. For example, a program called "Dialogue with the Muslim World" has been adopted at the federal level. It includes educational and cultural projects aimed at finding common universal values and mutual understanding [18].

Preservation of favorable environment is an important part of national security. Thus, Germany complies with international obligations resulting from the Kyoto Protocol on the reduction of the emission of greenhouse gases. The analysis of the website of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety of Germany shows that the country has adopted the concept for sustainable ecological development. It

points out that "sustainability is aimed at achieving equality between generations, social unity, enhancing the quality of life and developing international responsibility. In this respect, economic efficiency, protection of natural resources and social responsibility have to be combined" [19].

As preliminary conclusions on the national security strategy of the Federal Republic of Germany, the following should be noted. Firstly, the Basic Law of Germany where rights and freedoms are enshrined as the highest value had impact on its formation. The strategy itself is based not only on the White Paper but also on a number of other political and legal acts that develop it. Secondly, the underlying principles of the strategy are not limited to external policy interests but also include rights and freedoms of a man and citizen with humanistic values. The main objects of national security are citizens who are bearers of rights and freedoms; the state and its constitutional system. The implementation of the national security strategy is built based on the partnership between the state and the civil society, while there is a balance between the interests of the state and society in ensuring security. The third and fourth generations of human rights have had impact on the national security strategy and found reflection in a legal protection of ecology, security of information space as well as the establishment of a legal and cultural dialogue with migrants and their recognition as rightful members of society.

### 3.2 Analysis and Discussion on the Key Social Values of the National Security Strategy of Russia

Apart from the Constitution of the Russian Federation, there is a number of normative legal acts that determine national security: the Federal Law of the Russian Federation dated October 5, 2015 No. 285-FZ "On Security" [20]; Decree of the President of the Russian Federation dated December 31, 2015 No. 683 "On the Strategy of National Security of the Russian Federation"; "The Russian Federation's Concept of Public Safety" approved by the President of the Russian Federation on November 14, 2013 No. Pr-2685 [21]; "The Strategy for Countering Extremism in the Russian Federation until 2025" approved by the President of the Russian Federation on November 28, 2014 No. Pr-2753, etc. The above-mentioned legal acts complement each other and develop specific statements of the national security strategy. For instance, the strategy for countering extremism in the Russian Federation was developed in order to elaborate the statement of the Federal Law of the Russian Federation dated June 25, 2002 No. 114-FZ "On Counteracting Extremist Activities". Without going into all the details of the normative legal acts that regulate national security, it can be noted that they are systemic in nature. Thus, it can be concluded that there is a relatively independent branch of legislation aimed at regulating the activity on the provision of national security.

The official concept of national security is given in Paragraph 6 of the Decree of the President of the Russian Federation "On the National Security Strategy" where it is defined as: "the state of protection of an individual, society and the state from internal and external threats, which ensures the implementation of constitutional rights and freedoms of citizens of the Russian Federation (hereinafter citizens), decent quality and standard of living, sovereignty, independence, state and territorial integrity, sustainable social and economic development of the Russian Federation". As it follows from the legal definition of national security, its key notions include the "state of security"; "internal and external threats"; rights and freedoms of citizens of the Russian Federation as well as decent quality and standard of living are given top priority, which proves its social and humanistic orientation.

It should be stated that the legal definition of security has undergone significant changes. Thus, in the Law of the Russian Federation dated March 5, 1992 No. 2446-1 "On Security", which is no longer in force, it was defined as "the condition of safety of the vital interests of an individual, society and the state from internal and external threats". If we carry out a comparative analysis of two conceptual definitions, then the second one does

not contain an indication of “rights and freedoms” (it has been replaced by the idea of interests); decent quality and standard of living. However, the rights and freedoms, the material and spiritual values of society, the state, as well as the constitutional system together with sovereignty are the main items of security (paragraph 3 of Article 1).

In the doctrinal provisions of the “national security” concept at the initial stage of its formation it was regarded within the narrow scope. For example, A.V. Chumak states in his work that the constitutional order and protection from external threats are at the core of national security, and the rights of the individual are only mentioned in the context of the reasonable balance with the interests of societies and the state [22]. Other studies have noted that the concept of national security is unreasonably expanding through pointing out economic, environmental issues, crimes against the person, and public safety [23-25]. Indeed, a single crime against the life of a particular person will not affect the state of national security, as well as a single crime in the economic realm. Neither do occasional environmental crimes constitute threats to national security. However, there may be such a limit when their combination threatens national security as a whole, due to high mortality or reduced life expectancy of citizens of the state, who are the holders of the rights and freedoms. The decrease in the population of the country with a huge territory ultimately leads to a decrease in the possibilities for its control, and therefore creates potential threats to the territorial integrity and sovereignty of the state.

Thus, according to the Federal Service for National Statistics of the Russian Federation (Rosstat), the population of Russia in 2017 amounted to 146,793,744 people. During 2017, 515,890 people died, and 420,780 people were born. Thus, the population decline accounted for 95110 people. There is a large proportion of violent death and grievous bodily harm that can ultimately lead to death. Thus, in 2017, over 9,000 murders were committed and more than 24,000 crimes that inflicted grievous bodily harm; 20,161 people died as a result of road traffic accidents. More than 20,000 people committed suicide [26]. The number of deaths caused by alcohol was over forty-nine thousand. Every year about 70,000 people go missing in Russia, one third of whom cannot be found within a year or more. Criminologists logically assume that this one third is made up of latent murders. Thus, the official number of murders should be added to the part of the citizens missing. The average life expectancy among male population in 2017 was only 66 years.

According to official estimates of the Ministry of Internal Affairs of the Russian Federation, damage from corruption and economic crimes amounted to more than 177.5 billion rubles [27]. According to the experts, in 2015, 944 people per 1 million inhabitants died of air pollution from PM2.5 particles in Russia. In terms of sulfur dioxide emissions, Russia is one of the world “leaders”. For instance, it is by 16.6 times higher than in France and by 10.5 times more than in Germany. For carbon monoxide (CO), with a smaller number of vehicles this figure is by 5.3 times higher than in Germany. The statistics provided by the Office of the Prosecutor General of the Russian Federation on the reduction of environmental offenses does not mean their fewer occurrence, it only emphasizes their latent character. It is well known that the main factor provoking cancer is the unfavorable ecological situation. In 2017, 290,662 people died from malignant tumors in Russia (that is more than half of the number of dead). The cases of death from social diseases were registered, though in insignificant quantity. Thus, 21 deaths from syphilis and 341 cases of malnutrition were recorded.

Statistics, which reflect only a part of social reality, determine the formulation of additional tasks in the “Strategy of the National Security of the Russian Federation” (hereinafter referred to as the Strategy). As already indicated, for the purpose of this article we do not seek to analyze the whole Strategy but only focus on its social and humanistic aspects. Thus, paragraph 115 defines the main indicators for assessing the state of national security, including: “citizens’ satisfaction with the degree of protection of their constitutional rights and freedoms, personal

and property interests against criminal offense; life expectancy; a share of the territory of the Russian Federation that does not meet environmental standards”, etc. Only one of the ten indicators required for assessing the level of national security relates to defense as the indication of the share of modern weapons, military and special equipment.

The Strategy structure stands out particularly. Thus, in the fourth paragraph “National Security Protection”, one chapter focuses on military defense and the others – on national and social security; the improvement of the quality of life of the Russian Federation citizens; economic growth, science, technologies, and education; health care; culture; living systems ecology and sustainable nature management. The paragraph ends with the provision of strategic stability and equal strategic partnership.

Only two subsections in the Strategy are related to the external threats and military defense, the others focused on the internal social, humanitarian, ecological economic and other problems of national security. The emphasis on the internal threats is reflected in scientific research as well, where the economic [28], cultural [29, 30], social [31], legal security [32], security of a person, and other its varieties [33] started to be distinguished as the parts of national security. The Strategy of the national security of Russia and the scientific studies that expand this notion are the result of actual state of social relations, internal and external threats, and the level of the development of the state and the insufficient protection of basic rights and freedoms of a human and a citizen. The expansion of the notion “national security” is the regularity associated with the realities of present time and the existing challenges and threats. The regulatory legal acts developing the provisions of the Strategy highlight certain types of security as the variety of national security. Thus, “The Conception of Social Security in the RF” notes that it “is the system of views of the provision of social security as a part of national security of the Russian Federation”. The Presidential Edict dated June 9, 2010 No. 690 “On the approval of Strategy of the national counter-drugs policy of the Russian Federation until 2020” notes that “the appropriate provisions of the Strategy of national security are being developed and detailed in it in respect to the sphere of counter-drugs activity”. The Presidential Edict dated December 19, 2012 No. 166 “On the Strategy of state national policy of the Russian Federation until 2025” notes that it is developed “considering the documents of national strategic planning in the spheres of the provision of state (national) security”. The Presidential Edict dated December 5, 2016 No. 646 “On the approval of the Doctrine of Information Security of the Russian Federation” states that it “constitutes a system of official views on ensuring the national security of the Russian Federation in the sphere of information”. Analogous provisions can be seen in “The Doctrine of Food Security of the Russian Federation”, “Transport Strategy of the Russian Federation for the period until 2030” and other laws and regulations. National Anti-Corruption Strategy approved by the RF Presidential Decree dated April 13, 2010 call corruption as one of the consistent threats to the security of the Russian Federation.

Let us go back to the analysis of the main provisions of the Strategy. For example, in paragraph 5, it is noted that “the current Strategy is based on the symbiotic relationship and interdependence of national security of the Russian Federation and the social and economic development of the country”. The paragraph that covers national security highlights the protection of rights and freedoms of a human and a citizen. Whereby, criminal offenses against a person and property as well as the corruption are named among the threats to the state and public security. The Strategy contains the chapter covering the improvement of the quality of living of Russian citizens where the development of human potential, satisfaction of the material, social and spiritual needs of citizens and the decrease of social and income inequality are called the strategic objectives (Section 50).

In the Strategy, Russia recognizes the lag in the technological process that negatively influences the quality of life of Russian

citizens and, as a result, the fact that nowadays their rights and freedoms are more a declaration than a reality. Obviously, it is insufficient to declare human rights and freedoms in the RF Constitution, it is necessary to assure their actual effect, both the right to life and the good living standard itself. The number of suicides in Russia and recorded deaths by socially significant diseases (syphilis, malnutrition) is the registered indicator of the low quality of life. In the Strategy, the misappropriation of state funds is recognized as the threat to the quality of life and, by its nature, it is one of the varieties of corruption-related offense.

Russia declared the right to labor in the Constitution, but it is necessary to ensure fair payment for labor which would allow satisfying the demand of a person for personal development. Paragraph 52 of the Strategy confirms that "the improvement of the quality of life of citizens is guaranteed by means of food security, greater availability of comfortable housing, high-quality and safe goods and services, modern education and health protection, sports facilities, the creation of highly-effective working places, as well as favorable conditions for the improvement of social mobility, the quality of labor, its adequate remuneration, support of socially significant employment, the provision of accessibility of the facilities of social, engineering and transportation infrastructure for the disabled people and other groups of people with limited mobility, and adequate pension provision". From this provision, the social and humanistic orientation of the Strategy is obvious; the problem is in its actual securing.

The subsection of the strategy on economic growth is inextricably linked with the subsection on the quality of life, since it is difficult to ensure the latter without effective implementation of the economic function of the government. At its core, the budget revenue, the financial system stability, economic safety assurance as part of national security depend to a large extent on of the government's economic function fulfillment. Any law or government program that requires cash investment for its implementation turns into vain wishes without adequate financial support. In its turn, the economic development is impossible without science, technology and education, and that is what the next subsection of the Strategy is about. That is the way they are logically related: science, technology and education – economic growth – the quality of life. A significant shortcoming of the subsection addressed to science, technology and education, and especially regarding education, is that there is no indication of the threats preventing the development of this area, among which scientists and teachers of higher schools listed bureaucratization of the educational process, setting the quality of education equal to the quality of paperwork, introduction of formal indicators which defy common sense [34-36]. One should also mention the lack of consistency – on the one hand, the priority of cultural and spiritual values caused by historical traditions is proclaimed, and on the other hand, foreign standards are introduced in education by means of administrative methods.

Considering the low life expectancy of the population and the high mortality rate that leads to a decline in the population, the health care development and healthy lifestyle promotion in the Russian Federation is the most important focus in national security protection. The subsection specifically mentions the observance of the citizen's rights in the health protection field, and the provision of state guarantees related to these rights. By virtue of the massive spread of oncological and cardiovascular diseases, HIV infection, tuberculosis, drug and alcohol addiction, they are recognized as threats to national security since they lead to population decline.

State-organized society should be based on spiritual and moral values and civic consciousness, otherwise it is doomed to extinction. The Strategy reads that "traditional Russian spiritual and moral values include priority of moral values over material ones, protection of human life, human rights and freedoms, family, creative work, service to the Motherland, moral and ethical standards, humanism, mercy, justice, mutual assistance, collectivism, historical unity of all the Russians, and continuity

of the history of our country". Any state can be destroyed from inside by enforcing ideals alien to society. Therefore, the strategic goals of ensuring national security with regard to culture are the preservation and enhancement of traditional Russian moral values as the Russian identity basis of the Russian Federation nations and the single cultural space of the country. Blurring the distinction of identity in the long term leads to disappearance of statehood as such. In order to ensure national security, the processes of globalization should be carefully approached taking into account the existing moral traditions as much as possible. Thus, the normative church act "On the foundations of the social concept of the Russian Orthodox Church" states that it is necessary "to approach the process of legal and political internationalization with caution when pursuing policies related to the adoption of binding international agreements and the actions of international organizations, governments should assert the spiritual, cultural and other identity of countries and nations, and the legitimate interests of the state" [37].

A distinctive feature of the concept is the formal involvement of civil society institutions in its implementation. Thus, its general provisions point to the consolidation of the state with the institutions of civil society, and then following the logic of a normative act, civil society is defined as a partner in ensuring state and public security (paragraph 44); improving the quality of life (paragraph 53); economic growth (paragraph 62); health care (paragraph 74); ecology (paragraph 84); culture (paragraph 92). However, the problem is that a civil society is still being formed in Russia and the legal activity of citizens is at a rather low level.

#### 4 Conclusion

The analysis of laws and regulations stating the strategy of national security of Russia and Germany shows that they have such similar external features indicating the characteristics of a system as the integrity, structure hierarchy, plurality, interdependence, as well as the securing the priorities both at the level of laws and other regulations what is largely caused by the entry of these two countries into the Romano-Germanic legal family.

From the substantive and not external side, the strategies of national security of two countries have both common and distinctive features. Thus, both strategies have human rights, a person and the society come first; their humanistic social orientation is traced; the ensuring of third and fourth rights of generation of a human are reflected in the regulatory documents establishing national security; the existence of common collectivity features in the mentalities of both nations are reflected in the form of participation of the civil society institutions in the national security protection. Global challenges in the form of migration, eliminating the distinctions of cultural identity are traced in the strategies of two states as well. Despite Germany is a NATO country, its strategy in international relations is created on the participation in the international authorities in order to ensure inherent security. The national security of Germany as well as of Russia is based on the concept of the unity of the internal and external threats and is not built according to the principle of the internal security provision exclusively at the account of global and external security.

In the light of the uneven economic and social development, there are significant differences between the national security strategies of the Russian Federation and Germany. Thus, foreign policy and defense in the Russian Strategy are given only two articles, and the focus is on the internal threats which lead to the reduction in the population of the state, namely: low quality of life, insufficient health care, high mortality level, drug addiction, socially significant diseases, corruption, and crimes. Stagnation in technical progress and the resource-based economy are officially recognized.

The defined differences do not mean that the security strategy of Germany lacks an orientation towards sociocultural, economic

and civilian elements, health of the nation, and technical progress, as they are a logical consequence of the recognition of human rights and human dignity as the highest value, and therefore are reflected in the strategy in the aspect of their development and improvement. Meanwhile, the Russian national security strategy focuses more on raising the life quality indexes to world standards, and internal threats. That is all predetermined by the fact that human rights and freedoms have not yet found a straightforward statement in the form of the highest value in the minds and mentality of all population segments, when one indication of them in the Constitution or another law should be sufficient. This is largely explained by the initial stage of the formation of democratic institutions in Russia, as well as the peculiarities of legal consciousness of state and municipal officers who perceive and adopt easier the provisions stated in the subordinate regulatory legal acts adopted by the highest official of the state.

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#### Primary Paper Section: A

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## THE TAIWAN ISSUE IN THE MASS MEDIA OF THE FUJIAN PROVINCE

<sup>a</sup>FU LISHA, <sup>b</sup>OLGA SAFONOVA, <sup>c</sup>SERGEY NIKONOV,  
<sup>d</sup>NIKOLAI LABUSH, <sup>e</sup>YONGHUA ZHAO

<sup>a</sup>*Saint Petersburg State University, Universitetskaya Embankment, 7/9, 199034, Saint-Petersburg, Russia*

<sup>b</sup>*Saint Petersburg State University, Universitetskaya Embankment, 7/9, 199034, Saint-Petersburg, Russia*

<sup>c</sup>*Saint Petersburg State University, Universitetskaya Embankment, 7/9, 199034, Saint-Petersburg, Russia*

<sup>d</sup>*Saint Petersburg State University, Universitetskaya Embankment, 7/9, 199034, Saint-Petersburg, Russia*

<sup>e</sup>*Renmin University of China, Zhongguancun Avenue, 59, 100872, Beijing, China*

email: nikonovs@mail.ru

**Abstract:** The Chinese mass media differ from some countries in the global media development system. This is due to economic, cultural and socio-political factors. The Chinese mass media are currently experiencing major structural changes caused by new media trends. The emergence of new media has changed the news industry, primarily under the influence of external factors. The study of the socio-cultural dynamics of modern Chinese mass media is relevant and timely. The regional press in China, which includes the Taiwanese mass media, is of particular interest.

**Keywords:** China, Fujian province, mass media, Taiwan.

### 1 Introduction

Taiwan, with a population of about 23 million people, has been governed and has existed independently of the mainland since 1949. The People's Republic of China (PRC) considers the island one of its provinces, while the inhabitants of this territory consider themselves an autonomous unit with their own democratically elected government. The leading political circles on both sides of the strait have different views on the status of the island and the specifics of bilateral relations. Despite this, in recent years, there has been a significant improvement in relations in the financial sector and yet political tensions continue to cloud relations between China and Taiwan.

The issue of China's reunification with Taiwan remains one of the most difficult issues in regional relations. The origin of this problem dates back to the last months of the Chinese Civil War in 1949.

Since then, each government — the new Beijing and the old Taipei — has claimed to be the only legitimate Chinese government [1]. The Soviet Union recognized the PRC and the United States and its allies recognized the government of Chiang Kai-shek (Republic of China). The US and many other Western countries supported the position of the Republic of China and for a long time did not recognize the communist government of Beijing (PRC).

With the advent of President Nixon, the US administration changed its mind. The Republic of China lost its status as the Chinese representative to the United Nations in 1971.

In 1979, the US formalized official diplomatic relations with Beijing, reinforcing them with a joint communiqué telling that the US recognized the position of China. According to the communiqué, there was only one China and Taiwan was its component. During that period, US President Jimmy Carter terminated all relations with the Government of the Republic of China in Taiwan. However, soon the US Congress passed the Taiwan Relations Act, confirming the importance of informal relations with the island.

Thus, the issue of Taiwan's affiliation is relevant and to a large extent affects the stability of the entire region.

### 2 Methods

The sociological approach, clarifying the dependence of politics on society, the social conditionality of political phenomena,

including the impact on the political system of economic relations, ideology and culture. This method is presented in the theory of interest groups by A. Bentley.

The culturological approach, focused on identifying the dependence of political processes on political culture.

The functional approach, studying the relationship between political phenomena and the level of economic development.

The novelty of the study lies in the fact that the Chinese press has a significant influence on society and the Taiwan issue has political significance and is constant in the coverage of the central and regional press of the PRC.

The practical significance of the study lies in the fact that the conclusions that we obtained as a result of our research can be applied in the activities of journalists and used to study international relations.

To analyze Taiwan issues in the regional media in Fujian, we selected three of the most popular and famous publications: Fuzhou Wanbao, Fujian Ribao and Strait News.

To analyze the coverage of Taiwan issues using the example of the regional media in Fujian, we collected materials from the news sources cited above for the period from October 11, 2018 to March 11, 2019. For clarity and generalization of statistical data, we conducted a study in several directions: plot of coverage, content analysis and anonymous survey.

We believe that these aspects are the most significant ones and fully contribute to the display of a real picture regarding this issue.

The coverage theme was divided into several subtopics: "Politics", "Economics", "Sports" and "Society".

The "Politics" subtopic includes the coverage of political processes in China and beyond, international activities, diplomatic visits and statements by senior administration of the PRC.

The "Economy" subtopic includes foreign economic activities, investment, finance, etc.

The "Sports" subtopic covers various sports events.

The "Society" subtopic displays social news related to people in general and Chinese citizens in particular.

### 3 Results

Due to its geographical location, the PRC province of Fujian has become the frontier of mainland China propaganda in Taiwan. Since 2010, Fujian and Taiwan's media contacts have become more frequent.

In September 1987, a reporter for Independent Evening News in Taiwan violated a ban from Taiwan authorities and interviewed people in the mainland. The mainland authorities quickly responded positively and welcomed the Taiwanese press on the mainland for an interview.

For government officials, a special regulation was developed — "The Administrative Measures for the Interviews of Journalists from Taiwan on the Mainland". Since then, the Taiwan Affairs Administration of the PRC has made several changes to the rules for the Taiwanese journalists who wanted to take interviews on the mainland. In April 1993, the Taiwan Affairs Department of the State Council of the PRC amended the "Interview Regulations for Taiwanese Reporters on the Mainland", simplifying procedures for Taiwanese reporters coming to the mainland for interviews.

Naturally, the problem of the territorial affiliation of Taiwan attracts a lot of attention both in the regional and central mass media of mainland China. However, this topic and the features of its consecration in Fujian province have their unique features, which are caused by several factors.

The Fujian province is located on the coast of southeast China, 120 km from Taiwan. China and the island of Taiwan are separated by the Taiwan Strait.

Despite the political and ideological differences that today distinguish relations between the two sides of the Taiwan Strait, they are united by the common Chinese culture, ethnic unity and language.

In addition to cultural unity and a convenient geographical location, over the past decades, tendencies toward the integration of the inhabitants of the two shores of the Taiwan Strait in the economy have intensified [2].

At present, the processes of exchange and cooperation between the press groups of Taiwan and Fujian province are actively developing, softening rather complicated relations on both sides of the strait and presenting a model that cleverly avoiding intergovernmental disputes on sovereignty allows for constructive dialogue and exchange of experience. Nevertheless, it cannot be denied that, due to differences in intergovernmental systems, people on both sides of the strait face some pressing problems [3].

Thus, the problem of information exchange within the framework of press groups between Fujian and Taiwan is due to several reasons:

1. The interaction between them is often temporary and random.
2. The rules for performing various types of activity are not balanced, there are no restrictions on the work of the

Taiwanese media on the mainland, while those restrictions exist for the representatives of the PRC on the island.

3. The Chinese government has unilaterally assisted reporters from Taiwan arriving in Fujian.

Some Chinese sources indicate that while the mainstream Chinese media focus on objectivity and comprehensive information when writing articles or reporting on Taiwan, the latter, in turn, emphasize hyperbolizing events in China, thereby selectively reinforcing ideological differences and encroaching on the objectivity of the subject in question.

Active online media collaboration is also beneficial for integrating the media between Fujian and Taiwan. Today, when the audience needs to be diversified, traditional media, such as radio, television and newspapers, are inextricably linked to new media.

For the driving force behind technology and raising capital, Internet broadcasting, Internet television, and digital newspapers are becoming a new area of cooperation. The media activities of Fujian and Taiwan are aimed at solving the problem of joint broadcasting in multimedia.

The new media have become a new tool for news exchange in the media between Fujian and Taiwan. The audience of the new media mainly consists of young people. They can adapt to new realities. At the same time, young people are an object, at which the manipulative influence of the media is directed [4].

However, there are still some problems with the network connection between Fujian and Taiwan. For instance, radio, cinema and the Fujian television group, as well as its subsidiary sites, such as the South-East TV channel, do not have traditional access to Taiwan and cannot provide information for Taiwan users. Topics directly or indirectly affecting Taiwan and the issue of its affiliation in the regional media of Fujian province have the frequency indicated in Table 1.

Table 1. The number and proportion of references to Taiwan in the regional press of Fujian

|          | Fuzhou Wanbao | Fujian Ribao | Strait News | Total        |
|----------|---------------|--------------|-------------|--------------|
| Politics | 18<br>31.6%   | 28<br>40.6%  | 65<br>35.3% | 111<br>35.8% |
| Economy  | 24<br>42.1%   | 24<br>34.8%  | 54<br>29.3% | 102<br>35.4% |
| Sports   | 2<br>3.5%     | 5<br>7.2%    | 20<br>10.9% | 27<br>7.2%   |
| Society  | 13<br>22.8%   | 12<br>17.4%  | 45<br>24.5% | 60<br>21.6%  |
| Total    | 57<br>100%    | 69<br>100%   | 184<br>100% | 310<br>100%  |

Based on the table, we can conclude that the largest number of mentions of Taiwan in the regional press of Fujian belongs to the "Politics" sub-topic (the average of the total number of references in the media equals 35.4%). Such news is often related to the desire of mainland China to reunite with its "younger brother" as soon as possible and harsh criticism of the countries that interfere in the internal state security issues of the PRC.

The second highest percentage belongs to "Economy", with a 0.4% lower percentage of mention of Taiwan. Here the key role is played by Taiwan's desire to attract as much investment to the region as possible and to accelerate the peaceful reunification of China through economic integration across the bay.

In third place is "Society" with an average value of 21.6%. In the framework of this subtopic, representatives of the regional press of Fujian province touch upon the issues of identity, cultural and linguistic unity of the two countries.

"Sports" is in the last place with a total number of references of 27 and 7.2% of the total.

Although all three newspapers are regional, the Strait News is noticeably the leader in the total number of references to Taiwan, more than double that of Fuzhou Wanbao and Fujian Ribao. This is largely due to the orientation towards the people of Taiwan and the distribution of their products in this region.

Fuzhou Wanbao has the smallest number of mentions of Taiwan since this newspaper is more urban and has the smallest circulation of all three.

It is also worth paying attention to the fact that the number of references in the sub-topic "Economics" in the Fuzhou Wanbao and Fujian Ribao newspapers is the same and amounts to 24%, but in percentage terms, they vary significantly.

Table 2. The number and proportion of references to Taiwan issues or negative island coverage of the island's life in the regional press of Fujian Province

|          | Fuzhou Wanbao | Fujian Ribao | Strait News | Total       |
|----------|---------------|--------------|-------------|-------------|
| Politics | 9<br>40.1%    | 13<br>59%    | 12<br>50%   | 34<br>49.7% |
| Economy  | 7<br>31.8%    | 6<br>27.4%   | 4<br>16.7%  | 17<br>25.3% |
| Sports   | 1<br>5.4%     | 0<br>0%      | 2<br>8.3%   | 3<br>4.6%   |
| Society  | 5<br>22.7%    | 3<br>13.6%   | 6<br>25%    | 14<br>20.4% |
| Total    | 22<br>100%    | 22<br>100%   | 24<br>100%  | 68<br>100%  |

We identified the frequency of mentioning Taiwan issues or negatively portraying the island's life using the same set of topics (Table 2).

Based on the data of the table compiled by us, we can conclude that the largest number of references to the problems of Taiwan or the mention of the island in a negative way in the regional press of Fujian province belongs to the "Politics" subtopic. The average value from the total number of references equaled 49.7%, which is significantly higher compared to the previous table.

The "Economy" subtopic is in second place while and the third and fourth places were taken by "Society" and "Sports", respectively.

In view of a certain policy towards Taiwan, in the local press of the PRC, as well as the central one, Taiwan is often covered one-sidedly and exclusively from the standpoint of united China, emphasizing many times both the position of China on Taiwan's affiliation with the PRC and the position of countries that do not recognize Taiwan as a separate state.

For example, the media emphasizes Panama's attitude to Taiwan as one of the regions of the PRC, and the fact that President Tsai Ing-wen is referred to not as the president of a separate sovereign state, but as the head of the region subject to mainland China.

Tsai Ing-wen has never been a "president". We call her "the leader of the Taiwan region of the PRC. You should be aware of this". The article in "Fenghuang News" was written in the same style: "The Foreign Ministry corrected the words of a journalist who called Tsai Inven 'President'" [5].

An interview with the Taiwanese actor Wang Yaocin was also massively covered by a mainland television channel, during which the actor aggressively reacted to the presenter calling him "half-Chinese". His response, "Taiwan is also an integral part of the homeland" [6], received huge publicity, including in the regional media in Fujian. This statement of the actor was covered from a positive point of view.

In the same vein of admiration, all such statements by the Taiwanese about supporting the position of united China are highlighted. For example, a Taiwanese scientist reporting a fine by Taiwan of \$50,000 for her report on Taiwan's reunification with China provided good material to condemn Taiwan's desire for independence in the regional media. The Fujian Wanbao newspaper interviewed Lin Yushi, who spoke about the unfair attitude of the Taiwanese authorities towards citizens advocating unity with the PRC and poor life on the island: "I do not trust the authorities of Taiwan, because now Tsai Ing-wen is trying to stop the people of Taiwan from coming to the mainland".

There were also reports in the press about the incident, as a result of which, Taiwan refused to participate in the world mobile exhibition in Barcelona, as exhibition organizers refused to add Taiwan to the list of exhibitors under the name other than "Taiwan Province of China". The request by the Taiwanese authorities for a presentation under the name "Taiwan" was rejected with a reference to the official name used by the UN. An

article entitled "Taiwan Province of China" on the front page of the online version of the Strait News newspaper mocked Taiwan's stubbornness. The regional press did not ignore the updated statistics on the self-determination of the Taiwanese population.

Fuzhou Ribao in its article updated statistics for 2018, according to which, the proportion of the Taiwanese population, recognizing itself as part of China, had grown significantly over the past few years. The statistics are presented as expected:

"Given the development of the mainland, taking into account the interests of Taiwan and the peaceful development of the two sides of the strait, the Chinese identity of the Taiwanese people should have increased", — concludes the author at the end of the article [7].

The scandal during the Golden Horse Award Ceremony in Taiwan was widely covered in the Fujian media.

The Taiwanese director Fu Wei, who won the Best Director nomination, delivered a speech from the stage in support of the acceptance of Taiwan as an independent state by the world community. The Fuzhou Wanbao publication article sharply criticized the director's speech and the support of her speech by users of the Taiwanese Internet: "The network users expressed support because they had been brainwashed from an early age. For them, China has always been an image of backwardness and poverty, which they have often been told about since childhood, so they left the country" [7].

The topic of "wrong" propaganda to set the young generation against mainland China is reflected in some articles on Taiwan's education system. Strait News highlighted the reform of the history curriculum in schools with an article entitled "Taiwan Incorporated 'History of China' into 'History of East Asia'. What are the intentions of brainwashing students?". In addition to analyzing the reform itself, the article focuses on criticism of the reform by Taiwanese teachers themselves. Any political error or unfavorable forecast for the future development of Taiwan is analyzed by the regional media with particular attention. Let us mention several articles from Fuzhou Ribao as an example: "What future does Tsai Ing-wen promise to Taiwan?" — an article which describes the hopeless development of the country while maintaining the policy of estrangement from the PRC: "To protect personal power and be prepared to undermine the peaceful situation in the Taiwan Strait, she does not hesitate to provoke a war and harm the life and property of the people. Is this the peace that Tsai Ing-wen wants to bring to the people of Taiwan?" [8].

The article "What proposal of Tsai Ing-wen has Japan directly rejected?" published in the Strait News, ridiculed Taiwan's proposal to engage in a security dialogue with Japan. "Relevant officials from the Japanese Foreign Ministry also confirmed that Japan's main stance on Taiwan was to comply with the Sino-Japanese joint statement signed in 1972 and that the country invariably maintained a 'nongovernmental' practical relationship with Taiwan. This has not changed". "If Tsai Ing-wen made an erroneous judgment, I did not expect Japan to openly reject it. This shows that her security team is in big trouble. An optimistic

analysis of relations between Taiwan and Japan is so ridiculous and completely unrealistic”.

The leader of Taiwan receives an extremely negative assessment if we look at articles in the Fujian media for March 2019.

A popular topic for mainland regional media is the special attention and analysis of policy blunders of Taiwanese President Tsai Ing-wen and her government.

Regional media have noted the presence in the market of high-quality products made in Taiwan. The culture of modern Taiwan is perceived by regional journalists as a unique fusion of ancient Chinese and Japanese traditions.

The regional media, in contrast to the central ones, pay much more attention to such vital topics as crime, sports and Taiwan's ecology. The regional media are increasingly interested in such a winning topic for publications as Taiwan's rich culture.

When evaluating events related to the Republic of China, regional journalists take an involved position, describing the facts and indicating their position on the events. The arguments of the authors of publications on political and economic issues are biased in a particular way and most often do not suggest the reader to guess what the real message of the article is (Figure 1)..

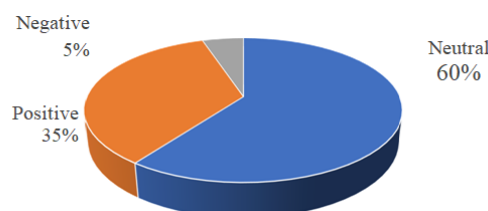


Figure 1. The emotional coloring of publications.

Considering the whole process of confrontation between China and Taiwan in the same vein as the federal media, the regional press pays special attention to the mutual role. Taiwan is positioned as a state set up for peace negotiations and finding a solution in a civilized way and, at the same time, ready to defend its independence by military means (and having the corresponding potential). The direct and perhaps the main role in the confrontation is attributed by the Russian media to the US, which is arming Taiwan and exerting pressure on the world community to support Taiwan.

Taiwan's economic potential is rated extremely high in the Chinese media. The economic cooperation between Taiwan and China is actively developing despite complex political relations. We are talking about joint Sino-Taiwanese enterprises and the transfer of several industries to China by Taiwan.

By the powerful potential of Taiwan's economy and competitiveness in international markets, first of all, we understand the high-tech market, where Taiwanese products (computers, televisions, mobile phones, LCD and plasma monitors) are leading, and the interest in the Asian market, in general, coming from foreign global corporations.

Since 2016, when Tsai Ing-wen was elected President of Taiwan, the Chinese authorities have suspended official negotiations with Taipei. By organizing campaigns to isolate the Republic of

China and carrying out naval maneuvers around the island over and over, they are thus trying to force Tsai Ing-wen to recognize the principle of “united China”.

Until China develops a roadmap for reunification with Taiwan, which will be recognized by the international community, the island's current status will remain unchanged. This was written by Mark Harrison, a senior teacher of Chinese at the University of Tasmania, in his article “Taiwan: no roadmap to unification”, published in *The Strategist*, an Australian political publication. The author of the article believes that concerning Taiwan, Beijing is still forced to act within the framework of international law. Harrison notes that China needs the peaceful reunion with Taiwan to be supported by the international community, which, in turn, needs China to comply with international standards and not turn the region into a hotbed of crisis [9]. The public diplomacy that Lai Lingzhi wrote about [10] is still functioning or the PRC is already implementing an information strategy that scientists call noopolitics [11,12].

#### 4 Discussion

We conducted an online survey where we asked the participants to answer the following questions about Taiwan.

How many times have you been to Taiwan?

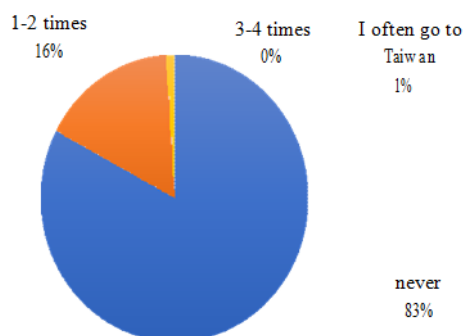


Figure 2. The results of the survey on visiting Taiwan

Five respondents (1%) answered that they had traveled to Taiwan regularly and the majority of the respondents (83%) had never been there (Figure 2).

For political reasons, the Taiwan government has not recognized the position of “united China” in recent years. Many media outlets report Taiwan's shortcomings, resulting in fewer and

fewer tourists choosing to go to Taiwan, preferring South Korea and Japan for traveling and preferring mainland media to inform them about Taiwan tourism.

Next, we divided the respondents by age group. Thus, most of the respondents were aged from 18 to 30 (36% and 43% respectively) (Figure 3).

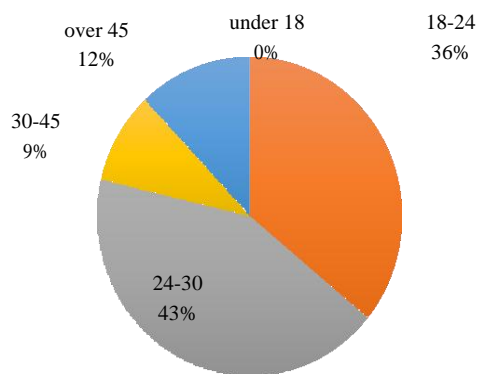


Figure 3. Age categories

In terms of gender, the analysis of the respondents showed a significant prevalence of the female gender (Figure 4).

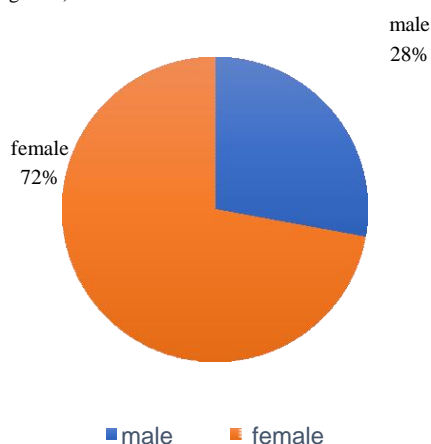


Figure 4. Gender division

What information would you most like to know about Taiwan?

|                        |        |
|------------------------|--------|
| other                  | 19.20% |
| medicine               | 28.80% |
| science and technology | 24%    |
| education              | 42.30% |
| diplomacy              | 36.50% |
| culture and art        | 69.80% |
| economy                | 31.70% |
| politics               | 51.90% |

The majority is interested in culture and art (69.8%), while somewhat fewer readers prefer politics (51.9%). Science and technology are of interest to a small number of people (24%) compared with Taiwanese education (42.3%).

We see more mainland residents, especially Fujian residents, interested in the art and culture of Taiwan because of its close cultural ties with Taiwan due to its special geographical location. Political issues are also troubling Fujian residents.

Without the cognitive needs of people on both sides of the strait, there will be no interaction and development between the two sides of the strait. For people on both sides of the strait, their needs are both informational and spiritual needs, they must understand the latest information from both sides and have a common cultural identity (Table 3).

As for the exchange of information and cooperation between the peoples of Fujian and Taiwan for the media of Fujian and Taiwan, people are most interested in cultural exchange and cooperation. People on both sides of the strait want to know more about each other's society. It is reported that Taiwanese

people understand Fujian more intuitively and expect to be able to travel to Fujian to study, do business and work.

The most popular source of information is the website SINA.com.cn (80.8%) and among the print media — the newspaper Zhenmin Ribao (59.6%). The Sina social network has more than 500 million regular users and publishes millions of messages per day. The number of users is increasing by 20 million every month, according to company reports. Currently, the top 100 users have united more than 180 million unique subscribers. It is the largest Chinese-language mobile portal. It is managed by Sina Corporation, which was founded in 1998. The company was founded in Beijing and its global financial headquarters have been in Shanghai since October 1, 2001. Thus, we can conclude that 80.8% of users receive information about Taiwan via the Internet, however, since the network is an open platform, a lot of negative and inaccurate information comes from the network.

Renmin Ribao readers accounted for 59.6% and Fujian Ribao readers accounted for only 9.6%, which suggests that more and more users prefer to use information from regional media than read the official ones. In principle, in the era of the development of a new visual culture in the media space, this, according to the Russian researcher Kudriashova, is natural [13].

More often, users and readers receive information through Internet resources (85.6%) and television (69.2%), since the Internet occupies a leading position not only in this country but also in the world. Almost in the last place was the position "books" (31.7%).

Half of the respondents answered that the problem is covered in mass media and most often it is politics (90.4%).

## 5 Conclusion

The content analysis of the text of publications has shown that the image of Taiwan is presented one-sidedly while the most important components of the image of the republic are ignored. Such topics as technological development, scientific discoveries, socio-economic, tourism, lifestyle and other winning topics for Taiwan are not presented widely and in a detailed way. The mainland Chinese media reports on Taiwan focus on objective and comprehensive information, while some media in Taiwan often report on the mainland in a way to selectively reinforce ideological differences and influence the objectivity of news reports.

Thus, we can conclude that the main topic for the regional press of China on the Taiwan problem is the censure of the current Taiwanese government's desire to secede from China, ridicule of Taiwan's attempts to position itself in the international arena as a separate state, which is emphasized in the press by the non-acceptance of Taiwan's sovereignty by other foreign states and international organizations, the desire of the Taiwanese themselves to identify themselves as citizens of the PRC in both ethnic and political aspects.

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## BALANCED SCORECARD AS AN EFFECTIVE MANAGEMENT TOOL FOR A PROJECT-ORIENTED COMPANY

<sup>a</sup>INNA LITVINENKO, <sup>b</sup>YAKOV YADGAROV,  
<sup>c</sup>VAGIF ALIEV, <sup>d</sup>IRINA SMIRNOVA, <sup>e</sup>ROZALINA TSOY

<sup>a</sup>*Department of Management and Entrepreneurship, Moscow State University of Humanities and Economics, 107150, 49 Losinistrovskaya Str., Moscow, Russian Federation*

<sup>b,d</sup>*Department of Economic Theory, Financial University under the Government of the Russian Federation, 125993, 49 Leningradsky Prospekt, Moscow, Russian Federation*

<sup>c</sup>*Department of Criminal Law Disciplines, Moscow City Pedagogical University, 129226, 2 Selskokhozyaistvennyi Prospekt, 4, Moscow, Russian Federation*

<sup>e</sup>*Department of Regional Economics, Industries and Enterprises, Rostov State University of Economics, 344002, 69 Bolshaya Sadovaya, Rostov-on-Don, Russian Federation*

email: <sup>a</sup>inna.litvinenko.hum@rambler.ru,

<sup>b</sup>yakoviyadgarov@mail.ru,

<sup>c</sup>vagif.law@mail.ru, <sup>d</sup>ismirnova@fa.ru, <sup>e</sup>media.rsue@mail.ru

**Abstract:** The implementation of a significant number of projects at enterprises in the unstable socio-economic environment of the Russian and world economies requires an efficient toolkit giving performance. Balanced scorecard is such a tool in the modern environment. This article discusses the full range of measures to implement this toolkit. Balanced scorecard has been transformed into a powerful apparatus for implementing strategies and constantly assessing their performance. Companies that successfully implemented the system achieved a significant increase in monetary efficiency and almost all of them occupied leading positions in their own markets. This tool enables building an organization focused on strategy. It enables an organization to express plans and strategies for the future correctly and to implement them as real actions. It ensures the inverse relationship between internal business processes and external indicators required to increase strategic performance and achieve results. When implementing balanced scorecard, strategic planning is transformed from a theoretical exercise into a company's main activity.

**Keywords:** balanced scorecard, management, project-oriented company, prospects, staff, finance, business processes, customers.

### 1 Introduction

Currently, in order to achieve the main strategic goals of project-oriented enterprises, i.e. to preserve viability and use their potential for growth, the following tasks need to be accomplished:

- Increase in market share;
- Geographic expansion and new distribution channels;
- Creating a good company reputation;
- Marketing activities;
- Staff recruitment and training;
- Organizational structure optimization;
- Clear separation of duties among staff;
- Creating an effective motivation and monitoring system.

All these tasks are closely interrelated and should be solved by management in parallel, which will ensure a balanced development of the enterprise and an equal distribution of resources for their solution. (1) In practice, managers need to properly prioritize, highlight the strategically important goals of the organization, identify their interdependence, determine the timing and sequence of specific activities that contribute to achieving the goals, determine their budget, and assign responsible persons. Managers cannot cope with the solution of such a complex of difficult tasks at the same time, which will lead to the fact that the strategy will not be implemented in full.

Therefore, there is a need of a model that enables discerning the strategy most simply and clearly, integrating the entire set of strategic events in a specific system or scheme of actions, and creating a system of simple, cheap and up-to-date control over the implementation of these measures. Balanced scorecard is one of the mechanisms to solve all these problems.

### 2 Materials and Methods

When conducting a strategic analysis, the authors determined the optimal set of tools based on certain conditions. The mechanisms used are required to provide comprehensive information about the state of the enterprise important for the subsequent formulation of the strategy and the development of the balanced scorecard, although it should not be redundant.

As the recommended methodology became more well-known, rapidly developed and recognized in the project-oriented enterprises in which it was used, the number of mechanisms and technologies developing the original theory was increased. (2) The main objective of balanced scorecard is to increase the shareholder value of the company. In principle, there are two ways to achieve this goal: either to increase sales or reduce spending. According to this, it is important to take measures for value control that enable making more or spending less. (3) Reduction of expenses is interrelated with the accounting and capturing of suitable characteristics that is effectively handled by key activities cost accounting system. However, the main difficulty in managing the value is that this principle does not inform how to perform more. Balanced scorecard, on the other hand, shows where the increase in income comes from and which customers guarantee it and why.

After that, balanced scorecard identifies the main business processes, the improvement of which helps the company to make an offer to the customer properly. In the future, it orients investments, staff activities, the formation of internal systems of the company, corporate culture and microclimate in this direction. (4-5)

The content of balanced scorecard consists in the obligatory indication of the strategy in several perspectives, the proposal of strategic plans and the determination of the degree of achievement of the present plans. The word "balanced" means the equal importance of all characteristics. Balanced scorecard is reflected in the entire company by developing subjective questions. It is limited to the already established corporate strategies and encourages employees to present their role in the company's strategy. (6-7)

The general principle of the presented structure is that the goal of the highest level can be achieved only through the realization of all the goals of the lower level. (8-9)

The analysis showed that project-oriented enterprises operate in the environment of strong competition. Due to the specificity of the factors of competition in this market, the creation of a competitive advantage of an organization should be based on the use of intangible assets, namely the experience and knowledge of employees and the company's reputation. (10-12) In this regard, there is a need to evaluate these assets and the need to use a tool to manage the strategy based on the use of intangible assets. This once again confirms the need to implement a balanced scorecard for managing a project-oriented company.

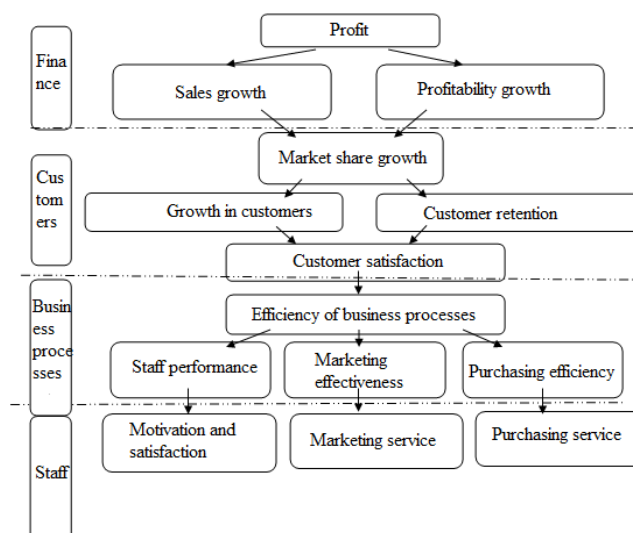


Figure 1. Example of a Target Structure Built with the Use of a Balanced Scorecard

### 3 Results and Discussion

The analysis of the degree of elaboration, relevance, and clarity of the generally accepted development strategy of a project-oriented company revealed the need to formulate a new relevant strategy. The result of all the steps described above are the formulated strategies:

- Model strategy, i.e. market development through the development of new regions, investment in development and reinvestment;
- Competitive strategy, i.e. product differentiation, “optimal balance of price and quality.”

The authors have developed an approximate scheme of causal relationships, i.e. a strategy map of a project-oriented company (Figure 2).

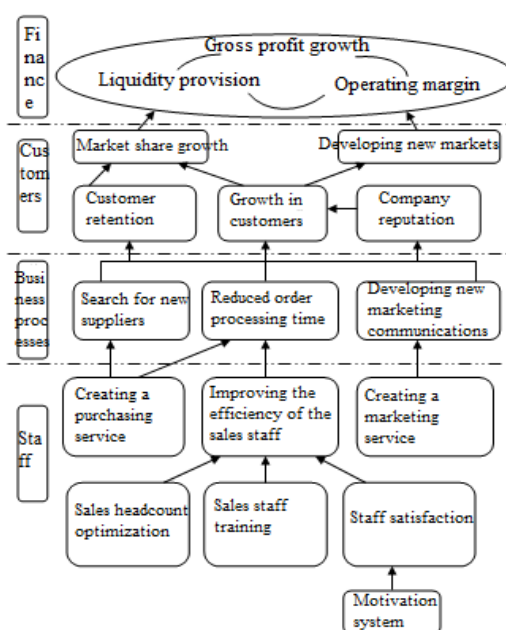


Figure 2. Balanced Scorecard Strategy Map of a Project-oriented Enterprise

### 3 Results and Discussion

The causal chain shows the correlation between the individual strategic objectives, and it is precisely this that reports the interrelated effects that arise on the way to achieving the objectives. The awareness of the dependencies between goals and their significance helps to create a common awareness of the strategy and, as a result, to improve managers' teamwork. (8,13)

The components of internal business processes describe the most important internal business processes that require improvements. This will enable the company to create offers for consumers and to contribute to the finding and retention of customers in the target sector of the market, as well as to attract potential buyers. The characteristics of these activities are focused on the assessment of those internal processes on which customer satisfaction and the solution of the financial and economic goals of the organization as a whole are sufficiently dependent.

In the balanced scorecard of a project-oriented organization in this perspective, the emphasis is on staff development as the main resource of the company.

Staff turnover is considered as an indicator characterizing the degree of staff satisfaction. The formation of a productive system of motivators as a long-term task is shown in Table 1. The average wage level of targeted employees is shown here as a characteristic. In the course of the enhancement of the effectiveness of human resources and the enterprise as a whole (increased sales of products and services that have a high added value), specialists' wages depending on the amount of sales should increase.

When developing a balanced scorecard for a project-oriented company, the methodology was simplified and adapted in accordance with the conditions and needs of the enterprise: the "growth and development" perspective was replaced with the "staff" perspective to focus on the main factor of growth and development of the organization. It was decided to abandon the stage of cascading characteristics common to the classical methodology for developing a balanced scorecard. It was decided to abandon the automation of the development system for balanced scorecard and feedback process.

At the organizational stage, the composition of the project team will be determined, a work plan will be drawn up, deadlines will be set and responsible executives will be appointed.

The project team belong to the strategic management level of the organization and are responsible for certain areas of the strategy. The project team of a project-oriented company should consist of

1. Director general;
2. Chief commercial officer;
3. Chief Accounting Officer;
4. Store-keeper.

This is the optimal team size. It is more difficult to organize teamwork with more participants. In addition, in an average organization, there should not be a large number of strategists. In a large company, a much larger number of people take part in the development of a strategy. Due to this, several teams are formed in accordance with the organizational structure.

It is important to note that the balanced scorecard development is teamwork. If one person develops it, for example, a director-general, then the result will not have any value.

After creating a team, it is important to appoint a project manager. He/she is responsible for the results of the project, has all the necessary resources for its execution, takes all the key actions in the process of project implementation. In the case of a project-oriented enterprise, a chief commercial officer is appointed as a project manager. Because the duties of this specialist are more suitable for the development of a balanced scorecard.

The company develops a balanced scorecard without the participation of consultants; therefore, a preliminary training of a specialist will be conducted. This employee will study the literature on the presented topic and undergo training in which he/she will master the practical skills needed to solve relevant problems.

The project team members need to set the following goals:

- To show the strategy in a way understandable to all employees of the organization;
- To clearly assign different responsibilities to participants including "simple doers" for the implementation of the strategy;
- To create a strategic management control system that enables checking the implementation of the strategy.

The first goal that the project team is required to accomplish is to formulate strategic objectives for inclusion in the balanced scorecard.

After solving the problem of the number of projects and their names, specialists should begin the task of developing goals. Each team member will propose definitions of several strategic objectives for each project. This work is organized as follows: at the second meeting of the team members, the team leader explains to the participants how to express the goals and in what form to present the results. After receiving homework, team members prepare their proposals.

In the future, the task of the team will be to develop each strategic goal of the project-oriented enterprise, with the exception of the goals of the "Finance" perspective of the relevant activities. For financial purposes, individual strategic measures are not developed since their achievement is facilitated by measures implemented in the lower level perspectives (Customers, Processes, and Potential), which are shown in Tables 1, 2, and 3.

Table 1. Development of Measures Necessary to Achieve the Strategic Goals of the "Customers" Perspective

| Strategic goal                          | Characteristics   | Activities   |
|---|---|--|
| Market share growth                     | Sales growth  | -  |
| Improvement of the company's reputation | The proportion of customer orders made on the basis of a recommendation in the total number of orders | Marketing activities and enhancement of staff efficiency                                       |
| Customer retention                      | Customer retention rate   | Individual approach to each client; use of forms and terms of payment convenient for customers |
| Growth in customers                     | Share of new customers  | Staff training, Developing new marketing communications, personal sales                        |
| Developing new markets                  | Share of sales in new markets   | Advertising in targeted regions  |

Table 2. Development of Measures Necessary to Achieve the Strategic Objectives of the "Business Processes" Perspective

| Strategic goal                          | Characteristics   | Activities   |
|---|---|--|
| Search for new suppliers                | Increase in supply  | Creation of a purchasing service   |
| Reduced order processing time           | Percentage of reduced order processing time   | Sales staff training; creation of a purchasing department; implementation of a new motivation system |
| Developing new marketing communications | Share of customers who learned about the company from a certain source of advertising information | Advertising in free publications, specialized directories, installation of billboards                |

The proposed activities in this perspective will optimize existing business processes in the project-oriented company to achieve the strategic goals of the enterprise as a whole.

Table 3. Development of Measures Necessary to Achieve the Strategic Objectives of the "Staff" Perspective

| Strategic goal   | Characteristics   | Activities  |
|--|---|---|
| Improvement of the efficiency of the sales staff                             | Average profit margin of contracts  | Implementation of a new motivation system; enhancement of staff satisfaction; optimization of sales staff number; staff training                      |
|  | Average salary of target groups of employees  |   |
| Implementation of an effective motivation system                             | Average salary of target groups of employees  | Building a motivation system according to the following principle: remuneration depends on sales and additional bonuses depend on targets achievement |
| Enhancement of staff satisfaction and loyalty                                | Staff turnover  | Involvement of employees to participate in management, explaining the organization's strategy to employees  |
| Optimization of staff number   | Staff workload  | Hiring, dismissal, training   |
| Sales staff training   | Number of employees trained during a given period; number of employees that meet the qualification requirements | Development of staff training plan; Appointment of a mentor   |
| Creation of a purchasing service and setting up the work of its staff        | Number of hired employees   | Hiring, dismissal, training   |
|  | Degree of workload of employees   |   |
| Creating and setting up a marketing service (hiring and training a marketer) | Study satisfaction index  | Hiring, dismissal, training   |
|  | Degree of workload of employees   |   |

At the last stage, it is necessary to carry out the unification of all previously compiled tables into a single balanced scorecard. In the summary table, strategic goals, characteristics, and activities are attributed to the four perspectives. The balanced scorecard of the project-oriented company is presented in Table 4.

It was found that for a project-oriented enterprise, one balanced scorecard could be developed for a specific project, which will be enough to guide the actions of all staff and for cascading. This means that there is no need to appoint responsible persons for the individual goals of the balanced scorecard.

Table 4. Balanced Scorecard of the Project-oriented Enterprise

| Perspective             | Strategic goal                                   | Characteristics  | Target values | Activities  |
|-------------------------|--|--|---------------|---|
| Finance                 | Gross profit growth                              | Gross profit, RUB  | 1 million     |   |
|                         | Sufficient liquidity provision                   | Cash ratio, %  | 0.5           |   |
|                         | Profitability growth                             | Operating margin, %  | 20            |   |
|                         | Market share growth                              | Sales growth, %  | 10            |   |
| Customers and marketing | Improvement of company reputation                | The proportion of customer orders made on the basis of a recommendation in the total number of orders, % | 40            | Marketing activities; enhancement of staff efficiency   |
|                         | Customer retention                               | Customer retention rate, %   | 75            | Individual approach to each client; use of forms and terms of payment convenient for customers; discount system                                       |
|                         | Growth in customers                              | Share of new customers, %  | 25            | Staff training, Developing new marketing communications, personal sales   |
|                         | Developing new markets                           | Share of sales in new markets, %   | 30            | Advertising in targeted regions   |
| Business processes      | Search for new suppliers                         | Increase in supply, %  | 15            | Creation of a purchasing service  |
|                         | Reduced order processing time                    | Percentage of reduced order processing time, %   | 20            | Sales staff training; creation of a purchasing department; implementation of a new motivation system  |
|                         | Developing new marketing communications          | Share of customers who learned about the company from a certain source of advertising information, %     | 40            | Use of Internet resources, advertising in free publications, specialized directories, installation of billboards                                      |
| Staff                   | Improvement of the efficiency of the sales staff | Average profit margin of contracts, RUB<br>Sales growth  | 20000         | Implementation of a new motivation system; enhancement of staff satisfaction; optimization of sales staff number; staff training; sales competition   |
|                         |  |  | 10 %          |   |
|                         | Implementation of an effective motivation system | Average salary of target groups of employees   | 30000 RUB     | Building a motivation system according to the following principle: remuneration depends on sales and additional bonuses depend on targets achievement |
|                         | Enhancement of staff satisfaction and loyalty    | Staff turnover   | 10%           | Involvement of employees to participate in management, explaining the organization's strategy to employees; maintenance of corporate culture          |
|                         | Sales staff optimization                         | Degree of workload of employees  | 220000 RUB    | Hiring, dismissal   |

|  |  |   |            |  |
|--|--|---|------------|--|
|  | Sales staff training   | Staff compliance with qualification requirements          | 8          | Grading of managers according to 10-point system |
|  | Creation of a purchasing service and setting up the work of its staff        | Degree of workload of employees                           | 200000 RUB | Hiring, dismissal, training                      |
|  | Creating and setting up a marketing service (hiring and training a marketer) | Study satisfaction index; Degree of workload of employees | 9          | Hiring, dismissal, training                      |
|  |  |   | 30000 RUB  |  |

Balanced scorecard should be the basis of the new management system to overcome the following barriers resulting from the traditional management system: the company's concept and strategy are not clear to all employees of the organization; the strategy is not related to the individual goals and objectives of the divisions, the existing feedback is tactical, not strategic.

In order to enhance the process of strategic management and use all the advantages that the balanced scorecard provides, it is important for the management of the project-oriented organization to give special attention to the implementation of the balanced scorecard. Any of the above obstacles is overcome by merging the balanced scorecard into an innovative structure of strategic management.

The organization of an innovative managerial system will be carried out in stages. When the basic organizational scheme for transforming a managerial system is the balanced scorecard, all changes are logical and interconnected. The formation of organizational factors for the implementation of the balanced scorecard, in the first place, is the involvement of managers of all positions in the process of elaborating the creation and development scenario of the balanced scorecard, as well as the involvement of all employees in the implementation process.

Managers should use any opportunity to distribute the strategy and remind employees about it. (8,14) The communication program should include the following steps:

- To achieve all employees' understanding of the strategy;
- To conduct staff training on the topic "Balanced scorecard and management system for strategy implementation";
- To provide feedback through the balanced scorecard regarding the organization's strategy.

A clear motivating reward system is the main activity stimulus. At the same time, there is no universal instrument connecting incentive compensation with the strategy, and each company develops its own approach to solving this problem. For a project-oriented company, the link between the corporate strategy and the daily work of each employee will be the interdependence between the motivation of human resources and incentive programs on the one hand, and a balanced scorecard on the other hand. (15-16)

The coordination of the goals and tasks of an individual in accordance with a single concept and strategy of an enterprise is a complex and lengthy process. The company will need extensive experience with the balanced scorecard before it becomes possible to associate a specific motivation system with it.

Staff training is a special factor in the implementation of the balanced scorecard. Employees must understand the content of the new management system based on the balanced scorecard. They also must understand how they will become involved in the process of developing and implementing the strategy. (6,17) In practice, strategy maps are commonly used throughout the world for staff training and explaining the content of the balanced scorecard. Such maps show cause-effect relationships of strategic goals and characteristics. An organization should move towards ensuring that all employees participate in the process of

shaping and implementing the strategy, and actively support their initiatives and proposals for solving the set goals and objectives.

Managers of an organization are required to have the right to use constant double loop feedback, in other words, to accept information about how well their concept being the basis of the entire company's operation corresponds to the existing (possibly changed) environment. (10,18)

To build such a feedback process, it is necessary to encourage employees to monitor changes in the business environment, in particular through communication with customers, suppliers, partners and promising candidates for a job in their company. (8,19)

It is necessary to motivate employees, who have access to information, to compare observations, analyze previous experience of the company and document the work done by them, which gives the right to the rest of the staff to have an idea about these materials. (20-23)

The last element of the information process is effective problem solving by a team. The creation of a team is of great importance since therefore the organization can successfully achieve a mutual understanding that is important for developing a strategy and balanced scorecard. The same corporate approach must be applied in the process of implementation and evaluation of the strategy. (10,24-25) The efforts of all employees must be combined to achieve a synergy effect.

#### 4 Conclusion

The use of an automated data collection system in the project-oriented enterprise for the control of various departments during the implementation of the balanced scorecard is not practical because the enterprise is small. Information in small organizations is accessible to managers and other employees, and the process of data collection is quite simple and does not require automation.

The implementation of a balanced scorecard is a strategic project, so the full result can be obtained six months or a year after the start of the project. However, according to managers of project-oriented companies, the first results of the balanced scorecard implementation project is noticeable earlier. These results include

- a) Elaboration and formalization of the company's strategy made at the beginning of the project that will help solve the problem of a misunderstanding of the strategy by company employees;
- b) Discussion about strategic characteristics that will lead to the identification of effective characteristics comfortable for quick management;
- c) The knowledge acquired as a result of the development of the balanced scorecard that can be the basis for the rest of the company's reorganization projects such as management accounting, budgeting systems, and motivation systems;
- d) Solutions of operational tasks that will be found in the process of creating a strategy and drawing up strategy maps.

The causal relationship map demonstrates the logic of achieving the goals of the organization and allows each employee to clearly see their contribution to the development and success of the enterprise. (8,26) The developed system will make the organization's strategy understandable to both managers and ordinary employees.

It is extremely necessary for a project-oriented enterprise to implement a balanced scorecard system because this system will allow the company to overcome the strategy implementation barriers and to achieve the strategic management goals in the shortest possible time. The proposed implementation mechanism will provide the company's management with the ability to analyze the dynamically changing characteristics of the enterprise, with the possibility of adjusting the objectives and characteristics of each of the perspectives to achieve the adopted development strategy.

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## THE ACTIVITY OF THE EXTENSION OF COMENIUS UNIVERSITY IN BRATISLAVA DURING INTERWAR PERIOD OF CZECHOSLOVAK REPUBLIC (1918 - 1938)

<sup>a</sup>EDUARD LUKÁČ, <sup>b</sup>LUCIA HARTMANNOVÁ

*University of Presov, 17. novembra 1, 080 01 Prešov, Slovakia*

*email: <sup>a</sup>eduard.lukac@unipo.sk,*

*<sup>b</sup>lucia.hartmannova@smail.unipo.sk*

The paper is a partial result of the project VEGA 1/0303/17 entitled "Adult education in Slovakia during the existence of Czechoslovakia (1918-1938)".

**Abstract:** The period of the existence of interwar Czechoslovak Republic (1918 – 1938) provided space for the development of adult education controlled by the state for the first time. In Slovakia, the Extension of Comenius University in Bratislava also participated in this activity and took the extensions in Prague and Bratislava for example. Its main activities were: organization and personal providing of lectures for broad public in the whole area of Slovakia and for Czech and Slovak community in Vienna, of university courses for teachers, of courses for military edifying officers as well as the cooperation with Edifying organization for Slovakia, publishing of lectures and studies in its own edition with the name Collection of lectures and debates of the Extension of Comenius University.

**Keywords:** history of adult education in Slovakia, Extension of Comenius University, Extension of Czechoslovak universities in Czechoslovak Republic, M. Weingart

### Introduction

The area of education came into priority attention of governing classes during the period of Enlightenment and there were reforms to make at least elementary education available to as many people as possible. This tendency also reflected into the interest in adult education, for which the new organizational forms were applied in the area of contemporary Slovakia, like for example reading groups, schooled communities, Sunday schools, economic organizations, educational casinos etc. Their main aim was to saturate the educational needs of adults who, despite compulsory school attendance, attended school only when there was no work in agriculture and their literacy was on a low level. The spreading of higher education is characteristic for the period of second half of the 19<sup>th</sup> century until the creation of Czechoslovak Republic (1918 - 1938). The adults gained access to the highest education only after the founding of Comenius University in Bratislava through university extension.

### 1 The beginning of university extensions

The pioneer of universities' engagement into adult education was James Stuart (1843 - 1913). He gained practice at lectures for adults during 1867 – 1868 and elaborated and put into practice the idea of university extension, a new form of adult education for the first time. "In 1873 the University of Cambridge accepted his project and grouped professors into special commission for the organization and coordination of the lectures. This is how the first general university in England, called University extension, was formed. The name indicated broadening of the own academic activity of professors beyond the circle of students, to broader society classes. The activity was also called extra-mural work." (Škoda, K., 1986, p. 169.) The first educational efforts of J. Stuart and his colleagues from Trinity College from Cambridge University concentrated on organizing of the systematic educational courses for women organizations, technical (mechanical) institutes and edifying communities. According to the experience from Great Britain and example of University of Vienna, the university extension in Czech Republic was founded by the end of the 19<sup>th</sup> century and the incentive for its founding was the request of literary branch of Czechoslovak workers' debate addressed to Faculty of Arts of Czech university in Prague<sup>1</sup>, with the aim to provide lectures for workers. Professors of the given faculty consequently elaborated regulations of the university extension and handed them with the request of its financing to the Ministry of Education, which

accepted the regulations on 16<sup>th</sup> October 1898. (Horna, R. - Opravil, J. - Paulová, M., 1928) The chairman of the board was Professor J. Reinsberg, the vice-chairman was Professor O. Hostinský and the first lecture of the chairman about the mission and roles of the university extension took place on 5<sup>th</sup> April 1899. The first thematic lecture about the mission of the extensions gave Professor T. G. Masaryk on 6<sup>th</sup> April 1899 and it was called "About the development of European society in the 19<sup>th</sup> century." The first lectures of the Extension of Czech universities in Prague for adults took place only in Prague, but since the spring 1900 there were lectures also in neighboring towns and villages and later in the whole Czech Republic, Moravia and Silesia.

Also teachers from Czech high technical tutoring were being invited to give lectures since 1904 and the tutoring officially joined the university extension in 1908 and the Ministry of Education accepted the altered regulations by the order from 17<sup>th</sup> January 1908. The international congress concerning the issue of folk education took place in Paris between 1<sup>st</sup> – 4<sup>th</sup> October 1908 and the International federation of university extensions and folk universities were founded on the congress. The organization of the university extension of Czech university also became the member of the Federation from its beginning. "The University participated on behalf in the 1<sup>st</sup> international meeting of folk universities in Bologna, Italy in 1912." (Průcha, J. - Veteška, J., 2014, p. 282).

The university extension started during holiday 1910 lectures concentrated also on further education of teachers. Beside this, there were also courses concentrated on the issue of economy, agriculture, health system, physics etc. on the program in the period before the First World War. There were around 21 Prague courses a year before the First World War and each course comprised the series of 6 lectures. About 100 lectures a year were given in the neighborhood of Prague.

The second centre of extension's lectures became Brno. The „Commission for organizing of folk lectures“ was founded on the 1<sup>st</sup> February 1905 near Czech Technical university in Brno<sup>2</sup> and its first chairman was Professor V. Novák. The Commission started its activity on the 1<sup>st</sup> March 1905 through the lecture of B. Koloušek "On free competition" and 114 lectures for 8151 participants were given in Brno and 212 lectures for 35 284 participants took place in the neighboring towns and municipalities until the creation of the Czechoslovak Republic (Horna, R. - Opravil, J. - Paulová, M., 1928, p. 27).

The creation of Czechoslovak Republic was an incentive for the development of university extension's activity because it enabled the development of school system. The Commission for folk lectures of Czech universities in Brno started to work from the academic year 1919/1920 and beside Masaryk University, also other university institutions in Brno participated in its activity – University of agriculture and Veterinary University.

The order of Ministry of Internal Affairs of Czechoslovak Republic number 16.260 from 30<sup>th</sup> March 1920 also contributed to the broadening of activity and to the overall improvement of the lectures' efficiency, because it cancelled the duty of the extension to announce its lectures to the police and political offices. Since then, the extensions were able to give lectures freely on the whole area of Czechoslovak Republic.

### 2 The Extension of Comenius University in Bratislava

Before the Extension of Comenius University in Bratislava (EUC) was founded, the public in Bratislava could attend extension's lectures. For example, the extension of Prague

<sup>1</sup> The order of the Emperor Franz Joseph I. of Austria from 11<sup>th</sup> April 1881 and consequential Law from 28<sup>th</sup> February 1882 divided Carl – Ferdinand University in Prague from the half of winter term 1882/1883 and two separate universities were formed: Carl – Ferdinand German University and Carl – Ferdinand Czech University.

<sup>2</sup> Emperor Franz Joseph I. of Austria signed on the 19<sup>th</sup> September 1899 a decree of founding of Technical University in Brno.

universities organized from 4<sup>th</sup> to 16<sup>th</sup> June 1921 in Bratislava the 14-days-long courses for teachers of town and municipality schools, which could be seen as first courses from branches of Faculty of Arts held in Bratislava. The courses had together 60 lessons. The lectures took place from 8:00 a.m. until 1:00 p.m. and there were excursions in Bratislava and its surrounding in the afternoon. (Meško, D., 2014) "They took place in the great hall of the district house and 389 participants signed themselves to attend them. Beside them, there were also other people coming to see the lectures. The participants were from 2/3 Slovaks, mainly from the schools in the west of Slovakia, the others were from Moravia and Czech Republic. The lectures gave a collective picture of Slovakia from the philological and historic side." (Hanuš, J. - Weingart, M., 1925, p. 63) M. Weingart was in charge of those courses. He gave lectures since 1916 for the "Edifying organization," he belonged to the board of "Hus's school" (higher folk school) and during 1919 – 1921 he was the secretary of the Commission for organizing of folk lectures of Czech universities in Prague.

Also teachers of Comenius University in Bratislava gave such lectures and they took place mainly in the university aula, like for example "opening lecture of the dean Prof. Hanuš in October 1921 Dobrovodský and Slovakia, the lectures of Prof. Heidler about Havlíček, of Prof. Škultéty about Dostoevsky, of Pražák about Hviezdoslav, of Prof. Orel called the evening of old-Czech music and the evening of chorus' creation of J. B. Foerstr (both in cooperation with Acad. Singing Organization) and of Prof. Weingart: Hundred years of Slavistics since the issuing of the Institution Dobrovodský" (Zpráva odstupujícího rektora prof. Dra. Augustína Rátha, 1925, p. 115).

After the arrival to the Faculty of Arts of Comenius University in 1921, M. Weingart used his experience with edifying work and he remembers this period as follows: "From the beginning of Comenius University it was clear that the important part of its activity must be also the extensive activity: the teaching and educational activity of professors and docents cannot be restricted to only internal lectures and lessons for their own students, but they should also do cultural and educational work among broader classes of intelligence in Slovakia" (Meško, D., 2014, p. 48) He made his idea about the sense of this work into a proposal to found extension in Bratislava, which he handed to all faculties of University in February 1922 and stated three main reasons for its founding in the given period:

1. „Extensive activity cannot start immediately; the creation of extension, accepting of its regulations and the starting work needs some time to be prepared.
2. If the founding of Bratislava extension was delayed, some other organization giving lectures could gain suitable place for lectures in Slovakia and surrounding countries.
3. Even if Bratislava extension was not being discussed yet, the budget of Ministry of Education considered it in 1922.“ (Weingart, M., 1925, p. 212-213).

In the proposal of the founding of EUC was stated that its role would be to not only organize lectures and cycle of lectures according to the needs and wishes of people, but also to organize special courses concentrated on the target group of teachers. The proposal was accepted at all faculties and consequently a preparing board was elected that accepted the regulations elaborated by Weingart. They were later accepted by other academic organs and by the Ministry, too. He states in the first paragraphs:

#### § 1.

The Extension of the Comenius University is a folk-educative institution of Comenius University in Bratislava, which cares for folk lectures that are not included in the official lists of the university lectures, with the aim to enrich academic education of those broader classes, to which the academic study is unavailable.

#### § 2.

The subjects of the extensive folk lectures organized continually

(in courses or cycles) or individually, are all scientific branches, if they are appropriate for the folk presentation. Special attention is devoted to the mental needs of the period, nation and Czechoslovak state. Lectures concerning political parties and agitation are excluded." (Věstník, 1923, p. 436).

EUC started to work on 1<sup>st</sup> March 1923 under leadership of Prof. M. Weingart, who considered it to be "an especially important part of Comenius University from its beginning." (Sýkora, E., 1970, p. 365) Prof. M. Weingart "saw immediately, that the extension in Slovakia has much higher importance than in the native countries, where many organizations care for the organizing of folk-educative lectures. But, on the contrary, in Slovakia the concept "scientific folk-educative lectures" was totally unknown." (Horna, R. - Opravil, J. - Paulová, M., 1928, p. 29).

The Commission for organizing of folk lectures of Comenius University was on the head of the EUC. The Commission's chairman was Prof. M. Weingart and the first members were professors B. Tomsa and V. Vážný (for Faculty of Law), M. Netoušek and B. Polák (for Faculty of Medicine) and D. Orel and M. Weingart (for Faculty of Arts) and the rector J. Hanuš. The lectures of the EUC started in March 1923 by the lecture of S. Kostlivý "On first aid."

Tab. no. 1 Activity of the EUC in year 1923 – spring months

| Lecturer     | Name of the lecture                                      | Town             |
|--------------|--|------------------|
| S. Kostlivý  | On first aid.  | Bratislava       |
| K. Krofta    | On constitutional development of Slovakia.               | Bratislava (6 x) |
| E. Perfeckij | On Russian admirers of Slavic culture.                   | Bratislava       |
| R. Horna     | On historic meaning of borders of Czechoslovak Republic. | Vienna           |

Tab. no. 2 Activity of the EUC in August 1923 – course for folk-educative workers

| Lecturer    | Name of the lecture                     | Town     |
|-------------|---|----------|
| J. Škultéty | How to present the history of Slovakia. | Kremnica |
| A. Pražák   | On Czech literature.                    | Kremnica |

Tab. no. 3 Activity of the EUC from the second half of September until 5<sup>th</sup> October 1923 - courses in cooperation with Prague and Brno extension

| Lecturer       | Name of the lecture   | Town   |
|----------------|---|--|
| V. Chaloupecký | Idea of the Czechoslovak state and its historical development.    | Trenčín, Žilina, Turč. Sv. Martin, Zvolen, Banská Bystrica |
| M. Weingart    | Who are Slavs?  | Trenčín  |
|                | Beginnings of Slavonic literature.                                | Žilina, Zvolen   |
|                | Roles of Slavonic philology in Slovakia.                          | Martin   |
|                | Place of the Slovak language in the family of Slavonic languages. | Banská Bystrica  |

Tab. no. 4 Activity of the EUC in 1923 – fall and winter in Bratislava

| Lecturer | Name of the lecture                                  | Lecturer | Name of the lecture      |
|----------|--|----------|--------------------------|
| A. Tomsa | Overview of the history of philosophy – ancient era. | D. Orel  | J. L. Bella.             |
|          | Overview of the history of philosophy – Middle Ages. | B. Polák | On remedies and poisons. |

|          |  |             |                                  |
|----------|--|-------------|----------------------------------|
| V. Vážný | Chosen chapters from the law of antique.           | M. Weingart | Yugoslavia n teenage-boys songs. |
| A. Kolář | The impact of the antique on the European culture. |             |                                  |

Tab. no. 5 Activity of the EUC in 1923 – lectures in Nitra

| Lecturer    | Name of the lecture  | Date   |
|-------------|--|--------|
| M. Weingart | Slavs, their beginnings and present state.                     | 10.11. |
|             | Idea of the Slavonic mutuality and its historical development. | 24.11. |
| A. Pražák   | Slovak literary present.                                       | 13.11. |
| K. Chotek   | Main issues of the Czechoslovak ethnology.                     | 1.12.  |
| D. Orel     | J. L. Bella.   | 8.12.  |
| R. Horna    | Historic reasoning of the borders of Czechoslovak Republic.    | 15.12. |

Tab. no. 6 Activity of the EUC in 1923 – fall and winter

| Lecturer    | Name of the lecture  | Town   |
|-------------|--|--|
| M. Weingart | Idea of the Slavonic mutuality.  | Prešov, Bardejov, Košice, Spišská Nová Ves, Levoča, Kežmarok |
| R. Horna    | Historic reasoning of the borders of Czechoslovak Republic.  |  |
| A. Pražák   | Literary and cultural picture of the Czech life in the 60s on the beginning of physical education in Sokol organization. | Vienna   |

(Elaborated according to: Weingart, M., 1925, p. 215-217)

On the incentive of edifying report of Slovak military command in Bratislava, the EUC organized during January and February 1924 lectures for 40 military officers who had the function of edifying officers.

Tab. no. 7 Courses of the EUC for officers – military edifying officers

| Lecturer          | Name of the lecture                              | Nr. of lessons |
|-------------------|--|----------------|
| prof. Chlup       | Main principles of pedagogy and didactics.       | 10             |
| prof. Pražák      | History of Czechoslovak modern literature.       | 11             |
| prof. Toman       | Methodology of civics.                           | 6              |
| prof. Orel        | Methodology of singing.                          | 7              |
| prof. Weingart    | Slovak language and its ratio to Czech language. | 7              |
| prof. Daneš       | Methodology of geography.                        | 3              |
| prof. Chotek      | Ethnologic issues.                               | 5              |
| prof. Chaloupecký | From the history of Slovakia.                    | 5              |
| lector Emler      | Public libraries.                                | 4              |
| lector Haluzický  | Exercises from Slovak language.                  | 4              |
| lector Hofman     | Protection of sights.                            | 4              |

Bratislava extension started as the first one from all extensions in Czechoslovakia (in Prague, Brno and Bratislava), beside lectures, to orient its attention also on the publishing activity. The impulse to this activity gave Professor R. Horna and under his leadership the edition called „Collection of lectures and debates of the Extension of Comenius University“ started to be published in 1924 and it was issued by the company Academia in Bratislava (Zpráva odstupujícího rektora prof. MUDr. Stanislava Kostlivého, 1925, p. 7). The edition's aim was to “bring studies and books about the current problems of our state, Czechoslovak nation and of all Slavs, in the elaboration available to broader classes of educated public (Zpráva

odstupujícího rektora, 1925, p. 13) and R. Horna was not only the head of the EUC for years, but also the editor of its publications.” (Vietor, M., 1969, p. 200). The following titles were published in the given edition until the end of 1924/1925:

Horna, R.: Hranice Československé republiky ve světle historie (1924),  
 Laštovka, K.: Vývoj organizace veřejné správy v republice Československé. (1924),  
 Weingart, M.: Sto knih slavistových (1924),  
 Krofta, K.: O úkolech slovenské historiografie (1925).

As a part of Danube fair, which took place from 23<sup>rd</sup> August to 2<sup>nd</sup> September 1924 in Bratislava, the EUC took part in school exhibition on which it presented its lists of lectures, published books and statistic data about its lecture activity. The following overview belonged to one of these:

Tab. no. 8 Number of lectures of the EUC from its founding until the end of 1923/1924

| Town       | No. | Town          | No. | Town      | No. |
|------------|-----|---------------|-----|-----------|-----|
| Bratislava | 167 | Nitra         | 10  | Trenčín   | 3   |
| Zilina     | 2   | T. Sv. Martin | 3   | Kremnica  | 4   |
| Zvolen     | 2   | B. Bystrica   | 2   | Námestovo | 1   |
| Sereď      | 1   | Košice        | 2   | Prešov    | 2   |
| Sp. N. Ves | 3   | Bardejov      | 2   | Levoča    | 4   |
| Kežmarok   | 3   | Poprad        | 2   | Vienna    | 6   |

(Weingart, M., 1925, p. 220)

The activity of the Bratislava Extension consisted of individual lectures and regular courses and each course involved six lectures. The Extension was active not only in Bratislava; also adults in other towns and municipalities in Slovakia could attend its lectures. “It became a habit that professors at their extension's trips not only gave lectures but also had friendly conversations and debates about current issues with the representatives of the local intelligence. These debates and meetings have sometimes higher importance than the lecture itself.” (Weingart, M., 1925, p. 215). For example, Prof. S. Růžička gave lectures “On eubiotics” in Nitra on 23<sup>rd</sup> and 30<sup>th</sup> October 1927 and on 13<sup>th</sup> November 1927. He also presented this topic on 9<sup>th</sup> December 1927 and 27<sup>th</sup> February 1928 in Komárno, where doc. J. Borovička gave lecture “On Trianon Treaty” on 1<sup>st</sup> February 1928. The lectures had great success mainly in the towns in the middle of Slovakia, where they were organized by Pohronská district of the Czechoslovak legionary municipality (Zpráva odstupujícího rektora 1930). “The most of the lectures gave until his departure to Prague Prof. M. Weingart, who visited many Slovak towns, but also other professors participated in giving lectures, for example A. Pražák, J. Kollár, V. Chaloupecký, K. Chotek, F. Žákovec, J. Eisner J. Borovička etc.” (Paulinyiová, E., 1969, p. 310).

Tab. no. 9 Activity of the EUC in the chosen period

| Period    | Number of lectures in Bratislava | Number of lectures in the countryside |
|-----------|----------------------------------|---------------------------------------|
| 1923/1924 | 146                              | 51                                    |
| 1924/1925 | 68                               | 49                                    |
| 1925/1926 | 9                                | 77                                    |
| 1926/1927 | 38                               | 118                                   |
| together  | 261                              | 295                                   |

(Horna, R., Opravil, J., Paulová, M., 1928, p. 40-41)

The lectures were held in theater halls, cinema halls, or in the halls of district houses, in the town hall as well as in secondary schools and local cultural institutions and mainly local branches of Matica Slovenská were usually in charge of their organization. In some of the towns there was a tradition of regular lectures in winter with their stable audience.

A special centre of the Bratislava Extension became Vienna, where Academic organization of Vienna helped with the organization of lectures and the EUC “should have encouraged

and maintained national awareness of Czechs and Slovaks who lived there.” (Paulinyiová, E., 1969, p. 292) There were around four or five lectures a year that took place in the hall of Slavonic debate and 19 lectures were organized until the end of 1927.

Tab. no. 10 Examples of the EUC lectures in Vienna

| Lecturer       | Name of the lecture   | Date       |
|----------------|---|------------|
| J. Král        | T. G. Masaryk.  | 2.5.1925   |
| R. Horna       | Czechoslovak minorities in the neighboring states.            | 20.2.1926  |
| A. Pražák      | Reactions to war in the current Czech literature.             | 14.3.1926  |
| M. Weingart    | On language ratio between Czech and Slovak language.          | 17.4.1926  |
| B. Tomsa       | „Rothermere's action from the viewpoint of international law. | 10.12.1927 |
| Z. Frankenberg | On microscopic structure of human body.                       | 28.1.1928  |
| J. Král        | The sense of life.  | 28.4.1928  |

In cooperation with Ministry of Education and National Edification, Bratislava Extension also participated in organizing of the annual university courses for teachers, which took place during holiday. In the academic year 1925/1926 the EUC started to cooperate with Comenius organization<sup>3</sup> and the results of this cooperation were also common lectures, to which belonged the presentations of J. Král „Sociology and social life,“ respectively of A. Pražák „On the importance of Štúr in the past and present.“ (Zpráva odstupujícího rektora prof. Ph. Dra. Miloše Weingarta, p. 15). Beside lectures in Slovakia, professors from Bratislava started to be active also in Czech towns, like for example in Brno and Prague where they organized courses concentrated on eubiotics (S. Růžička), as well as socially-oriented course (J. Král) in the town Dvůr Králové nad Labem.

Beside realized lectures, other lectures and studies that should have helped to increase general education level among adults were being issued in the edition “Collection of lectures and debates of the Extension of Comenius University.” The initial publications were followed by for example: Pražák, A.: Slovak individuality (1926), Růžička, S.: Eubiotics or healthy lifestyle (1926), Weingart, M.: Slavonic mutuality (1926), Horna, R.: Reports on the history of processes with witches in the western Slovakia. Part I. (1928), Pražák, A.: Mikuláš Šubič Zrinsky and Slovaks (1928), Kolář, A.: Relations of the European culture towards the antique (1929), Kopal, J.: On French war novel (1934), Kolář, A.: Antique and modern democracy (1936), Buben, V.: Studies on modern French (1938) etc. J. Kállay, the Minister for the governing of Slovakia, as well as Ministry of Education and National Edification with the Ministry of Public Health and Physical Education helped financially with the issuing of this edition.

After the first courses for teachers realized in Bratislava in June 1921 by the Extension of Prague universities, the EUC organized during holidays from 12<sup>th</sup> to 24<sup>th</sup> July 1926 courses for teachers in Banská Bystrica in cooperation with Bratislava school department.

Concerning the content, they were divided into:

a) *philosophical-pedagogical topics:*

- Introduction to philosophy. (J. Král, 6 lessons)

- Sociologic principles of pedagogy. (J. Král, 6 lessons)
- Psychology of a child. (B. Tomsa, 6 lessons)
- Pedagogy. (J. Hendrich, 6 lessons)
- School hygiene. (S. Růžička, 6 lessons)

b) *geographical topics:*

- Physical geography of the Czechoslovakia. (F. Štůla, 6 lessons)
- Czechoslovak ethnology. (K. Chotek, 6 lessons)
- Czechoslovak language. (M. Weingart, 6 lessons)
- Chapters from Czechoslovak literature. (A. Pražák, 6 lessons)
- Territorial development of the Czechoslovak Republic. (R. Horna, 3 lessons)
- Ration of the church and state in historic overview. (V. Bušek, 3 lessons)

The total number of lessons of this holiday course, which took place in the aula of secondary grammar school for boys, was 60 and 312 participants attended it (Zpráva odstupujícího rektora prof. Ph. Dra. Miloše Weingarta, p. 16). Teachers came mainly from the middle and east of Slovakia, from church and state school institutions. The EUC realized 138 lecture lessons in the given academic period. The most of the participants, 300 in average, came to lectures to the government building in Bratislava, to “Comenius” organization in Vienna, to Ružomberok and to Prešov. The lowest attendance had the lectures in Turčiansky Svätý Martin and new centers of the EUC became Prievdzia and Topoľčany.

M. Weingart, the chairman of Organization of the EUC was named regular Professor at Charles University in Prague by the decree of the Republic's president from 17<sup>th</sup> December 1926. When he was leaving Bratislava, the Academic senate of Comenius University in Bratislava wrote a letter to say goodbye to him. In the letter, A. Pražák, on behalf of the rector O. Sommer, appreciated Weingart's work in the EUC and his other activity. “Before the Faculty of Arts was founded, it was your idea to found university extension in Slovakia and you re-worked this idea in 1922 and since 1923 you bravely promoted it in all Slovakia and in Vienna.” (Sommer, O., 1927, p. 55). The new chairman of the Organization of the EUC became Professor R. Horna, who still edited the issuing of lectures and studies of the EUC and he presented the EUC on the meeting of the board of Masaryk folk-educative organization in Prague on 5<sup>th</sup> June 1927, as well as on the meeting of folk-educative workers from Slovakia, which took place during holidays in Banská Bystrica. In the academic year 1926/1927 there was a lack of finances so the lectures in the countryside had to be restricted and “in Bratislava the lectures were restricted to the minimum considering the low interest of the local audience.” (Zpráva odstupujícího rektora University prof. JUDRa Otakara Sommera, 1928, p. 12). The EUC organized presentations of the professors in bigger Slovak towns (Trenčín, Nitra, Banská Štiavnica, Banská Bystrica, Zvolen Lučenec, Ružomberok, Levoča, Košice, Prešov etc.) and in Opava, Krnov, Karviná, Moravská Ostrava; two lectures in Vienna and a holiday course for teachers in Turčiansky Svätý Martin.

As the number of visitors in Bratislava was lower than the attendance on lectures held in other towns, the EUC joined with Edifying organization for Slovakia with its seat in Bratislava and together founded Higher folk university. There were lectures of for example D. Orel “Chapters from the history of music” and of Z. Frankenberg “On development of human body” in the academic year 1927/1928 and in the academic year 1928/1929 there were lectures of Prof. R. Horna “Overview of the history of Hungarian law” and “On development of the middle European constitutions”, of F. Žákavec “Czechoslovak painting of the 19<sup>th</sup> century,” of J. Buchtala “Murders by poisoning, their social meaning and their investigation” or of A. Mach “Care for the teeth.” (Bakoš, V., 1991). The EUC used the chance to present itself at the event “Exhibition of the current culture in Czechoslovakia,” held from May to September in exhibition area in Brno, on which it presented the issued lectures and studies,

<sup>3</sup> The organization was founded in 1920 by F. Jetel with the original name „Comenius – the organization for support and maintenance of Czech schools behind the borders of Czechoslovak republic in Prague;“ which changed in 1923 to „Comenius – the organization for support of Czechoslovak foreign schools in Prague.“ It was apolitical and had the aim to support all schools abroad with Czech and Slovak as a teaching language; Czech and Slovak libraries and reading rooms, to organize holiday camps in Czechoslovakia for Czech and Slovak children from abroad, to give lectures, debates and academies about famous people born in Czechoslovakia and active abroad, collect finances, keep the national awareness in people active abroad etc. The organization cooperated intensively with the organization with the same name in Vienna. After the Protectorate of Bohemia and Moravia was created, the activity of the organization was reduced and by the decision of empire-protector from 31<sup>st</sup> January 1942 the organization was cancelled.

posters of the folk-educative activities and number of its lectures as a part of university exhibition.

### 3 The Extension of Czechoslovak universities in the Czechoslovak Republic

The mutual contentual and organizational coordination of these three university extensions led finally to its fusion so on 1<sup>st</sup> June 1926 they created a common institution called the Extension of the Czechoslovak universities in the Czechoslovak Republic.

The regulations of the Extension, which were accepted by the Ministry of Education and National Edification on 16<sup>th</sup> June 1926 under number 51.063/24-IV, stated the main role: "To provide opportunity to all classes of people to gain education and to enrich it on the scientific basis to reach mental and moral uplift of the Czechoslovak people. The Extension fulfills this role by providing:

- a) general education
- b) professional education
- c) critical education

to broad classes, which should make the participants able to think individually and critically. The Extension lays special emphasis on the nearest contact with current mental streams of the period, trying to meet all the needs of the personal, national and state life." (Horna, R. - Opravil, J. - Paulová, M., 1928, p. 32). The events of the extensions were public for a small organizational fee and everyone without a certificate of previous education could have attended them.

In practice, the university extensions organized:

1. courses and lectures in the seat towns of the universities, at the expense of the corresponding universities
2. lectures in municipalities on the basis of the request and payment of the local organizers.

The Boards made up from the representatives of the universities in Prague, Brno and Bratislava were on the head of the Extensions. One member of the Board represented 10 professors (Halas, 1981). The Boards elected 4 chairmen and the chairmen of all three extensions created a Representation of the Extension of Czechoslovak universities, which met annually at one of the seats of extensions and its roles were:

- "to discuss all matters that are common for all three local extensions,
- to elaborate individual principles for folk-educative activity of the Extension in the whole Republic,
- to keep contact, mutual cooperation and unity in organizational issues." (Horna, R. - Opravil, J. - Paulová, M., 1928, p. 18).

The function of the Board or representation member lasted for five years.

Tab. no. 11 Lectures organized by all extensions in Slovakia during 1918 – 1928

| Town                  | Number | Town                | Number |
|-----------------------|--------|---------------------|--------|
| Bardejov              | 3      | Poprad              | 3      |
| Brezno                | 4      | Prešov              | 13     |
| Banská Bystrica       | 86     | Prievidza           | 1      |
| Banská Štiavnica      | 17     | Rožňava             | 2      |
| Kežmarok              | 11     | Ružomberok          | 8      |
| Komárno               | 3      | Sereď               | 1      |
| Košice                | 9      | Skalica             | 9      |
| Kremnica              | 14     | Spišská Nová Ves    | 9      |
| Levoča                | 18     | Tisovec             | 3      |
| Lučenec               | 3      | Topoľčany           | 1      |
| Turčiansky Sv. Martin | 24     | Trenčianske Teplice | 1      |
| Liptovský Sv.         | 3      | Trenčín             | 8      |

|            |    |        |    |
|------------|----|--------|----|
| Mikuláš    |    |        |    |
| Námestovo  | 1  | Trnava | 2  |
| Nitra      | 21 | Zvolen | 25 |
| Podbrezová | 5  | Žilina | 6  |

(Elaborated according to the data: Horna, Opravil and Paulová 1928, p. 49 – 53)

After the Extension of Czechoslovak universities in Czechoslovak Republic was founded, the meetings took place during the academic year 1926/1927 concerning the possible common issuing of Extension's lectures and studies, but the idea failed on the fact that no appropriate publisher was found. The effort was successful in the next academic year and the representatives of the individual boards of extensions (Prague, Brno and Bratislava) agreed that from the academic year 1928/1929 "all the three Czechoslovak extension boards will issue a common Collection of lectures and debates in the Unity of mathematicians and physicians in Prague." (Zpráva odstupujícího rectora magnifica prof. MUDRa Jiřího Brdlika, 1930, p. 17)

Based on this agreement, the new edition called "Extension of the Czechoslovak universities in Czechoslovak Republic. Collection of lectures and debates. Issued with the support of Ministry of Education and National Edification." started to be issued. The edition was divided into three parts:

Part I. Extension of Prague universities.

Part II. Extension of Brno universities.

Part III. Extension of Comenius University in Bratislava.

Tab. no. 12 Publications issued by the EUC in edition „Extension of the Czechoslovak universities in Czechoslovak Republic“

| Author                                | Year | Name  | Number of pages | Nr. |
|---------------------------------------|------|---|-----------------|-----|
| Kolář, A.                             | 1929 | Relation of the European culture towards the antique.   | 272 p.          | 1.  |
| Kopal, J.                             | 1930 | Romain Rolland.   | 97 p.           | 2.  |
| Kuklová-Štúrová, B.                   | 1931 | Contagious diseases.                                    | 60 p.           | 3.  |
| Eisner, J.                            | 1932 | Devín in Bratislava.                                    | 13 p.           | 4.  |
| Kopal, J.                             | 1934 | On French war novel.                                    | 66 p.           | 5.  |
| Křivý, M.                             | 1934 | Ten chapters on nerve and mental diseases for everyone. | 96 p.           | 6.  |
| Knappek, L., Eisner, J., Ondrouch, V. | 1935 | Some lectures on the history of Slovakia. I.            | 97 p.           | 7.  |
| Kolář, A.                             | 1936 | Antique and modern democracy.                           | 119 p.          | 8.  |
| Kopal, J.                             | 1937 | George Sandová and Božena Němcová.                      | 26 p.           | 9.  |
| Buben, V.                             | 1938 | Studies on modern French.                               | 114 p.          | 10. |

Even if the main role of the common Extension was the organization of lectures, respectively issuing of lectures and studies, its members organized also courses for teachers and specialized seminars; they prepared exhibitions and organized trips. It was very important that universities were in near contact with the developing theoretical knowledge of the given period at one side and they should have had "vivid understanding for the needs of personal, national and state life" on the other side (Chlup, O. - Kubálek, J. - Uher, J., 1938, p. 407).

#### 4 Activity of the EUC during crisis

The years of crisis had influence also on the activity of Comenius University in Bratislava and reflected into all of its spheres: pedagogical, scientific-research, publication, lecturing as well as into material equipment. This was the reason why the yearbook of Comenius University for the academic year 1928/1929 was published only in 1930 with such evaluation: "The lack of finances in the restricted state budget for universities did not allow to provide money for the publication of the yearbook for the next years" and the following yearbook was published in 1935, describing the state of the previous academic year (Úvodní slovo, 1934).

The clear evidence of the tragic impact of the crisis on the EUC in Bratislava is the fact that "the initial 40 000 Kčs provided for the extension's activity by the Ministry was in the 30s restricted to at first 8000 Kčs and later to only 6000 Kčs." (Paulínyiová, E., 1969, p. 310). The evaluation of the university's activity for the academic year 1932/1933 reveals that special grants, items for social care for students, for issuing of publications, for scientific staff and lecturing activity were sharply restricted. "The carrier of the popularization work here, the Extension of Comenius University, stopped the publication activity completely due to the lack of finances and it had to restrict the lecturing activity to the minimum." (Řeč odstupujícího rektora Magnifica prof. Dra Viktora Reinsberga, 1934, p. 9). Despite this, there were a few lectures on the whole area of Slovakia; the connection to Vienna was being kept, the teachers could attend lectures in the building of radio and the lecturers took part in the 4<sup>th</sup> year of holiday course of catholic pedagogy in Banská Bystrica. The situation of the EUC did not improve in the following year, it got even worse, because, as the rector B. Tomsa stated in the evaluating report of the academic year 1933/1934, by the restricting or total stopping of grants "was the extensive work nearly handicapped in the last year. The kind of replacement became the lectures of the university in the radio, thanks to the radio-journal that accepted this idea." (Řeč odstupujícího rektora prof. Dr. Bohuše Tomsy, 1935, p. 6-7.). Such worsened situation continued also in the next period; it was not even possible to "run the extension's office in the academic year 1934/1935 due to the lack of finances." (Řeč odstupujícího rektora magnifica prof. Ph. Dr. Antonína Koláře, 1937, p. 6.). The lack also reflected into the restriction of possibilities to publish and the Board of the EUC was forced to decline requests of the various folk-educative organizations to give edifying lectures, so there were only a few of them. The presentations in Bratislava concentrated on the history of Slovakia, organized in cooperation with Edifying organization for Slovakia, belonged to them – J. Eisner: Slovakia on the doorstep of history (5<sup>th</sup> February 1935), V. Ondrouch: Slovakia in the Roman-German period (12<sup>th</sup> February 1935), V. Chaloupecký: Slovakia in the Middle Ages (19<sup>th</sup> February 1935), L. Knappek: Church organization in Slovakia (28<sup>th</sup> February 1935). The EUC planned to issue these presentations in the edition of extension's lectures, but it did not happen anymore. Beside this cycle, the lectures were also given in the summer term in Piešťany – I. Karvaš: Current economic crisis (24<sup>th</sup> February 1935), A. Milota: The issue of abortions from the viewpoint of law (28<sup>th</sup> February 1935), K. Koch: On miraculous doctors (3<sup>rd</sup> March 1935), in Skalica – V. Klecanda: The importance of the 85<sup>th</sup> birthday of the republic's president (10<sup>th</sup> March 1935), in Nitra – J. Babor: Racial problem and heredity (30<sup>th</sup> March 1935), R. Horna: On west – Slovakia winemaking in the past and present (13<sup>th</sup> April 1935), I. Karvaš: Economic autonomy of Slovakia (4<sup>th</sup> May 1935), K. Kizlink: Law and justice (11<sup>th</sup> May 1935) and in Vienna – V. Klecanda: Fight of Zborov (12<sup>th</sup> January 1935) and J. Babor: On diluvian human (13<sup>th</sup> May 1935). The lectures of the university pedagogues in Bratislava radio tried to "save" the situation of the extension's lectures. Such unfavorable conditions were in the activity of the EUC until the end of existence of the interwar Czechoslovak Republic. Also in the academic year 1935/1936, the EUC "had to restrict its lectures and publishing activity to the minimum, what was a great cultural shade." (Zpráva odstupujícího rektora magnifica prof. MUDr. Bohuslava Poláka, 1938, p. 5.). Concerning the lectures in

Bratislava, the cooperation with Edifying organization for Slovakia was still active, in the given period on the topic "Fight against social diseases;" two lectures were held in Vienna and only a few of them in the Slovak countryside; the lectures in the radio continued. This situation persisted until the end of Czechoslovak Republic in 1938.

#### 5 Conclusion

The Extension of the Comenius University in Bratislava represented a form of edifying-educative activity of Comenius University in Bratislava, which was "concentrated on the popularizing of the newer results of scientific work." (Pavlik, O., ed., 1984, p. 230). It could be founded after the Comenius University in Bratislava had been founded and the Czech Professor M. Weingart did the most to found it, because he used his experience and knowledge from the similar schools of the Prague and Brno extensions. Bratislava teachers took them as example and organized lectures in towns and villages in the whole Slovakia, in Vienna and later also in Bohemia and Moravia. Beside public lectures, it also concentrated on university courses for teachers, courses for edifying workers in the army and on radio programs. Compared to the other extensions in Prague and Brno, the EUC was the best concerning the issuing of lectures and studies in its own edition and it successfully participated in the work of the common Extension of the Czechoslovak universities in the Czechoslovak Republic. Its fruitful activity was influenced by the crisis years and by the lack of finances, what led to the continual restriction of the lectures and publishing activity; only radio lectures and special public presentations were given. "The Extension of the Comenius University in Bratislava during bourgeois Czechoslovakia confirmed that its founding was a well-deliberated act, which led to the cultural and social uplift of Slovakia." (Mátej, J., 1976, p. 351). The EUC continued with its activity also after the interwar Czechoslovakia no longer existed and it stopped to exist after 1948 when the institutions active in the area of adult education were united and re-organized.

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**Primary Paper Section: A**

**Secondary Paper Section: AB**

## THE IMPORTANCE OF MATHEMATICS AND PHYSICS FOR THE STUDY OF SAFETY AND PROTECTION OF HEALTH AT WORK

<sup>a</sup>DANKA LUKÁČOVÁ, <sup>b</sup>GABRIEL BÁNESZ, <sup>c</sup>IVANA TUREKOVÁ

*Constantine the Philosopher University, Faculty of Education,  
Department of Technology and Information Technologies,  
Dražovská cesta 4, 949 74 Nitra, Slovakia  
email: <sup>a</sup>dlovakova@ukf.sk, <sup>b</sup>gbanesz@ukf.sk, <sup>c</sup>iturekova@ukf.sk*

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**Abstract:** The article deals with the learning results of students in Math and Physics in the period of 6 years. The research sample, consisting of 355 students, analyzed their study results and compared the success of students in the different organization of the inclusion of subjects in teaching. For five years, teaching Math and Physics was done in one subject, and after evaluating the student's learning results, teaching was divided into two separate subjects. After this organizational intervention a survey was conducted of how the results of students changed from the original state and whether this way of teaching subjects reflected in the students' ability to apply acquired knowledge in other subjects of technical focus. The results say that the new concept of teaching Math and Physics has led to more students being successful in these subjects.

**Keywords:** health and safety at work, mathematics, physics, research.

### 1 Introduction

Occupational Safety and Health (OSH) is a multidisciplinary department focused on safety, health and well-being at the workplace. Students studying in the field of safety at work learn their skills in areas such as safety legislation, safety behavior, ergonomics, chemical safety, risk management and occupational hygiene (Andersson, Gunnarsson, Rosen, 2015). Applying their knowledge is closely related to other scientific areas such as Math and Physics. In this area, conducted research was done by K. Thanikasalam (2017), who found that the level of exploitation of Math and student logic during their practice in identifying areas of danger, identifying the population at risk, assessing the risk of exposure and prevention and control was very high. The findings showed that students who successfully completed Math during their studies were more successful in solving problems. Thus, Math is an important part of OSH practice with the necessary accuracy in measurement and calculation, in quantifying risks, logical considerations, and conclusions.

Math and its methods provide an apparatus for solving application tasks in various areas of economic practice, e.g. in economics, technology, biology, agriculture, and others. Teaching Math at universities and faculties of vocational training aims to enable students to understand the importance of using mathematics as a means of solving tasks in other specialized subjects (Gregáňová, R., 2012, Neuschlová, M., 2018). The proper joint of information and communication technologies, mathematical theory and solving of applied tasks in the teaching of mathematics and physics improves the quality of university education and from interdisciplinary relationship point of view develops the students' abilities to obtain new complex knowledge (Országhová, 2007).

At Pedagogical faculty Constantine the Philosopher University in Nitra there is the possibility of bachelor study in OSH study program since the academic year 2005/06. Graduates in the field of occupational safety and health can analyze problems and opportunities that open up in different areas of occupational safety, design and implement OSH systems, have the ability to integrate them into other systems or incorporate other systems into it.

During bachelor study, in addition to professional knowledge and skills, students are expected to acquire a broader theoretical background as defined in the core knowledge of the field of study: applied Mathematics and applied Physics. This idea is in line with the principles of curriculum development for technical fields of study and has been used since the year 2009. Therefore,

since the academic year 2010/11, the subject of Applied Mathematics and Physics has been included in the OSH bachelor study program.

The inclusion of this subject has raised concerns that the attractiveness of security studies will be reduced from the perspective of students. Science subjects are generally the least interesting and challenging for students. Science education has been (and is) very challenging for universities, as students come to university from different types of schools with varying levels of knowledge in Mathematics and Physics. Interest in studying technical disciplines has decreased. Of the students who report to this study, many consider it only a substitute solution, as they have not reached more attractive subjects. This is also related to the level of Math knowledge, which is very low, as confirmed by researches by several authors (Bezákova, 2000, Serafin, 2016). At the same time students believe mathematics and physics subject matter is difficult (Saleh, 2012, Whitelegg, Parry, 1999), boring and irrelevant to their lives.

Therefore, we have included in the content of the subject Applied Mathematics and Physics topics that we assumed students in secondary schools did not take over, and yet are necessary for the given field. The content of the course consisted of: systems of equations, limits, derivations, integrals, fundamentals of mechanics and basics of kinematics. Since there was no subject with similar content in the study program in the previous period, we were wondering how students would manage it. The course was included in the study plan as a compulsory subject in the winter semester with a 2-hour weekly lecture and a 2-hour seminar. The subject Applied Mathematics and Physics was completed by an examination consisting of a written test. We followed the results of the students in the above-mentioned subjects during the five academic years: 2010/11 - 2014/15 on a total of 238 students. We found that the benefit of students from the subject was significantly influenced by the inclusion of thematic units from physics to the subject, so we proposed to increase the time allocation of the subject or divide the subject into two semesters and thus provide students with enough time to complete the knowledge in this area and master the subject (Lukáčová, Bánesz, 2015).

### 2 Research questions and methodology of the research

In 2014, when we repeatedly accredited the Health and Safety at Work study program, we changed - applied Mathematics and Physics by two separate subjects: Mathematics, Physics. Mathematics remained in the winter semester of the first year in the range of 1-hour lecture, two hours' seminar and Physics was included in the summer semester of the first year in the same range as Mathematics. After the subjects were taught in the academic year 2015/16, we conducted a survey to find out what changes the change in teaching Mathematics and Physics for the OSH study field brought. In the survey, we tried to answer surveying questions:

How did the average grade of Mathematics and Physics change from the original state?

How did the number of students who did not successfully complete the subject change?

How did the benefits of science students affect their results in the subject Machines and their parts?

The sample for the needs of the survey consisted of 117 students of the first year of the bachelor study and OSH study program. To verify the observed phenomena, we found the average grade of students from the above subjects and graphically displayed the data (Chart 1). Evaluation of subjects at the university is based on a grading scale consisting of six grades: A - excellent (1), B - very good (1.5), C - good (2), D - satisfactory (2.5), E - sufficient (3), FX - insufficient (4). All insufficient evaluations (grade 4) were included in the calculation of the average if the

student repeated the subject exam. The survey was based on statistical data from an academic information system that records student learning outcomes. We compared the data collected with the data in the 2015 survey. The composition of the exploratory sample and basic data is presented in table 1.

Table 1 Survey sample composition

| subject                          | average grade | number of students | number of insufficient (grade 4) |
|----------------------------------|---------------|--------------------|----------------------------------|
| Mathematics                      | 3.12          | 63                 | 21                               |
| Physics                          | 3.41          | 54                 | 17                               |
| Mathematics and Physics Together | 3.26          | 117                | 38                               |
| Applied Mathematics and Physics  | 3.31          | 238                | 37                               |

From the comparison of students' study results, we can conclude that the average grade of students in Mathematics has slightly improved with the average grade of Applied Mathematics and Physics. As expected, the average grade in Physics was worse than in Mathematics as well as in the subject of Applied Mathematics and Physics. The subject of Physics, as shown in table 1 and figure 1, has the worst average grade, while the relative abundance of failed students (grade 4) is high (figure 2).

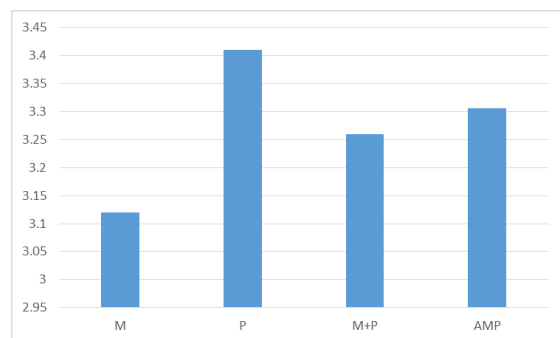


Figure 1: Average grade of students (M-Mathematics, P-Physics, AMP-Applied Mathematics and Physics)

By dividing the original subject of Applied Mathematics and Physics into two separate subjects, we managed to improve the average grade from Mathematics, on the other hand the results from Physics show a worse average grade than previously the subject of Applied Mathematics and Physics. Despite the high relative abundance of unsuccessful students on both subjects (figure 2), by distributing the subject into two subjects, there were fewer students who could not continue their studies because those students who were not successful in Mathematics were not always the same who were not successful in the subject of Physics.

For verification of the second monitored phenomenon, we present a graph of relative abundances (in %) of unsuccessful students in the studied subjects - figure 2.

Figure 2 shows a clear increase in the relative number of students who have not completed the subject after dividing it into two separate subjects. This number rose from 15.55 % to 33.33 % in Mathematics and 31.45 % in Physics. However, when we watched again if there is a correlation between the number of enrolled students and the number of students who do not complete the subject, we found that this relationship exists with a correlation rate of  $r = 0.67$ , or moderately high binding. In that year, when we were teaching Mathematics and Physics alone, more students were admitted to the OSH curriculum than in previous years, and there was an increase in failed students.

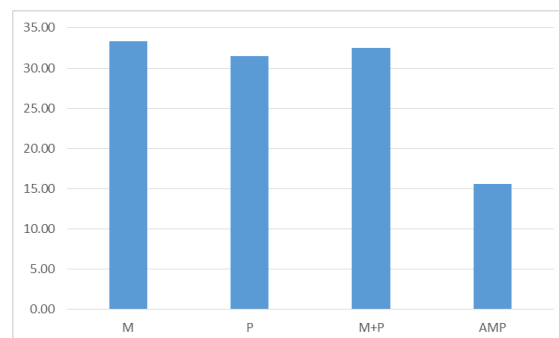


Figure 2: Relative student frequency that failed in the subject

The final examination of the students was slightly more effective, as shown in figure 3, which illustrates the average number of test terms per student. The average number of terms dropped from 1.8 to 1.24 in Mathematics, the average number of terms in Physics remained at 1.74.

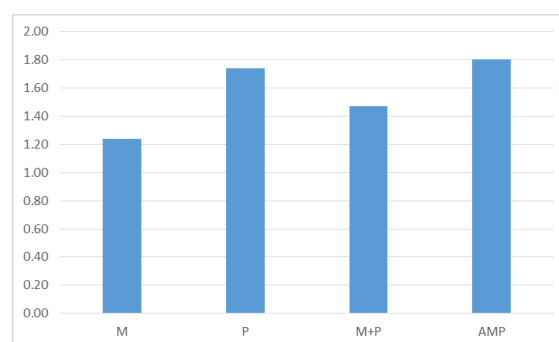


Figure 3: Average number of exam terms in individual subjects

This state illustrates the situation of the final evaluation of students, who were very successful in Mathematics on the first term. These changes had a positive impact on Mathematics teaching.

To answer the latest research question, we evaluated the average student rating in the subject Machines and their parts. In this subject, it was necessary to be able to apply the knowledge of Mathematics and Physics to successfully finish the subject. The course is focused on basic principles of machines and selected types of mechanisms (mechanical, hydraulic, pneumatic) and is taught in the range of 4 hours per week. We investigated whether there were differences in the benefit of students from the subject before and after 2015. The data obtained were processed into table 2.

Table 2: Evaluation of subject Machines and their parts

| year              | 2010/11 | 2011/12 | 2012/13 | 2013/14 | 2014/15 | 2015/16 |
|-------------------|---------|---------|---------|---------|---------|---------|
| average           | 2.58    | 2.83    | 2.97    | 3.01    | 2.96    | 3.22    |
| Not ended         | 23      | 22      | 28      | 22      | 19      | 21      |
| number of ratings | 87      | 86      | 91      | 55      | 65      | 87      |
| Not ended (%)     | 26 %    | 26 %    | 31 %    | 40 %    | 29 %    | 24 %    |

A comparison of the student averages between 2010 and 2016 indicates that the students achieved approximately the same results. When we calculated the total average of students for 2010 to 2015, we got a value of 2.87, in 2016 it was 3.23. Despite improvement in teaching itself, the students worsened on average. On the other hand, the relative numbers of students who have not completed the subject show different results. The percentage of failed students dropped from 30 % to 24 %, which is a significant advance. Overall, we can say that more students

can master subjects that require to apply mathematical and physics knowledge, albeit with a worse overall assessment.

Interesting and comparable findings were obtained by the authors Zvára - Anděl (2001), who examined the connection between the results of the admission procedure and the success of the study at the Faculty of Mathematics and Physics of Charles University in Prague. They have conducted research that shows that the average student is only 50 % likely to go to the third year of study in study programs Physics, Informatics, and Teaching and only 9 % in Mathematics. Therefore, in their contribution, the authors suggest modifying the teaching in the first two years of the study so that it is adapted to the level of incoming students and at the same time suggest modifying the curricula of the mentioned study programs in order to maintain the quality of graduates.

### 3 Conclusion

According to the results obtained, we can summarize the conclusions and recommendations for the bachelor study of the OSH study program at UKF in Nitra to the following points: The average grade in Mathematics was slightly improved by creating a separate subject.

The average grade in Physics remained at approximately the same level as the average grade in Applied Mathematics and Physics.

The relative abundance of students who have been unsuccessful in the subject has risen. This is related to the number of students admitted to the field - the higher the number of students admitted, the higher the relative number of unsuccessful students ( $r = 0.67$ ).

Better teaching of Mathematics and Physics has led to more students being successful in the subject. Their evaluation has deteriorated from the past but having more time to master Mathematics and Physics has also been reflected in the subject where they have used their knowledge in applications.

The sense of inability in mathematical problem solving or a lack of talent in math along with feeling of low level of math intelligence may gradually cause negative attitudes towards Mathematics and Physics. The improvement and compensation of students' weaknesses in Mathematics and Physics can have an important role in students' academic motivation (Lotfali, S., Alem, Z. G., 2017).

Regarding the data obtained, we recommend optimizing the number of students admitted to the OSH department during the admission procedure. The acceptance of more students also increases the relative number of students who fail in Mathematics and Physics and cannot continue their studies.

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**Primary Paper Section: A**

**Secondary Paper Section: AQ**

# CURRENT STATE AND DEVELOPMENT DIRECTIONS OF RUSSIAN FEDERATION'S INTERNATIONAL COOPERATION WITH THE CIS COUNTRIES IN THE FIELD OF TRAINING OF POST GRADUATE STUDENTS

<sup>a</sup>ANNA MALTSEVA, <sup>b</sup>NATALYA BARSUKOVA, <sup>c</sup>MARIA GUSEVA, <sup>d</sup>ALEXANDR BIRUKOV, <sup>e</sup>YULIYA ALEKSAKHINA, <sup>f</sup>ELENA GORSHKOVA, <sup>g</sup>IGOR RYZHOV

<sup>a</sup>*Lurye Scientific and Methodological Center for Higher School Innovative Activity, Tver State University, Tver, Russian Federation*

<sup>b</sup>*Lurye Scientific and Methodological Center for Higher School Innovative Activity, Tver State University, Tver, Russian Federation*

<sup>c</sup>*Project management Department, State University of management, Moscow, Russian Federation*

<sup>d</sup>*Project management Department, State University of management, Moscow, Russian Federation*

<sup>e</sup>*Department of Public administration and law, Moscow Polytechnic University, Moscow, Russian Federation*

<sup>f</sup>*Department of Public administration and law, Moscow Polytechnic University, Moscow, Russian Federation*

<sup>g</sup>*Department of economic theories and military Economics, Military University of the Ministry of defence of the Russian Federation, Moscow, Russian Federation*

email: <sup>a</sup>80179@list.ru, <sup>b</sup>starey1951@yandex.ru, <sup>c</sup>boxgusevoy@yandex.ru, <sup>d</sup>vaga@inbox.ru, <sup>e</sup>aleksahina@yandex.ru, <sup>f</sup>drug73@gmail.com, <sup>g</sup>ryzhovi@mail.ru

**Abstract:** The article considers such area of scientific and technological cooperation between Russia and the Commonwealth of Independent States (CIS countries) as training and certification of highly qualified scientific personnel. The authors presents characteristic of the system of training and certification of post graduate students in the CIS countries in comparison with the Russian experience. The authors analyze data on the number of post graduate students from the CIS countries studying at Russian universities. It is concluded that high-rated universities, universities participating in the 5-100 program are the most attractive for teaching post graduate students from CIS countries because of the higher quality level of students.

**Keywords:** international scientific and technological cooperation, certification of post graduate students, Commonwealth of Independent States, academic degrees, post graduate study, dissertation defense

## 1 Introduction

The development of multilateral interaction and integration processes in the space of the Commonwealth of Independent States are formulated by the President of the Russian Federation V.V. Putin as Russia's key foreign policy priorities (Decree of the President of the Russian Federation "On measures for the implementation of the foreign policy course of the Russian Federation", 2012). One of the forms of interstate cooperation among the CIS countries is scientific cooperation - the institutional efforts pooling of scientists from different countries in order to increase the performance of scientific activity, to increase the contribution of science to the economic development of countries, to increase their own scientific authority and potential (Khoperskaya, 2016).

The Russian Federation's strategic documents are also emphasize the importance of developing international cooperation to increase the competitiveness of the Russian education and science system (Maltseva et al., 2017), and the export of educational services. For example, the Strategy of Scientific and Technological Development of the Russian Federation (2016) defines as one of the main tasks of the scientific and technological development of the country "the formation of a model of international scientific and technical cooperation and international integration in the field of research and technological development, allowing to protect the identity of the Russian scientific sphere and state interests in the conditions of internationalization of science and improve the effectiveness of Russian science through mutually beneficial international interaction".

If the economic and political cooperation of the CIS countries is mostly based on institutional interaction, then educational and scientific integration is based primarily on personal communications (Skakovskaya et al., 2018). It is personal professional contacts in the scientific and educational community that most often turn into institutional channels of interstate cooperation, where joint research is made, educational programs are implemented, highly qualified personnel are trained, scientists and scientific information are exchanged, and promising directions for the development of modern science and education are discussed (Khoperskaya, 2016).

The development of international cooperation among the CIS countries concerns not only the joint acquisition and use of new scientific knowledge, but also the assessment of the quality of education (Filippov, 2017) and the level of training of highly qualified personnel involved in integration processes. Therefore, one of the most sought-after forms of interaction between states is the certification of highly qualified scientific personnel, which is implemented in the following aspects:

- evaluation by scientists from CIS countries of the results of scientific studies of applicants for scientific degrees at the national level, presented in publications. In most CIS countries, legal acts regulating the process of certification of highly qualified scientific personnel provide for the publication (full or partial) of the results of dissertation research of candidates for a doctoral degree in foreign scientific publications, for candidates of sciences such a rule is advisory. It is also recommended to present the results of dissertation research at international conferences and symposiums;
- expert evaluation of dissertations prepared by applicants of a scientific degree, with the involvement of scientists from CIS countries as official opponents, members of dissertation councils, expert councils of the Higher Attestation Commission;
- development of common approaches to the recognition of documents on science degrees and academic titles issued in other CIS countries;
- interaction in the field of improving the legal framework for certification of highly qualified scientific personnel, solving strategic issues in the field of their training.

## 2 Materials and methods

The research theoretical basis was theoretical analysis, analysis of documents, systematization, comparison, etc.

The official Internet resources of the Ministry of Science and Higher Education of the Russian Federation, Higher certification commission and a number of other structures were used as the information base for the study.

The relevance of training of highly qualified personnel proved in numerous sources (Solvberg and Rismark, 2016; Halawa et al., 2017). As part of postgraduate education, there is an opportunity for students to develop research competencies that are currently in demand in the field of engineering, innovation, and creative industries, since the career trajectories of postgraduate students are not limited to higher education and research organizations (Valla, 2014; Leirós-Rodríguez et al., 2018). In addition, as part of training, the additional competences are developed in the field of management, innovation and project activities (Kaspersma et al., 2012).

The starting point for the formation of national systems of training and certification of highly qualified scientific personnel in the CIS countries was the successful experience of the Higher Attestation Commission of the USSR, that ensured high prestige of Soviet science in the world. However, in the changing

political, social and economic conditions, there is a need to reform the system of certification of highly qualified scientific personnel.

It should be noted that in most of the western countries the training and certification of scientific personnel is carried out in universities post-doctoral programs. After graduation from post-doctoral programs, dissertations are defended and degrees are awarded (Savina, 2015; Garcia & Nogueira, 2017; Martin, 2012). At the same time, universities are fully responsible for the quality of training, therefore, high demands are made on applicants of scientific degrees.

In the CIS countries, including Russia, training of highly qualified personnel is carried out in research organizations, in educational institutions of higher education and in organizations of additional professional education (Kadnikova & Chvora, 2017). The award of scientific degrees is made by state structures - the highest (national) attestation commission. It should be noted that the Government of the Russian Federation adopted a resolution according to which some scientific organizations will be able to award degrees independently. This list includes universities that has the "Federal University" category and "National Research University" category and several other universities that has been granted the right to implement their own educational standards of higher education. Thus, this list includes almost all universities from the "5-100" program (Kiseleva, 2017).

However, the certification system for scientific personnel in the CIS countries also has its own characteristics due to the political and socio-economic features of development after the collapse of the USSR (Table 1).

Table 1

*Scientific degrees received in the CIS countries\**

| State                      | Scientific degrees  | Legal act   |
|----------------------------|---|---|
| THE REPUBLIC OF AZERBAIJAN | Doctor of philosophy(PhD) (with branches of science)<br>Doctor of Sciences (with branches of science)                       | Law of the Azerbaijan Republic of June 19, 2009 No. 833-IIIQ "On Education"   |
| THE REPUBLIC OF ARMENIA    | Candidate of Sciences<br>Doctor of Sciences   | The Law of the Republic of Armenia dated December 26, 2000 No. ZR-119 "On Scientific and Scientific-Technical Activity"   |
| THE REPUBLIC OF BELARUS    | Candidate of Sciences / Doctor of philosophy(PhD)<br>Doctor of Sciences   | The Law of the Republic of Belarus of October 21, 1996 No. 708-XIII "On Scientific Activities"  |
| THE REPUBLIC OF KAZAKHSTAN | Master of Science<br>Doctor of Philosophy(PhD)<br>Doctor of Sciences  | The Law of the Republic of Kazakhstan dated July 27, 2007 No. 319-III "On Education"  |
| THE REPUBLIC OF KYRGYZSTAN | Candidate of Sciences<br>Doctor of Sciences   | Decree of the Government of the Kyrgyz Republic of August 22, 2012 No. 578 "On approval of regulatory legal acts regulating the activities of the Higher Attestation Commission of the Kyrgyz Republic" |
| THE REPUBLIC OF MOLDOVA    | Doctor of Sciences<br>Habilitation Doctor   | Code of Moldova Republic on Science and Innovations of July 15, 2004 No. 259-XV   |
| THE REPUBLIC OF TAJIKISTAN | Doctor of Philosophy(PhD)- Doctor of Sciences<br>Candidate of Sciences<br>Habilitation Doctor                               | Law of the Republic of Tajikistan dated March 18, 2015 No. 1197 "On Scientific Activity and State Scientific and Technical Policy"  |
| THE REPUBLIC OF UZBEKISTAN | Doctor of Philosophy(PhD) (in the relevant branch of science)<br>Doctor of Science(ScD) (in the relevant branch of science) | Decree of the President of the Republic of Uzbekistan dated February 16, 2017 No. UP-4958 "On the further improvement of the system of postgraduate education"  |

Currently, there are two models of the system of training and certification of scientific personnel in the CIS countries: Soviet

and Western system, each of which has features of training, procedures for certification of scientific personnel and the award of scientific degrees (Atabekova, 2017).

In the system of certification of scientific and scientific-pedagogical personnel in the Republic of Belarus, the Republic of Armenia, the Kyrgyz Republic, as well as in the Russian Federation, currently retains the Soviet model of awarding scientific degrees, that involves obtaining a scientific degree of a candidate of sciences in a particular branch of science, and then obtaining the scientific degree of doctor of sciences.

At the same time, the rapid process of globalization in all spheres of human life, including education and science, encouraging the CIS countries, that are full members of international educational and scientific organizations, to adopt foreign experience in the attestation of scientific personnel.

It is known that the western analogue of the scientific degree of the candidate of science is the science degree of the doctor of philosophy (PhD) (Marinosyan, 2014). Such degrees were introduced in the Republic of Azerbaijan, the Republics of Kazakhstan, Tajikistan and Uzbekistan.

According to the law "On Education", adopted in 2009, graduate school in the Republic of Azerbaijan was closed. The training of scientific personnel is carried out according to the PhD programs and Doctor of Science programs. In accordance with the Law of the Republic of Kazakhstan "On Education", the training of postgraduate students and applicants for a scientific degree was stopped since 2012.

It should be noted that in the Republic of Tajikistan both degrees are awarded: Candidate of Sciences and Doctor of Philosophy.

In the Republic of Moldova and the Republic of Tajikistan, by analogy with Western countries (Germany, Switzerland, Austria, etc.) the degree of "doctor of habilitat"\* (Habilitation Doctor) was introduced. This degree in a number of characteristics is comparable to a doctoral degree in the Russian Federation and gives the right to occupy a professorship at a university. It should be noted that in the Western countries the title "habilitated" is not a separate science degree, but an additional qualification for a doctoral degree.

The main stage of the "habilitation" procedure is the defense of a dissertation that is the research of a much higher level than for a doctor's degree (Savina, 2015). In the countries of Western Europe, "habilitation" assumes that the subject of peer review is not only the dissertation itself, but also the entire work of the applicant, including scientific publications, teaching activities, participation in international scientific organizations, management of research projects, etc.

In order to respect human rights and freedoms, international treaties on the recognition and equivalence of educational documents and scientific degrees were made between the CIS countries.

Originally, the Government of the Republic of Belarus, the Government of the Republic of Kazakhstan, the Government of the Kyrgyz Republic, the Government of the Russian Federation and the Government of the Republic of Tajikistan adopted the Agreement of 11/24/1998 "On the mutual recognition and equivalence of degree certificates, scientific degrees and academic titles" (Republic of Armenia is not joined to the Agreement).

Subsequently, some provisions of the Agreement were integrated into the Treaty on the Eurasian Economic Union (2014) (Articles 96-97), while the agreement, without being formally canceled, in connection with the signing of the Treaty on the EEU, continues

\* Compiled by the authors on the basis of an analysis of the regulatory legal acts of the CIS countries

\* Habilitation - the procedure for obtaining the highest academic qualifications, following the degree of doctor of philosophy in some European and Asian countries.

to apply subsidiary to the provisions of the Treaty in those part that not contradictory to provisions.

Along with the Agreement and the Treaty on the EEU, certain issues of mutual recognition of documents on education, scientific degrees and scientific titles are addressed in bilateral agreements between the CIS countries, which may provide for special rules for mutual recognition of this category of documents.

The list of existing agreements between the Russian Federation and the CIS countries on mutual recognition of education certificates is below:

The Agreement between the Government of the Russian Federation and the Government of the Republic of Belarus on mutual recognition and equivalence of degree certificates, science degrees and academic titles (Moscow, February 27, 1996);

Agreement between the Government of the Republic of Tajikistan and the Government of the Russian Federation on cooperation in the field of certification of highly qualified scientific personnel (Dushanbe, February 12, 1997);

The Agreement between the Government of the Russian Federation and the Government of the Republic of Armenia on the mutual recognition of degree certificates, science degrees and academic titles (Yerevan, September 15, 2001);

The record on the accession of the Republic of Tajikistan to the Agreement between the Government of the Republic of Belarus, the Government of the Republic of Kazakhstan, the Government of the Kyrgyz Republic and the Government of the Russian Federation on mutual recognition and equivalence of degree certificates, science degrees and academic titles of November 24, 1998 (Moscow, February 26, 2002);

The Agreement between the Government of the Russian Federation and the Government of the Republic of Azerbaijan on the mutual recognition of degree certificates, science degrees and academic titles (Moscow, September 23, 2002);

Agreement between the Government of the Russian Federation and the Government of the Republic of Moldova on the mutual recognition of degree certificates (Chisinau, March 3, 2003);

The Agreement of the Members of the Commonwealth of Independent States on the mutual recognition of certificates on higher / higher vocational education (Minsk, May 31, 2013, ratified by Belarus and Kyrgyzstan).

One of the aspects of scientific communication in the CIS space is the defense of dissertations for the degree of candidate or doctor of science by citizens of CIS countries in Russian dissertation councils.

The Decree of the Government of the Russian Federation of September 24, 2013 No. 842 "On the Procedure for Awarding Science Degrees" determined that "persons with a higher education certified by a specialist's or master's degree certificate are allowed to apply for the degree of candidate of sciences", "persons with the degree of candidate of sciences are allowed to apply for the PhD degree."

In accordance with Part 13 of Article 107 of the Federal Law of December 29, 2012 No. 273-FZ "On Education in the Russian Federation", documents on foreign education and (or) foreign qualifications recognized in the Russian Federation must be legalized according to the procedure established by the Russian Federation legislation.

Part 1 of Article 107 273-ФЗ establishes the recognition of foreign education and (or) foreign qualification, which is made in accordance with the international treaties of the Russian Federation governing the recognition and determination of equivalence of foreign education and (or) foreign qualification.

Citizens from the CIS countries who have documents on postgraduate and vocational education that are not covered by the above contracts need to go through the procedure of nostrification (recognition) of documents, that is, obtaining the

consent of the relevant government authorities on the validity of these documents on the territory of the state in order to defend a dissertation in the Russian Federation". For example, this applies to applicants from Uzbekistan, since diplomas of higher professional education of this country are not recognized in Russia, the nostrification is necessary for documents issued in the CIS countries in the 90s of the last century.

As for the rest, the procedure for submitting dissertation to the defense for citizens from CIS countries is the same as for citizens of the Russian Federation.

According to the Decree of the Government of the Russian Federation of September 24, 2013 No. 842 "On the Procedure for Awarding Science Degrees", applicants who have prepared a dissertation "during training programs for scientific and pedagogical personnel in postgraduate training program (adjuncture)" and those applicants who have "higher education, confirmed by a diploma of a specialist's or a master's degree, who prepared a dissertation for the degree of a candidate of sciences without mastering the program of training scientific and pedagogical personnel in postgraduate training program (adjuncture)" are admitted to the degree of candidate of sciences.

A dissertation for a doctoral degree can be prepared in a doctoral program of scientific and educational organizations where dissertation councils are created.

### 3 Results

The CIS countries are currently the main source of candidates for a dissertation interested in Russian science degrees. Admission of foreign citizens to graduate school is carried out on the basis of international agreements of the Russian Federation, as well as under individual contracts concluded by the university, a scientific organization with legal entities or individuals.

According to information and analytical materials on the results of monitoring the performance of educational institutions of higher education for 2015–2017 the data on the number of graduate students from the CIS countries enrolled in 509 state universities of Russia were studied. The analysis showed that the number of post-graduate students from the CIS countries is steadily growing: in 2015 - 1,822 people, in 2016 - 3,218 people, in 2017 - 3,408 people\*\*. Over 2 years, the increase was more than 90%.

In 2015, graduate students (adjuncts, interns, residents) from the CIS countries studied at 223 universities of Russia, in 2016 - at 271 universities, in 2017 - at 287 universities.

The leaders in the number of graduate students from the CIS countries in the period under review are: Peoples' Friendship University of Russia, St. Petersburg State University, National Research Tomsk Polytechnic University, I.I. Mechnikov North-Western State Medical University, St. Petersburg State Pediatric Medical University (Fig. 1).

\* Justification: part 4–11 of Article 107 of the Federal Law of 29.12.2012 No. 273-ФЗ "On Education in the Russian Federation" in accordance with the Administrative Regulations for the provision of state service for recognition of education and (or) qualifications obtained in a foreign country by Federal Service for Supervision in Education and Science, approved by order of the Ministry of Education and Science of the Russian Federation of December 24, 2013 No. 1391 (Registered in the Ministry of Justice of Russia on February 21, 2014 No. 31387).

\*\* The following monitoring indicators were used for the calculation: The total number of graduate students (adjuncts), interns, residents, interns assistants; the proportion of the number of foreign citizens from the CIS countries from among the graduate students (adjuncts), residents, interns, interns assistants of an educational organization in the total number of graduate students (adjuncts), residents, interns, interns assistants.

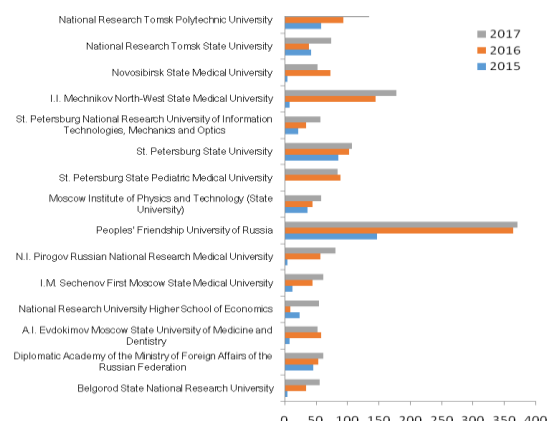
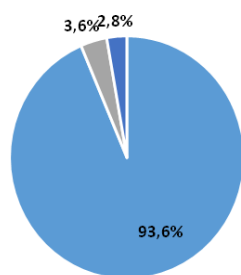


Figure 1. Russian universities - the leaders in the number of postgraduate students from the CIS countries in 2015–2017.

Compiled by the authors on the basis of information and analytical materials on the results of monitoring the performance of educational institutions of higher education for 2015–2017. (URL: <http://indicators.miccedu.ru/>)

1911 dissertation councils operated in the system of certification of scientific and scientific-pedagogical workers of the Russian Federation as of October 31, 2018. Due to the large number of studied objects and the lack of complete and unified information on the defense dissertations for the degree of candidate and doctor of science by citizens from CIS countries on their Internet sites, orders to issue diplomas of doctors and candidates of science placed on the website of the Higher Attestation Commission under the Ministry of Education and Science of the Russian Federation in the section "Diplomas, certificates and certificates" for the period 2014–2017 and 10 months 2018 (from January to October) were used for the analysis.

In the period under review, 63296 people were awarded the degree of doctor and candidate of science, of which 4053 are foreign citizens (6.4%), including citizens of the CIS countries - 1755 people (2.8%) (Figure 2).



Russian citizens ■ Foreign citizens (except CIS) ■ Citizens of the CIS countries

Figure 2. The share structure of the number of defended dissertations in dissertation councils of Russia in the period 2014–2018 in terms of citizenship of applicants

Compiled by the authors based on the analysis of orders to issue diplomas of doctors and candidates of sciences, posted on the website of the Higher Attestation Commission (HAC) under the Ministry of Education and Science of the Russian Federation in the section "Diplomas, certificates and certificates" for the period 2014–2017 and 10 months 2018 (from January to October) (URL: <http://vak.ed.gov.ru/121>)

Figure 3 provides information on dissertation defenses for each studied year.

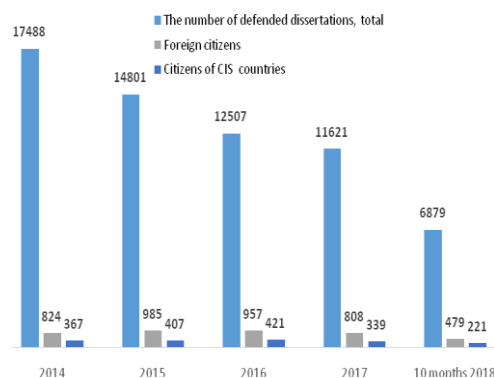


Figure 3. Statistics of dissertations defense in Russian dissertation councils with awarding a scientific degree in 2014–2018.

Compiled by the authors based on the analysis of orders to issue diplomas of doctors and candidates of sciences, posted on the website of the Higher Attestation Commission (HAC) under the Ministry of Education and Science of the Russian Federation in the section "Diplomas, certificates and certificates" for the period 2014–2017 and 10 months 2018 (from January to October) (URL: <http://vak.ed.gov.ru/121>)

It should be noted that alongside a decrease in the total number of defenders in Russian dissertation councils, the percentage of applicants for degrees from CIS countries changed slightly (no more than 0.6%) in both smaller and larger directions. As for the share of applicants from the CIS countries in the total number of foreign applicants, it increased from 44.5% in 2014 to 46.1% in 2018.

The highest rates of the number of defenders in Russian dissertation councils are observed in the Republic of Tajikistan - 56.0% of the defenses for the entire period under consideration (Figure 4). This is due to the fact that in the Republic of Tajikistan attestation for the award of degrees of candidate and doctor of science is carried out by the Higher Attestation Commission of the Ministry of Education and Science of Russia. Despite the fact that the dissertation councils of universities from the Republic of Tajikistan award a science degree in some areas of science, science degrees are awarded exclusively by the Higher Attestation Commission of the Ministry of Education and Science of the Russian Federation and only after reading the content of the dissertation. Applicants after defending dissertations receive Russian diplomas on the award of science degrees of candidate and doctor of science.

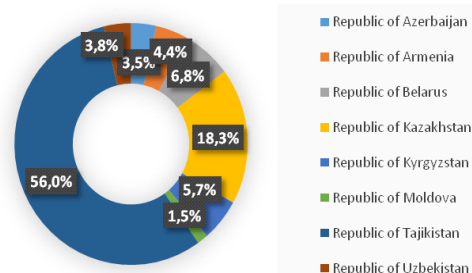


Figure 4. The share structure of the CIS countries in the total number of defended dissertations in dissertation councils of Russia in the period 2014–2018

Compiled by the authors based on the analysis of orders to issue diplomas of doctors and candidates of sciences, posted on the website of the Higher Attestation Commission (HAC) under the Ministry of Education and Science of the Russian Federation in the section "Diplomas, certificates and certificates" for the period 2014–2017 and 10 months 2018 (from January to October) (URL: <http://vak.ed.gov.ru/121>)

The second place by the number of defended dissertations in dissertation councils of Russia took the Republic of Kazakhstan

(18.3% of defenses). The lowest value of the indicator is in the Republic of Moldova (1.5%), which is largely due to the fact that the degree of the candidate of science and its counterpart - Doctor of Philosophy - is absent in Republic (not awarded). Science degree of the candidate of sciences was preserved prior to the opening of doctoral programs, in accordance with the Code of the Republic of Moldova dated July 17, 2014 No. 152 "On Education". With the opening of new doctoral programs, a re-attestation of candidates of science was carried out with awarded of science degrees "master" or "doctor" depending on the results of certification.

The figure 5 shows the number of citizens who have been awarded science degrees by orders of the Higher Attestation Commission of Russia, by CIS countries and by year.

The figure does not show a single trend of changes in the number of citizens who defend dissertation in the period under review. A significant decrease in defended dissertations is observed in the Republic of Tajikistan and the Kyrgyz Republic. As for the Republic of Tajikistan, it is probably connected with the suspension of some dissertation councils of the Higher Attestation Commission of Russia on the territory of this state.

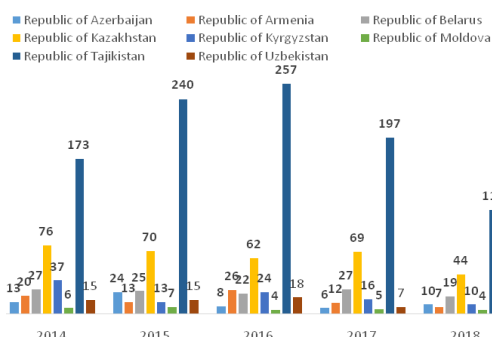


Figure 5. The number of citizens from CIS countries defended dissertation in Russian dissertation councils in 2014–2018.

Compiled by the authors based on the analysis of orders to issue diplomas of doctors and candidates of sciences, posted on the website of the Higher Attestation Commission (HAC) under the Ministry of Education and Science of the Russian Federation in the section "Diplomas, certificates and certificates" for the period 2014-2017 and 10 months 2018 (from January to October) (URL: <http://vak.ed.gov.ru/121>)

The data presented in Figure 6 allow us to conclude that the defense of candidate dissertations in dissertation councils is more in demand by citizens of CIS countries than doctoral dissertations, the ratio on average is 86/14 in percent.

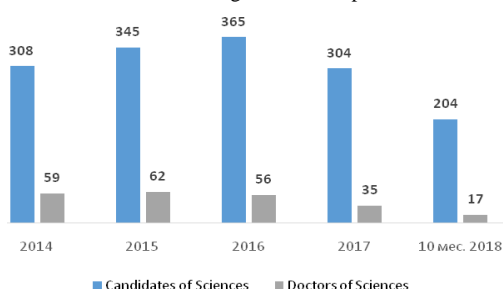


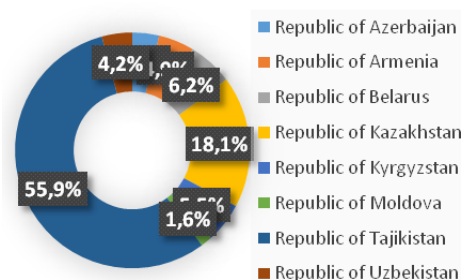
Figure 6. Statistics of the number of citizens from CIS countries who defended their candidate and doctoral dissertations in Russian dissertation councils in 2014–2018.

Compiled by the authors based on the analysis of orders to issue diplomas of doctors and candidates of sciences, posted on the website of the Higher Attestation Commission (HAC) under the Ministry of Education and Science of the Russian Federation in the section "Diplomas, certificates and certificates" for the period 2014-2017 and 10 months 2018 (from January to October) (URL: <http://vak.ed.gov.ru/121>)

At the same time, starting from 2016, there has been a decrease in the number of candidate of sciences and doctor of sciences degrees awarded by HAC of Russia to citizens from CIS countries by 16.7% and 37.5%, respectively.

The leaders in the number of defended dissertations for candidate of sciences degree are the Republic of Tajikistan (55.9%) and the Republic of Kazakhstan (18.1%), the lowest indicators are in the Republic of Moldova (1.6%). Other CIS countries account for from 3.7 to 6.2 percent of the defended dissertations (Figure 7).

### Candidates of Sciences



### Doctors of Sciences

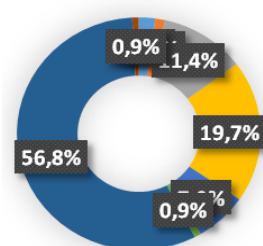


Figure 7. The share structure of the CIS countries in the total number of defended dissertations for candidate of sciences and doctor of sciences degrees in dissertation councils of Russia

Compiled by the authors based on the analysis of orders to issue diplomas of doctors and candidates of sciences, posted on the website of the Higher Attestation Commission (HAC) under the Ministry of Education and Science of the Russian Federation in the section "Diplomas, certificates and certificates" for the period 2014-2017 and 10 months 2018 (from January to October) (URL: <http://vak.ed.gov.ru/121>)

The defense of dissertations for doctor of sciences degree are practically not demanded in such countries as the Republic of Azerbaijan (5 people), the Republic of Armenia (3 people), the Republic of Moldova (2 people), the Republic of Uzbekistan (2 people). The low indicator of the number of applicants for science degrees from the Republic of Uzbekistan is most likely due to the fact that diplomas of higher professional education of this country are not recognized in the Russian Federation, the relevant agreement on the recognition of degree certificates, science degrees and academic titles was not concluded between the Russian Federation and the Republic of Uzbekistan, that causes additional difficulties associated with the need for nostrification of documents.

In the Kyrgyz Republic no one defended his doctoral dissertation in Russia in 2017–2018.

The leaders in the number of defended doctoral dissertations are the Republic of Tajikistan (130) and the Republic of Kazakhstan (45).

The greatest interest among applicants from the CIS countries is caused by scientific branches: medical - 17.55% of all defenses, philological - 12.99%, pedagogical - 11.11%, economic -

10.37% and technical - 10.26% (Table 2). Cultural studies are less in demand - 0.06% of all defenses, architecture - 0.06%, pharmaceutical sciences - 0.11%, sociological sciences - 0.23%. Veterinary, geographical, geological, mineralogical, psychological sciences, art history - also less than 1%. Recently, the interest of foreign applicants in agricultural sciences has grown: in 2014 - 7 defended dissertations, in 2017 - 29 defended dissertations.

Table 2

*Scientific areas for which foreign citizens from CIS countries defended dissertations*

| Scientific branches                   | 2014 | 2015 | 2016 | 2017 | 10 months of 2018 |
|---------------------------------------|------|------|------|------|-------------------|
| Architecture                          | 19   | 11   | 10   | 6    | 6                 |
| Biological Sciences                   | 0    | 4    | 0    | 4    | 2                 |
| Veterinary Sciences                   | 0    | 1    | 2    | 6    | 2                 |
| Geographical Sciences                 | 8    | 3    | 0    | 0    | 0                 |
| Geological and mineralogical sciences | 0    | 1    | 4    | 4    | 3                 |
| Art history                           | 13   | 19   | 39   | 17   | 9                 |
| Historical sciences                   | 72   | 89   | 49   | 48   | 50                |
| Culturology                           | 1    | 0    | 0    | 0    | 0                 |
| Medical sciences                      | 53   | 60   | 46   | 19   | 17                |
| Pedagogical sciences                  | 6    | 4    | 2    | 3    | 1                 |
| Political science                     | 15   | 29   | 9    | 7    | 2                 |
| Psychological sciences                | 7    | 6    | 24   | 29   | 16                |
| Agricultural Sciences                 | 0    | 0    | 0    | 2    | 2                 |
| Sociological sciences                 | 37   | 33   | 48   | 38   | 24                |
| Technical science                     | 0    | 0    | 0    | 2    | 0                 |
| Pharmaceutical Sciences               | 9    | 18   | 34   | 33   | 23                |
| Physics and Mathematics               | 54   | 48   | 44   | 54   | 28                |
| Philological Sciences                 | 0    | 15   | 12   | 10   | 5                 |
| Philosophical Sciences                | 2    | 2    | 24   | 7    | 1                 |
| Chemical Sciences                     | 45   | 28   | 48   | 40   | 21                |
| Economics Sciences                    | 25   | 36   | 26   | 10   | 9                 |
| Jurisprudence                         | 1    | 0    | 0    | 0    | 0                 |

*Compiled by the authors based on the analysis of orders to issue diplomas of doctors and candidates of sciences, posted on the website of the Higher Attestation Commission (HAC) under the Ministry of Education and Science of the Russian Federation in the section "Diplomas, certificates and certificates" for the period 2014-2017 and 10 months 2018 (from January to October) (URL: <http://vak.ed.gov.ru/121>)*

If we consider this problem in a country context, then applicants from the Azerbaijan and Kyrgyz Republics most often defend dissertations in Russian dissertation councils in the field of medical sciences (50.8% and 36% of defenses, respectively); the economic direction is the most popular in the Republic of Armenia (25% of defenses); technical and physical and mathematical sciences are the most popular in the Republic of Belarus (35% of defenses); technical, medical and pedagogical sciences are in demand in the Republic of Kazakhstan (18.7%, 16.2% and 15.3%, respectively); pedagogical sciences (23% of defenses) are the most popular in the Republic of Moldova; philological sciences (19.5%), medical sciences (13.6%) and pedagogical sciences (12.4%) are the most popular in the Republic of Tajikistan; medical sciences (45.5% of defenses) and technical sciences (39.4% of defenses) are the most popular in the Republic of Uzbekistan.

#### 4 Conclusions

Thus, the analysis shows the presence of active cooperation in the field of training highly qualified personnel between Russia and the CIS countries.

Scientific cooperation at the institutional level, the exchange of leading scientists for consultation and acquaintance with the results of scientific research, the participation of Russian specialists in the training and certification of graduate students and doctoral students from the CIS countries (Khoperskaya,

2016), the promotion of advanced training of scientists of the post-Soviet republics, participation of scientists in science events (congresses, seminars, conferences, etc.) held by the CIS countries can be considered as scientific communications (Mal'tseva, et al., 2018), that aimed, including to strengthen the role of the Russian Federation, the Russian science and education in the CIS countries space. In turn, scientific and educational communications, along with economic and political cooperation, are an instrument of the "soft power" of the foreign policy of the Russian Federation and the realization of national interests.

In the conditions of active globalization of science in the CIS countries, as well as political trends, communications with organizations from the European Union, the USA, and China are becoming increasingly important for the scientific and educational sphere of the CIS countries (Maltseva, Veselov, Monakhov, Karasyova, 2017). The domestic system of training highly qualified personnel and their certification, retaining its individuality against the background of other countries, must increasingly meet international requirements in order to remain attractive to applicants from CIS countries.

Obviously, taking into account the change of generations, the relations between scientific and educational organizations in Russia and the CIS countries formed in Soviet times are increasingly weakened. The question of expanding opportunities for applicants from the CIS countries on the preparation and defense of dissertations for the science degrees is very relevant, including taking into account the possibilities of introducing (expanding) quotas for training highly qualified personnel in Russia.

The analysis also demonstrated the obvious role of the quality level of training of personnel by domestic universities. Thus, high-rated universities, universities participating in the 5-100 program are the most attractive for teaching graduate students from the CIS countries. Taking into account the ongoing and outlined process of reforming the national education systems of the CIS countries, it is the qualitative component in the training of highly qualified personnel that can become the basis for expanding scientific cooperation in this area.

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#### Primary Paper Section: A

#### Secondary Paper Section: AM

## DRAFT METHOD FOR VALUATION OF SMALL LONG-TERM FIXED ASSETS

<sup>a</sup>JAN MAREČEK, <sup>b</sup>JAKUB HORÁK, <sup>c</sup>JAN HEJDA

*Institute of Technology and Business, School of Expertness and Valuation, Okružní 517/10, 37001 České Budějovice, Czech Republic*

*email:* <sup>a</sup>19723@mail.vstecb.cz, <sup>b</sup>horak@mail.vstecb.cz, <sup>c</sup>hejda@fm.vse.cz

**Abstract:** The aim of our paper was to create a methodology for determining the value of small tangible fixed assets. For this, a flat-rate valuation method is used. The compilation of the instrument for determining the value of small tangible fixed assets is based on observation of the Czech market in this type of goods. The method is applied to the model association XYZ, which was in the research before its transformation into a limited liability company. The results presented in the form of an amortization scale can be applied to other types of valued assets, provided all requirements are met.

**Keywords:** Small tangible fixed assets, lump sum method, amortization scale, association, limited liability company, property valuation, property classification

### 1 Introduction

In this paper we will deal with the valuation of small tangible fixed assets (hereinafter referred to as “STFA”) of a model association (hereinafter referred to as “XYZ Association”) of two individuals operating together in the field of hair and cosmetics products sales with a focus on hair and cosmetics studies. The business model of the XYZ Association is the so-called mail-order wholesale. The Association is defined in Act No. 89/2012 Coll. of the Civil Code (hereinafter referred to as the “CC”). The CC deals with this type of relationship in § 2716 - § 2755 (Czech Republic, 2012a). Generally, the assets of an enterprise are valued with regard to its purpose. Most often this value has a meaningful ability directly for its owners or partners. It is also an integral part of accounting, for example in its accounting depreciation. In our case we deal with its valuation in order to transform the association into a limited liability company (LLC). Information on how this transformation will change the conditions for the function of a newly formed company is readily ascertained in Act No. 90/2012 Coll. on Business Companies and Cooperatives (Business Corporations Act) (Czech Republic, 2012b).

We will value the STFA of the XYZ Association using the flat-rate valuation method we have created.

### 2 Literature research

The formation of the association is subject to a contractual obligation of two or more natural persons. The number of members in the association is neither closed nor limited by this obligation; during the very existence of the association, other natural persons may enter it as well as leave the association. The advantage of the association is that its establishment does not require a contract drawn up in writing. The oral agreement of the members of the Association has the same weight. However, in the event that property is pooled, it must be listed (Bezouška, Piechowiczová, 2013).

The association does not have legal personality, so it is also incapable of legal acts and duties, it cannot own, sell or donate anything. Assets acquired in the course of the joint activity of its members become co-owned by all members of the Association. In the case of legal relations, the individual members of the Association enter them separately. The Association is not subject to any registration of its existence (Nýltová, Marinič, 2010).

In the event that an association is established by a contractual obligation of two or more natural persons, these persons shall jointly contribute to the achievement of the common goal by their activity or by the deposit of property. The individual shares of each member's assets should be included in the contractual obligation. If this is not the case, the shares of all members in the property are the same (Horáková, 2014).

Pursuant to Section 2727 (1) of Act No. 89/2012 Coll. no member of the Association may, without the consent of the other members, do on his own or another account anything that is competitive in relation to the common purpose. If this happens, other members may demand that the member abstain from such conduct (Czech Republic, 2012a).

Members of the Association are liable to third parties jointly and severally. Since the reason for the XYZ STFA valuation is its transformation into a capital company LLC with legal personality, it should be noted that according to Hobza et al. (2015) guarantees this type of legal entity unlimited for its obligations. However, individual members of the LLC only guarantee up to the amount of the difference between the paid deposit obligation and the state recorded in the Commercial Register at the time when they were invited by the creditor to perform. On the other hand, in a joint stock company (JSC), shareholders are not personally liable for any liabilities, they only have a payment obligation.

Property valuation is regulated by Act No. 151/1997 Coll. Act on Valuation of Property and on Amendment of Some Acts (Act on Valuation of Property). Pursuant to Section 2 (1) of Act No. 151/1997 Coll. property and service are valued at the usual price, unless this law provides for another method of valuation. For the purposes of this Act, the usual price is the price that would have been achieved by selling the same or similar property or providing the same or similar service in the ordinary course of trade in the Czech Republic on the valuation date (Czech Republic, 1997). All circumstances affecting the price are considered, but the effects of the extraordinary circumstances of the market, the personal circumstances of the seller or buyer, and the influence of special popularity are not reflected in the price (Vrbka et al., 2019).

The asset valuation method (Stehel et al., 2019) may be used to measure items on the assets side of the balance sheet. These items can be valued on the basis of historical prices, based on the cost of restoring these items, on the basis of cost savings and on the basis of market values (Mařík et al., 2018).

Another method by which the company's assets can be valued is the book value described by Jan and Ou (2012). They claim that companies with negative book value are able to survive for a number of years before bankruptcy. Maliené et al. (1999) introduces a method of valuing a company's assets using the multi-criteria method. Using this method, a large number of criteria are taken into account, which are compared with each other between the assets being valued and their value determined on the basis of those criteria. Maliené (2011) also shows in real estate prices that their multi-criteria pricing is an excellent comparison tool. Zavadskas et al. (2001) claim that these valuation methods have become very important in international practice. Multicriteria methods are classified as modern comparative property valuation methods.

According to Azhou (2016), the structure of assets has a great influence on the value creation of the company. Bucataru and Tabara (2014) state that a very positive effect on the increase in the value of a company is the increase in the proportion of its intangible assets.

Jakoubek and Brabenec (2012) state that when a tangible asset is used to generate an intangible asset, its intangible value is usually included in its value as a tangible asset. As a rule, it is not necessary to determine the separate value of intangible assets. The only case may be the trade in intangible assets between interconnected enterprises.

Kulikova et al. (2016) claims that some companies intentionally or unintentionally misrepresent tangible assets in order to increase the enterprise's value in its financial statements. In order to eliminate these errors in accounting, it also proposed a

methodology that should make it easier for companies to determine the value of their assets in the financial statements.

The composition of tangible assets varies in each company according to its form. Grechenyuk et al. (2015) conducted research in this area on a sample of Russian joint stock companies. Their conclusions lead to the fact that there is a large difference in the structure of tangible assets between publicly tradable and publicly non-tradable joint-stock companies. They also note that the variability in the availability of individual items of tangible assets, especially short-term and long-term, varies in different types of companies. Bacataru and Tabara (2014) add that these changes are the result of the changes the world economy has undergone in recent years.

The composition of the company's assets can also serve as an indicator of its performance. This is an indicator that is evident to both the company's customers and its owners or potential investors (Majduchova, Kl'ucikova, 2014).

Kolarova et al. (2013) conducted a research into the correct classification of individual movable assets of companies by means of a questionnaire survey and notes that companies in the Czech Republic are not always able to correctly classify movable assets into the appropriate category in accounting. She therefore proposes the development of a methodology that would clearly define these items.

According to Mykolaitiene et al. (2010) it is very important for every company to effectively manage investments in tangible fixed assets. Company managers should have a constant overview of the current physical condition of this asset and its depreciation. Based on this information, it is easier to determine whether a given fixed asset is still able to generate economic value for the enterprise (Klieštík et al., 2018).

Jáčová and Horák (2015) dealt with the analysis of the impact of the sale of tangible assets on the performance of the company. However, it did not have to be a simple sale of assets but also their disposal from use after accounting depreciation or loss of functionality. If, for any reason, these assets can no longer be used, they can be excluded from tangible fixed assets. For this reason, they also focused on the process of liquidation and settlement of claims related to the disposal of these assets. The method of managing tangible assets also affects the tax burden and the performance of the enterprise.

Since it is often necessary to value tangible assets for the purpose of business transformation, some authors dealt with the course and methods of individual types of transformation. For example, Mendez et al. (2018) dealt with the transformation of companies into different types of other legal forms as well as forms without legal personality in Spain. Pospíšil and Vornáčková (2017) report that, for example, in the Czech Republic in 2013 there were dozens of different types of transformations of different companies. They also claim that 96% of these were merely business reorganisations. The main problem they point out is that during these transformations the faithful representation of the financial position of the successor company is significantly impaired and therefore they propose to revise the Czech regulation for the transformation of the company.

Johnson et al. (2012) point out that the legal transformation of a company is one thing but also point out that it is often necessary to transform the deep-rooted ways and practices that the company was still operating in its old form to increase the profits of the successor company. They also state that, according to the current market situation, it is clear that some companies entering the legal transformation process are not ready for this "mental" transformation.

Brabenec (2010), dealt with corporate-level discounts in mergers and acquisitions.

The aim of the paper is to identify the specifics of determining the STFA value of an enterprise on the example of XYZ.

### 3 Materials and methods

The decisive date for the valuation is 31st December 2017. The XYZ Association consists of two natural persons who founded the Association on 1st January 2008 by the Association Agreement. The need for STFA valuation stems from the intention to transform XYZ into a limited liability company. This valued STFA will be incorporated into the newly created LLC.

Newly created LLC will fully build on the activities of the previous XYZ association with the same business model. Employees, assets and liabilities will be transferred, business will be maintained, as will the entire customer portfolio. In our contribution we will deal with the partial valuation in the whole transaction, namely the STFA valuation. For the purpose of making this paper, XYZ provided all necessary data on the status of its STFA, which was still in use at the valuation date, together with proof of purchase with the date and amount of the purchase price.

In order to determine the value of these STFA items, a so-called Amortization Scale will be created. The development of this scale will be based on the study of several expert opinions and expert articles dealing with the determination of the price of STFA. A total of 36 publications will be available, some of which are also used as a literary basis for this paper. 11 expert opinions dealing with the evaluation of STFA were also found. To create an amortization scale, it will first be necessary to track a set of several STFA items of different ages and wear rates. This tracking will be done through the advertising servers with used goods. First, information about the date the advertisement was placed on the server will be recorded for these items. At the time of sale of one of the STFA items, the last advertised price will be recorded, assuming the sale for that last price and the date the expected sale will be made to a table. With this information, it will also be able to determine how long each item has been offered through the advertising server. The last indication will be the purchase price of the Association's assets. Based on the analysis and comparison of all this collected information, our amortization scale will be compiled. Since the oldest STFA, which is used by XYZ at the valuation date (ie as of 31st January 2017), is dated 2010, so the items of STFA with a maximum age of seven years will be tracked through advertising servers.

When designing a amortization scale, the main price-determining factors will be the age and wear rate.

To determine the individual ranges of the price decrease according to age and the purchase price for the creation of the amortization scale, a matrix of results will be created on which this scale will be based. The results matrix is shown in table 1.

Tab. 1: Matrix for the creation of a amortization scale

| Age in years | Price category  |                  |                   |                     | Total number of tangible fixed assets |
|--------------|-----------------|------------------|-------------------|---------------------|---------------------------------------|
|              | Up to CZK 5,000 | CZK 5,001-10,000 | CZK 10,001-15,000 | CZK 15,001 and more |                                       |
| 1            | 44              | 34               | 41                | 51                  | <b>170</b>                            |
| 2            | 38              | 39               | 45                | 44                  | <b>166</b>                            |
| 3            | 43              | 26               | 52                | 29                  | <b>150</b>                            |
| 4            | 32              | 44               | 39                | 18                  | <b>133</b>                            |
| 5            | 36              | 33               | 28                | 16                  | <b>113</b>                            |
| 6            | 34              | 49               | 23                | 13                  | <b>119</b>                            |
| 7            | 31              | 25               | 18                | 11                  | <b>85</b>                             |

Source: Own.

Table 1 shows the number of STFA according to its age and price category, which will enter the creation of the amortization

scale. Price categories will be set at CZK 5,000 each. This interval is determined on the basis of the purchase prices of STFA in use by XYZ. Individual STFA items will be of similar age, wear and parameters as STFA items to which the resulting amortization scale will be subsequently applied.

The items for creating the matrix will mainly include small electronics, computer equipment and garden equipment, so that the resulting amortization scale corresponds as closely as possible to the specific type of STFA, which we will subsequently evaluate.

It is therefore a flat-rate valuation method using the projected price drop for standard assets. The amortization scale is shown in Figure 1 in the result section. The input data for our research is included in Table 1, which is an inventory of all STFA owned by the XYZ Association at the valuation day with the acquisition dates of each item and its cost.

The vast majority of its STFA consists mainly of computer equipment. This also follows from the nature of the business strategy of the XYZ model association.

Tab. 2: List of STFA model association XYZ

| Date of acquisition | Small tangible fixed assets (STFA) | Cost [CZK] |
|---------------------|------------------------------------|------------|
| 4.2.2010            | Monitor LCD 24" BENQ               | 5,393.5    |
| 31.3.2010           | PC Triline Profi Office            | 9,747.0    |
| 18.5.2010           | Fridge Elektolux ERC2500           | 5,832.5    |
| 19.12.2013          | Computer CoolerMaster              | 18,000.0   |
| 13.1.2014           | LCD 20" FUJITSU monitor            | 2,118.9    |
| 13.1.2014           | Printer EPSON TM-U220B-057         | 6,028.6    |
| 1.4.2015            | Laptop ACER ICONIA W5, 8"          | 6,016.2    |
| 22.7.2015           | Laptop Acer Aspire E15             | 12,833.0   |
| 30.4.2016           | Tablet HP Pro 10 EE G1             | 9,503.0    |
| 31.8.2016           | Laptop Lenovo IdeaPad 100          | 9,668.0    |
| 31.10.2016          | Laptop Lenovo                      | 11,489.0   |
| 31.10.2016          | Laptop Acer Aspire                 | 14,968.0   |
| 10.2.2017           | Lawn mower                         | 9,495.9    |
| 27.2.2017           | Submersible pump                   | 9,409.1    |
| 7.12.2017           | Mobile phone Huawei P9 lite        | 4,083.5    |
| 13.12.2017          | Navigation TomTom VIA 52 Europe    | 3,710.7    |

Source: Custom adjustment.

According to Table 2, this is STFA with a total acquisition value of CZK 138,296.89, with a purchase price ranging from CZK 2,118.9 to 18,000. It is also evident that the oldest STFA, which is still used by the XYZ modeling association, was purchased on 04/02/2010 and the newest just a few days before the valuation day (13/12/2017).

### 3.1 Small tangible fixed assets (STFA)

Tangible fixed assets (TFA) include assets with a useful life of more than one year and a unit cost of more than CZK 40,000, pursuant to Act 586/1992 Coll. on income taxes. The limit of CZK 40,000 is fixed by law, but the lower limit may be set by the entity separately and information on this limit must be disclosed in the notes to the financial statements (Czech Republic, 1992). According to the internal accounting regulation, the XYZ association has set a cost limit for the classification of items between STFA from CZK 2,000 to CZK 39,999.

For example, according to Decree No. 410/2009 Coll. implementing certain provisions of Act No. 563/1991 Coll. on Accounting, as amended, for certain selected entities, which is valid for territorial self-governing units, voluntary unions of municipalities, regional councils of cohesion regions, contributory organizations, state funds according to budgetary rules and state organizational units, STFA is defined as tangible movable assets, or sets of assets that are characterized by a separate technical and economic purpose, for which the useful life is longer than one year and the valuation of one item is CZK

3,000 or more and does not exceed CZK 40,000 (Czech Republic, 2009).

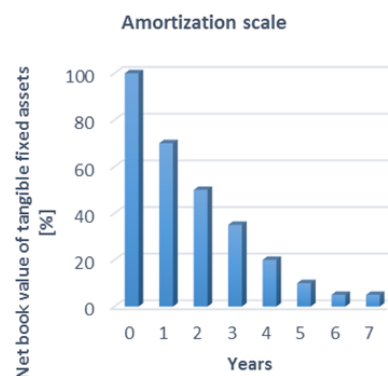
The identification of STFA is very important. Sometimes, depending on the nature of the business carried on by an enterprise, items that cannot be considered STFA may fall into the price range set by legislation. Stocks are a typical example. In the case of stocks which are intended for direct sale (goods), they are not, as a rule, met the condition of long-term.

However, depending on the activity performed, it should be remembered that what may be referred to as STFA for one company may not be STFA for another company. It is also necessary to distinguish STFA, TFA and stocks. For example, for a real estate company, an object, although intended for the operation of a manufacturing activity or the provision of services, is merely an item of stocks but for a company that actually carries out any of these activities, it will be a TFA item. Stocks, such as hand-made intermediates for further processing, may exceed the time constraints on tangible fixed assets at larger storage capacities and low consumption. In this case it is necessary not to assign them as TFA or STFA item. It should also be borne in mind that some of XYZ's assets, even if it complies with its internal accounting regulation for the definition of STFA, while not being stocks at the same time, is not that kind of property. Examples include lighting, external water heaters, etc. These items are part of the construction equipment and are always an integral part of the construction works and therefore cannot be considered STFA items. Although STFA does not form a substantial part of the assets of the XYZ model association, it is nevertheless necessary to carry out an appropriate valuation. Tangible assets are always tangible in nature.

## 4 Results

Based on the observations described in the methodological part of the paper, the amortization scale was compiled, which is depicted in Figure 1 and subsequently applied to solve our question.

Figure 1: Amortization scale of STFA



Source: Own.

The amortization scale represents the estimated percentage of STFA due to wear and tear with a use period of up to seven years. Based on our observations, the largest decrease in STFA is evident in the first year since its acquisition. In subsequent years, the decline in value is more gradual and smooth. It is also interesting to note that after two years of use STFA loses 50% of its original cost. Since the fifth year its value is less than 10% of the original value. The last noticeable decrease in the value of STFA is apparent between the fifth and sixth year after its acquisition. Since the seventh year of STFA its value has been around 5%. However, the time it takes to do so depends on how you use and maintain a particular item. With proper and gentle handling and proper and regular maintenance and technical inspection, this can be used for many years. However, this

applies provided that the item can continue to perform its function.

Depending on the value of the new STFA and the value at which the STFA used was sold through the advertising servers, its value decreased as the age increased in all price categories in the same way.

Based on this flat rate method, the STFA value of the XYZ model association was subsequently determined. The resulting values of the individual STFA items are given in Table 3.

Tab. 3: Value of small assets at the valuation date determined according to the flat-rate method

| Date of acquisition | Small tangible fixed assets (STFA) | Residual value [%] | Value after valuation [CZK] |
|---------------------|------------------------------------|--------------------|-----------------------------|
| 4.2.2010            | Monitor LCD 24" BENQ               | 5                  | 269.7                       |
| 31.3.2010           | PC Triline Profi Office            | 5                  | 487.4                       |
| 18.5.2010           | Fridge Elektolux ERC2500           | 5                  | 291.6                       |
| 19.12.2013          | Computer CoolerMaster              | 10                 | 1,800.0                     |
| 13.1.2014           | LCD 20" FUJITSU monitor            | 20                 | 423.8                       |
| 13.1.2014           | Printer EPSON TM-U220B-057         | 20                 | 1,205.7                     |
| 1.4.2015            | Laptop ACER ICONIA W5, 8"          | 35                 | 2,105.7                     |
| 22.7.2015           | Laptop Acer Apsire E15             | 35                 | 4,491.6                     |
| 30.4.2016           | Tablet HP Pro 10 EE G1             | 50                 | 4,751.5                     |
| 31.8.2016           | Laptop Lenovo IdeaPad 100          | 50                 | 4,834.0                     |
| 31.10.2016          | Laptop Lenovo                      | 50                 | 5,744.5                     |
| 31.10.2016          | Laptop Acer Aspire                 | 50                 | 7,484.0                     |
| 10.2.2017           | Lawn mower                         | 70                 | 6,647.1                     |
| 27.2.2017           | Submersible pump                   | 70                 | 6,586.4                     |
| 7.12.2017           | Mobile phone Huawei P9 lite        | 70                 | 2,858.4                     |
| 13.12.2017          | Navigation Tom Tom VIA 52 Europe   | 70                 | 2,597.5                     |

Source: Custom adjustment.

According to Table 3, we can see that the full scale of the amortization scale we have created was used. The value of all items was determined using this flat-rate STFA valuation method. Overall, the STFA value of the model association XYZ was set at CZK 52,578.79. Overall, the balance is 38% of the original cost of STFA. However, this is due to the composition of his age. Half of the STFA items were purchased more than two years before the valuation date, and therefore there is a more significant decrease in the total STFA value.

Our amortization scale can only be used if the STFA set is internally homogeneous and is mostly used for time reasons. According to the percentage decrease in STFA, it is clear that exactly half of the STFA items of XYZ have lost more than 50% of their purchase value during their use. By using a percentage decrease in the value of each STFA item due to wear, it is also possible to determine their usual current market financial value. The determined value of the assessed goods using the amortization scale was subsequently verified by a comparative method by comparing comparable goods according to the advertising servers. Comparable items were selected on advertising servers of similar age and wear state and their final selling price was monitored. According to this observation, it was found that the decrease in value depending on the age and wear of a similar item was similar according to the advertising servers, which indicates the benefit of our paper.

Table 4 lists the STFA items found at Czech advertising servers (www.bazos.cz, www.sbazar.cz) for comparison.

Tab. 4: STFA items for sale found

| Comparable STFA according to the same age, wear and parameters | Value according to www.bazos.cz [CZK] | Value according to www.sbazar.cz [CZK] |
|--|---------------------------------------|--|
| Monitor LCD 24" BENQ   | * 200<br>* 350                        | * 300                                  |
| PC Triline Profi Office  | * 800                                 | * 350<br>* 450                         |
| Fridge Elektolux ERC2500                                       | * 250<br>* 500<br>* 400               | XXX                                    |
| Computer CoolerMaster  | * 1,000                               | * 1,900<br>* 2,200                     |
| LCD 20" FUJITSU monitor  | * 200<br>* 600                        | * 500<br>* 800                         |
| Printer EPSON TM-U220B-057                                     | XXX                                   | * 1,000<br>* 1,550                     |
| Laptop ACER ICONIA W5, 8"                                      | * 2,000<br>* 2,200                    | * 2,400<br>* 3,000                     |
| Laptop Acer Apsire E15   | * 4,000                               | * 5,000                                |
| Tablet HP Pro 10 EE G1   | * 3,500<br>* 4,400                    | * 5,000                                |
| Laptop Lenovo IdeaPad 100                                      | XXX                                   | * 4,000<br>* 5,500<br>* 6,000          |
| Laptop Lenovo  | * 5,000                               | * 6,500<br>* 6,200                     |
| Laptop Acer Aspire   | * 6,500                               | * 8,000                                |
| Lawn mower   | * 6,500<br>* 7,000<br>* 6,900         | * 7,000<br>* 6,800                     |
| Submersible pump   | * 5,500<br>* 7,500                    | XXX                                    |
| Mobile phone Huawei P9 lite                                    | * 2,100<br>* 2,800<br>* 3,000         | * 3,500<br>* 3,000                     |
| Navigation Tom Tom VIA 52 Europe                               | * 2,800<br>* 2,500                    | * 2,200<br>* 2,350                     |

Source: Advertising servers.

## 5 Conclusion

The aim of the paper was to identify the specifics of determining the STFA value of an enterprise on the example of XYZ. The results of this method were applied to small assets of the XYZ model association. For this purpose, a methodology was developed for the valuation method, which seems to be applicable in the future for further research of this nature. The STFA value of the XYZ model association was set at a total of CZK 52,578.79. The aim of the paper was thus fulfilled.

As far as transformation is concerned, we can state that after using the flat-rate method of valuation of STFA using the amortization scale we have created, the model association XYZ can enter the transformation process.

It can be stated that on the basis of observation of the development of prices of individual types of assets according to their length of use and purchase price, it is possible to assemble a universal tool for determining its current value according to its age and state of wear. In this we see the greatest benefit of our paper. Our proposed amortization scale could therefore have several forms, depending on the type of property that will be valued with it. The final value of the asset at its valuation date using the amortization scale according to its age and wear and tear corresponds to its fair value.

Finally, it should be noted that the amortization scale we have created is valid for determining the value of STFA only in the conditions of the Czech Republic and its economy. It should be emphasized, however, that the methodology proposed by us is only applicable under very specific conditions, which include the normal use and prescribed maintenance of all items to which this method would apply. It cannot be used for damaged items, such

as excessive wear or completely broken. Even if the economies of other states are not isolated, it is necessary to be aware of their differences and in the case of the valuation of STFA it will be necessary to create a new amortization scale that will reflect the evolution of the value of a particular type of property in a particular country. However, our methodology can be used in other countries as well.

Table 5 shows a comparable STFA offered on Czech advertising servers that is of the same age as the STFA items owned and used by XYZ.

Tab. 5: Prices of used STFA by advertising servers

| Comparable STFA according to the same age, wear and parameters | The value requested by the seller of the used piece [CZK] | Value determined according to methodology [CZK] |
|--|---|---|
| Monitor LCD 24" BENQ   | 200-350   | 269,7   |
| PC Triline Profi Office  | 800-350   | 487,4   |
| Fridge Elektrolux ERC2500                                      | 250-500   | 291,6   |
| Computer CoolerMaster  | 1,000-2,500   | 1,800,0   |
| LCD 20" FUJITSU monitor  | 200-800   | 423,8   |
| Printer EPSON TM-U220B-057                                     | 1,000-1,500   | 1,205,7   |
| Laptop ACER ICONIA W5, 8"                                      | 2,000-2,200   | 2,105,7   |
| Laptop Acer Apsire E15   | 4,000-5,000   | 4,491,6   |
| Tablet HP Pro 10 EE G1   | 3,500-4,500   | 4,751,5   |
| Laptop Lenovo IdeaPad 100                                      | 4,000-6,000   | 4,834,0   |
| Laptop Lenovo  | 5,000-6,500   | 5,744,5   |
| Laptop Acer Aspire   | 6,500-8,000   | 7,484,0   |
| Lawnmower  | 6,500-7,000   | 6,647,1   |
| Submersible pump   | 5,500-7,500   | 6,586,4   |
| Mobile phone Huawei P9 lite                                    | 2,100-3,500   | 2,858,4   |
| Navigation Tom Tom VIA 52 Europe                               | 2,200-2,800   | 2,597,5   |

Source: Advertising servers.

According to Czech advertising servers (www.bazos.cz, www.sbazar.cz) the same or similar STFA items with similar age, wear and technical parameters were found to validate our results. The range of the stated target values for the offered STFA given in Table 5 depends on the greater or lesser extent of the presence of cosmetic defects, but all these items are advertised as fully functional. It is important to note, however, that the STFA values we set oscillate within the range of values on the advertising servers.

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**Primary Paper Section: A**

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# THE FRAGMENTATION OF POLITICAL REPRESENTATION AT MUNICIPAL LEVEL IN SLOVAK REPUBLIC IN PERIOD 2002 - 2018

<sup>a</sup>MARTIN KLUS, <sup>b</sup>MARCEL MARTINKOVIČ

*Department of Political Sciences, Faculty of Philosophy,  
Universitas Tyrnaviensis in Trnava, Hornopotočná 23, 918 43  
Trnava, Slovak Republic*

email: <sup>a</sup>*martin.klus@truni.sk*, <sup>b</sup>*marcel.martinkovic@truni.sk*

This paper is an outcome of the VEGA scientific project No. VEGA 1/0131/18 entitled Europe in Movement. Multicausality of Present Democracy Crisis and the Rise of Extremism in Europe.

**Abstract:** Presented study sheds light on the developments of political representation at municipal level and tries to identify the sources of its fragmentation. These sources are vested in electoral laws, in development of national party system and in public distrust towards partisan candidates including changes in decision-making dynamics of the electorate. All mentioned factors shape the popular preference to support independent candidates in achieving municipal offices. This phenomenon gained on intensity between 2002 and 2018. The trend of ever-increasing support for civic and non-partisan candidates also introduces practical implications and risks in terms of lacking effective governing, transparency and of municipal policy control. Factors such as: non-existence of integrative organizational basis for political decision making, low levels of civic skills or elusive ownership structure of regional media. Most importantly, it is the inability of established political parties to maintain the functionality of democratic institutions in terms of public administration. All these factors increase the risks of decision-making at municipal level. Such development is part of deepening crisis of trust in political parties and leads to risks of forming a defect democracy.

**Keywords:** fragmentation of party system, municipal representation, effectivity of rule, independent candidates, local elections, political parties

## 1 Introduction

Decentralization of municipal structures together with expansion of their competences present an important aspect in transformation, consolidation but also in research of liberal-democratic institutions. Thanks to competence transfer from central state bodies to municipal institutions citizen participation in public affairs, transparency and decision-making control of municipal representatives increases. Enhanced decentralization of public administration within Slovak political system under Mikuláš Dzurinda-led ruling coalitions (1998 – 2002 and 2002 – 2004 respectively) aimed to form a framework for a more effective and transparent municipal governing. Efforts of the reform-oriented 1<sup>st</sup> government of Mikuláš Dzurinda (SDK, SDL, SMK, SOP) followed up on the changes in territorial-administrative structure of Slovakia introduced by earlier Mečiar-led governments.

Thirty years since first efforts to decentralize Slovak public administration the research in this field within Central Europe focuses on analysis of chosen political aspects of competence transfer from the central authority to local governments. Among these we can include the issue of transparency and effectivity of governance, municipal modernization (Klimovsky, Pinterič, Jüptner 2016; Buleca, Mura 2014; Cseh Papp et al. 2018), limitation of participation (Klimovsky, Pinterič, Šaparniené 2016), legitimacy of municipal institutions (Hanáčková, Bumbalová, 2016), but also the research of political culture and aspects of forming communal representation. Within the context of lastly mentioned phenomenon, the relation between functioning of municipal effectivity and the extent of fragmentation of political representation is also being researched (Haydanka 2018). In connection to this, we can observe that with increasing agglomeration size, the functionality of local policymaking, based on of face to face principle, decreases. Environment defined by decline of mutual knowability between citizens renders their decisions dependent on external factors. If political parties and their candidates, in such environment of communal politics, do not have broad public support, then public electoral decision-making becomes influenced by regional and local interest groups, media and social media. Lower effectivity of institutions can become, relatively to maturity of civic society, the negative outcome of mentioned factors' influence. This is also being observed with institutions on national level. Both the

decrease in effectivity and increase in corrupt practices lower civic trust in political parties. Discontent with the functioning of political system manifests in decrease of credibility of liberal-democratic institutions (Gyárfášová 2015; Mura, Machyniak 2014), and in increase in extremist actors. This situation was confirmed by analysis carried out in V4 countries that acknowledged the historically ever highest distrust of Slovak citizens in political parties and institutions of representative democracy (Bútorová, Z., Mesežnikov, G. et al. 2017). Reasoning behind this development dwells not only in party centralization, but also in insufficient control and non-transparent financing of political parties. This leads to interweaving of political elites with chosen economic interest groups on national level. Increasing blurriness of interests at local level and declining turnout in municipal elections are part of this trend. The turnout continually dropped from 63.75% of eligible voters in 1990 to 48.67% in 2018. Trend of decreasing civic participation in municipal elections makes the questions on elected candidates' legitimacy more important. In 2018 there were 2919 municipal parliaments and mayors elected. Based on this figure we can close that intensive decentralization took place in Slovakia since 1990. Such decentralization complicates development of small municipalities due to scarcity of resources to cover multiplicity of legit duties in areas such as: education, social services, transportation, waste disposal, environment, etc. Therefore, analyses on pros and cons of possible municipal mergers are conducted on expert level (Klobučník, Bačík, Matiašová, Fila 2018).

## 2 Material and methods

The aim of proposed study is to shed light on development of political representation at Slovak municipal level. This issue is deliberated in academia due to the success of non-partisan candidates. Based on this, our research field is divided into smaller sections. The main goal is to characterize the development of trends in political participation by analysis of statistical data in last five municipal elections. In order to do so, we have to tap into the relation between national electoral rules, including the party system byproduct, and the processes of selecting local representation. This is the second, partial, goal. Research design of this study is characterized by empirical data and background information vested in available primary and secondary sources. Secondary sources consist of domestic and foreign journal articles indexed in the Web of Science and Scopus databases. Primary sources are represented by data from Statistical Office of the Slovak Republic, and thus methodology consist also of quantitative research methods. Cluster, critical and comparative analysis are used with local electoral outcomes and annual reports of political parties in terms of their member base and functionality. These are fundamental for research in the field of political sciences, integral to social sciences, in comprehending the actions and evolution of political actors. Mentioned methods are supported by basic methodology in terms of abstraction, analysis, synthesis and comparison.

### 2.1 Results and discussion

The decentralization of local power structures carries another risk. The risk of fragmentation of political representation, which is described by increasing significance of non-partisan candidates (NEKA) for occupation of public offices. Such observed phenomenon is indirectly linked to issues within functioning of political parties at national level. The reasoning behind this that the established political parties in Slovak party system facing the decrease in public trust, which leads to their inability to integrate and include citizens into political life through their vertical organization. Their party membership dwindles or decreases as well. It can also manifest in their lowered functionality with regards to the assembly of candidate lists followed by decreasing public support. Such state of affairs has been present for several electoral periods. The characteristics

of electoral system at local level pose another factor in favor of non-partisan candidates. Local and national electoral systems differ. General elections use proportional system with fixed party candidate list, where voters can assign maximum of four preferential votes to a political party in one, 150 mandates strong, constituency. Presence of just one electoral constituency lays foundation for a greater centralization of political parties.

At national level, this type of voting system was introduced by V. Mečiar's government (HZDS, SNS, ZRS) in 1998. Mečiar's cabinet has reduced four electoral districts into one, to fully exploit public popularity and charisma of its leader for electoral gains. This change of electoral system has had negative impact on development of Slovak system of political parties. Even today there are studies tackling outcomes of this change and discussing appropriate legislation changes to minimize the damage done (Kerekes, Pink, Šedo 2019). Consequences are seen in municipal, as well as regional elections. Electoral system at the nation-wide level has become an extreme pluralism model and inter-party competition can be described as polarized pluralism (Sartori 2005). This translates as competition between two blocks of political parties with occasional appearance of anti-systematic party within Slovak context. Moreover, it forms bipolar opposition. Domination of eccentric tendencies among political parties, ideologically structured society and policy of triumph vested in populism, all cause polarization of party system. Tendencies towards atomization of electoral system in Slovakia have been present also in the latest general elections of 2016, increasing the number of relevant parliamentary parties to eight. Low level of manifesto collaboration, strong interpersonal animosities among party leaders and the inability to create factions within party structures have led to continuing fragmentation and the rise of new political subjects. Ideological polarization rose also due to the entry of anti-systematic and extremist Kotleba – Ľudová strana Naše Slovensko (K-LSNS) party into parliamentary politics in 2016.

Compared to national level, municipal elections use first past the post system voting system for mayoral offices and semi-proportional voting system for members of municipal councils. There is no unity with regards to used terminology for categorization of such hybrid voting system. It could be specified as unlimited vote system or block ballot. Such system ascribes to voters as many votes to assign, as there are mandates in their district. These are not cumulative (Chytilík, Šedo, Lebeda, Čaloud 2009). Municipal districts can be classified as multi-mandate in terms of municipal council elections. The required threshold to score a seat is defined by acquired eligible votes and by number of mandates for that particular district. For example, in district with seven seats, first seven candidates ranked highest by eligible votes acquired will get a mandate in municipal council. Voters can assign a minimum of one vote. Maximum reflects the number of mandates per district. Such specific voting system leads to creating mixed party coalitions at municipal level and multiple vectors of cooperation, which are ideologically not possible at national level. Higher number of constituencies, preference of persons over parties, non-existence of explicit quorum and non-utilization of quota in electoral number calculus, etc. shape municipal voting system. When there is no order randomization principle for candidate list present, along with low-level of voters' awareness and unfamiliarity with candidates, such factors can lead to trend in preferring candidates ranked high in the candidate list. Nowadays, candidate lists are ordered by alphabetical order. Research conducted at the level of regional authorities implies the risk of non-equality among particular candidates. The very place of a candidate in the list, especially at the start or at the end, can give unjustified advantage compared to other runners (Spáč, Voda, Zagraban 2016). Albeit that parties form pre-election coalitions, there is a rising and long-lasting trend in support of non-partisan (NEKA) candidates. This can lead to the risk of losing public control over decision-making done in municipal councils. Often the public does not know to whom that particular non-partisan candidate is linked to, who financed his or her campaign or whose interests will he or she follow.

### 3 The development of support for non-partisan candidates at municipal level

While looking at the success rate of non-partisan candidates in municipal elections in the period of 2002 – 2018 we can conclude the following. The success rate of non-partisan candidates in municipal council elections copies the development in occupation of mayoral offices. The difference is minimal. Success rate of non-partisan candidates in municipal councils is on the rise, with 2 892 (13.46%) seats in 2002, 3 638 (17.10%) seats in 2006, 4 764 (22.66%) seats in 2010. Municipal elections of 2014 brought 28,91% support for non-partisan candidates, e.g. 6 000 seats and in latest election of 2018 we saw an increase to 35.36% - 7301 seats in municipal assemblies. Based on mentioned data, the success and increase in support of non-partisan candidates are at the expense of partisan ones. Increasing almost by a tri-fold in the observed period. This has been enhanced by a trend observed prior 2014 municipal elections, when party candidates started to register and run as non-partisans to increase their chances and leave corruption scandals of established political parties behind. Similar trend occurred in mayoral elections. In 2002 non-partisan mayoral candidates took 951 (32.66%) offices, with rare decrease to 895 (30.83%) in 2006 and back on track increase to 979 (33.67%) in 2010. Non-partisan mayoral candidates in 2014 elections scored 1 104 (37.95%) seats and 1323 (42.42%) seats in 2018.

#### 3.1 The development of public support for KDH, SMK and SMK-MKP parties at municipal level from 2002 to 2018

The development of support towards party candidates at municipal level has different specifications. The study states only the gains of partisan candidates of established parliamentary parties, who ran in municipal elections without their party's support, e.g. outside of multicolored pre-election coalitions. Yes, for Slovakia it is also true that these heterogeneous coalitions do not copy trends in cooperation at parliamentary level, but instead, they adapt to local context. Among parties with the oldest political tradition after 1989 we can include Christian Democratic Movement (KDH) and parties that represent Hungarian minority in Slovakia. The KDH party scored 157 (5.4%) of all mayoral offices and 2350 (11.38%) of all municipal councils' seats. This outcome was crucial for the party and its representative because it has been the first time since 2002 (13.52% of all council representatives and 7.07% of all mayoral offices) when they managed to stop declining support at municipal level. The decline climaxed in 2014 (10.55% of all council representatives and 4.19% of all mayoral offices) and signaled issues at national level as well. In 2016, for the first time since its formation in 1990, the party has not managed to be elected into National Council of the Slovak Republic.

Similar sine curve of development of voters' support at municipal level can be observed with ethnic party of Hungarian minority the Hungarian Coalition Party (SMK), later transformed to SMK-MKP. Hungarian minority parties transformed into one, the SMK, in 1998, due to legislative change disadvantageous to the formation of pre-election coalitions. SMK has not made it into parliament since 2010 due to party split and subsequent split in the electorate in 2009, accompanied with the departure of its leader Béla Bugár (co-founder of civic liberal subject Most-Híd). In 2018 municipal election the successor subject of SMK the SMK-MKP gained 115 (3.96%) of all mayoral offices and 1248 (6.04%) of all municipal councils' seats. Compared to results in 2014 the party managed to stop negative trend of declining support at local level at least. This trend became most visible, as in case of KDH, after 2014 municipal elections. In Hungarian minority dominated southern districts of Slovakia the SMK-MKP managed to get only 107 (3.67%) mayoral offices and 1151 (5.54%) municipal councils' seats.

KDH, SMK-MKP and SNS also have experience with out-of-parliamentary existence. Their partisan history also documents the existential significance of stable and developed member base.

The importance of developed local and regional structures manifests the most in situations when the party is not able to pass the 5% clause for entering the parliament. Vital member base, as in case of KDH, which member base strength fell from 17 814 in 2006 to 8 948 in 2017, represents a factor that can, by proper utilization of local structures, lead to parliamentary comeback. In case of SMK-MKP the member base declined, also due to the split of electorate, from 11 959 in 2006 to actual 9 200 members, which is still above Slovak average and presents the party with an opportunity to establish and develop itself as an important regional actor.

### 3.2 The development of public support for SMER Social Democracy and SNS parties at municipal level from 2002 to 2018

Since 2004 the left part of Slovak political spectrum is being dominated by SMER-SD party. As the strongest coalition party, it has gained 592 (20.38%) mayoral offices and 3692 (17.88%) council seats in municipalities in 2018 municipal elections. Albeit having a significant gain of mandates at local level compared to other parties, the fact is that its position has declined since 2014. We can observe a visible drop, because SMER-SD had dominated the 2014 municipal elections with 847 (29.11%) mayoral offices and 5123 (24.68%) council seats across Slovakia. Since its founding in 1999, the of voters' support culminated historically in 2014 at municipal level. This success can be ascribed to personal nation-wide popularity of party leader and prime minister R. Fico. The party has established its dominance in Slovak party system after march 2012 and in spite of highly proportional voting system in general elections it was able to achieve a rare victory in terms of becoming the single ruling party. This advantage has been fully capitalized on in 2014 municipal election. Popularity of the party and its leader has had impact on development of members base as well. The highest number of members – 16 869 – has been attained in 2010 and is slowly declining since then. Party progress report states 15 182 registered members by December, 31<sup>st</sup> 2017.

Nevertheless, the party representation of SMER-SD in municipal councils rose between the years 2002 – 2014 according to mandates gained at local level. The party gained 968 (4.5%) mandates in 2002, in 2006 it was 4043 (19%) mandates. The increasing trend continued also in 2010 with 4576 (21.76%) mandates and culminated in 2014 with 5123 (24.68%) mandates in municipal councils. Occupation of mayoral offices had a similar, increasing trend of support. In 2002 SMER-SD gained 68 (2.33%) of mayoral offices, it swung to 419 (14.43%) offices in 2006, followed by 599 (20.6%) in 2010. The party support at municipal level culminated in 2014 with 847 (29.11%) of all mayoral offices in Slovakia.

The next member of coalition that has been formed after march 2016 general elections is Slovak National Party (SNS). The party has secured a better position and support in 2018 municipal elections compared to the one held in 2014. Trends of public support for this party at national and local level are opposite in comparison to SMER-SD. Multiplicity of corruption scandals by party's members and ministers during R. Fico's 1<sup>st</sup> government in between years of 2006 and 2010, together with party infighting between party leader Ján Slota and 1<sup>st</sup> vice-chairwoman led to party split and electorate split in 1999 and 2011. Leadership infighting in 1999 caused the removal of Ján Slota as party leader, with Anna Malíková becoming the new one. Consequently, Ján Slota founded a new party on January 6th, 2001, called Nová (New) SNS. The following dissipation of nationalist voters between two political subjects caused that both SNS and NSNS did not make it into national parliament. After their unification on April 30th, 2003 SNS became a parliamentary party again in 2006 general elections thanks to developed regional structures and sufficient member base (1 198 registered members in 2006). The party gained 11.73% of all eligible votes in 2006 general elections and entered coalition with SMER-SD and Vladimír Mačiar's ĽS-HZDS. The situation in SNS leadership repeated in 2011. By that time Anna

Belosourová (maiden name Malíková) left SNS with her supporters and founded NaS party. Again, this schism prevented both SNS and NaS to pass 5% parliamentary threshold in 2012. With leadership change in 2010 and Andrej Denko becoming the party leader the stabilization and increase in member base came forth. Since 2012 the party's member base rose to 2 335 registered members and hit 7 662 members in 2018. Stabilization of member base brought results also at local level. In 2014 municipal elections, while not a parliamentary party, the SNS gained only 41 (1.91%) mayoral offices and 841 (4.05%) municipal councils' seats. However, in 2018 municipal elections municipal party representation rose to 160 (5.5%) mayoral offices. Improvement was also visible in municipal councils with an increase to 1 678 (8.12%) seats. Leadership reshuffle of 2012 brought a new impulse that translated into member base and popularity increase, and enhanced the representation at local and national level. This claim is supported by party gains at municipal level in 2002 with 673 (3.13%) council seats, with increase to 1 169 (5.49%) seats in 2006, with a drop to 938 (4.46%) seats in 2010. Party support in acquisition of mayoral offices had a parallel, sine curve, development. In 2002 SNS gained 38 (1.3%) mayoral offices, in 2006 it was 85 (2.92%) with decline to 60 (2.06%) offices in 2010. Comeback to former glory at municipal level of 2006 took place in 2018 municipal elections.

### 3.3 The development of public support for Most-Híd, SaS and OĽaNO parties at municipal level from 2002 to 2018

Next party that is part of current coalition (SMER-SD, SNS, Most-Híd) formed at national level in 2016 is civic-liberal Most-Híd party. The party formed due to ideological clash within the ethnically oriented Hungarian minority SMK party in 2009. Béla Bugár stepped down as long serving party leader of SMK and together with his followers (Zsolt Simon, Gábor Gál, László Sólymos, László Nagy and many others), including right-wing political elites such as: Rudolf Chmel, Ivan Švejna, Lucia Žitňanská and others, founded a new centrist political party based on civic principle. The party gained 127 (4.37%) of all mayoral offices in 2018 municipal elections. With regards to municipal councils it managed to gain 915 (4.43%) seats. Compared to election results of 2014 with 87 (2.99%) mayoral mandates and just 829 (3.99%), the party slightly improved its representation at local level on 2018. It was the best municipal election result ever since it has been founded in 2009 by splitting from SMK. Despite this fact, Most-Híd party has relatively low representation at municipal level in period of 2010 to 2018. In its first year of existence (2010) the party gained 908 (4.31%) council seats and 95 (3.26%) mayoral offices. Its municipal support had declined in next municipal election of 2014, which got mitigated by greater gain of mandates in 2018.

Currently the strongest opposition party in the National Council of the Slovak Republic, is the Liberty and solidarity (SaS) party, established in 2009 gained 7 (0.24%) mayoral mandates and 110 (0.53%) council seats. The party managed to increase its municipal representation by a minimal margin compared to 2014 municipal elections, with 5 (0.17%) mayoral offices and 89 (0.42%) council seats. However, it has managed to put a stop to the declining support at municipal level and slightly reach out to maximum of 20 (0.68%) mayoral offices and 212 (1%) council seats from 2010 municipal elections. Such results together with low number of members reflects party's cadre profile, its orientation towards national politics and ever-present disinterest of party leadership in forming vigorous local and regional structures. The party membership has fallen from historically highest number of 292 in 2012, due to departure of its members around Jozef Kollár, to 208 registered members in 2018. This fact and the fact that efforts for systematic development of local and regional structure is absent, could be one of the reasons for low municipal representation.

OĽaNO, founded in 2012, is another parliamentary subject in Slovak national politics. It has the character of non-standard, anti-establishment movement. Its leadership does not create regional structures on purpose. The whole movement centers and

profiles itself around charismatic figures such as the leader Igor Matovič, Jozef Viskupič or Erika Jurínová. Since Igor Matovič presents the movement as group of politically independent citizens, the subject does not meet one of the important aspects of standard political party. The presence of a rigid party structure fundamental to forming party discipline. Movement membership, as a prerequisite for manifesto integrity, does not exist among most of

OLaNO candidates. Provisional member base has changed only slightly since 2012. From 4 registered members back then to 13 in 2017. Therefore, the presented subject meets the criteria for anti-political and anti-establishment parties (Schedler 2002) that do accept democratic framework of political competition, but systematically question ability of established political parties to solve crucial societal issues. Today, the official name of the subject is OLaNO-NOVA due to acceptance of cooperation at national level with small party of KDH leavers centered around Daniel Lipšic and Jana Žitňanská. Their local representation reflects the non-engagement of the movement at local level. There are no successful candidates in 2014 municipal elections that would run independently, outside of pre-election coalitions. However, in 2018 municipal elections OLaNO independent sympathizers gained 3 (0.03%) mayoral offices and 84 (0.4%) council seats. Based on this it seems that OLaNO has started to focus also to local level, not just national one. Nevertheless, their local representation, in terms of their sympathizers, is still small.

### 3.4 The development of public support for K-LS NS and SME RODINA – Boris Kollár parties at municipal level from 2002 to 2018

Contemporary opposition at national level also includes subjects as K-LS NS and SME RODINA – Boris Kollár, both founded in 2015. Both parties have entered parliament after the 2016 general elections. Ideologically inconsistent, centrist party of the entrepreneur Boris Kollár got therefore involved in municipal elections just in 2018. It has gained 11 (0.37) mayoral offices and 123 (0.59) council seats. With the party being a freshman in Slovak politics, we cannot provide a more complex analysis. However, the party is working intensively with its member base, with 1350 registered members in 2017, which allows for future possibilities to establish itself at municipal level.

Last parliamentary party, which we have analyzed with regards to its development of political representation at municipal level, is the Kotleba – Our Slovakia people's party (K-LS NS). This extreme right-wing party is still a subject to dynamical development in communication strategy and self-presentation, while simultaneously being the very reason of polarization of party system in Slovakia. It can be described as hidden anti-system subject, which meets the ideological and relational anti-system attributes (Kubát, 2010). We will try to briefly account on its development, characterized by bottom-up creation. Marián Kotleba is the leader of extremist right-wing K-LS NS party. He managed to set up himself at national level in 2016 after multiple failed political projects. He and his closest colleagues and sympathizers of fascist Slovak state of 1939 – 1945 (Katuninec 2014) tried their luck in the first decade of 2000's with an organization listed as civic association and named Slovenská pospolitost' (Slovak Commonalty). This civic association got later transformed to a political party called Slovenská pospolitost' – Národná strana (Slovak Commonalty – National Party, SP – NS). SP – NS got abolished in March 2006 by the High Court of the Slovak Republic due to their manifesto being in defiance with The Slovak Constitution (Kupka, Laryš, Smolík 2009). Manifesto of current K-LS NS, founded in November 2015 is just a more sophisticated alteration of its predecessor from 2006. Marián Kotleba, as independent runner, won the 2013 regional election and become the President of Banská Bystrica Self-Governing Region. This has become a key moment for his party in establishing itself at national level. He made it into second round of mentioned regional elections with, then used, absolute first past the post voting system. His ability to mobilize disgruntled voters as an independent candidate against his opponent, then incumbent, MEP Vladimír Maňka from

SMER – SD, brought him 71 397 votes in the second round. His adversary gained only 57 164 despite support from a broad coalition formed by SMER – SD, LS – HZDS, HZD, KDH, SMK – MKP, SZ and SMS. Such result could be ascribed to multitude of factors. In this context, specific regional aspects, such as: unemployment rate, ethnic structure of population, investments into infrastructure, etc. had influence on this specific preference of voters in Banská Bystrica Self-Governing Region (Buček, Plešivčák 2017). Taking into account the center / periphery cleavage in Slovak party system, we can close that these regional elections were also a form of public disapproval of decisions and régime of SMER – SD ruling party. The win of a candidate that did not hide his extreme political positions could be ascribed to non-partisan candidacy and popularity. This is also an example of how does party polarization, and civic disapproval of parliamentary parties, influence voters' decisions at municipal level. Cumulation of disgruntled and politically unidentified voters, high level of electoral volatility with the decisions done in segment of first-time voters – 22.7% in 2016 (Világi 2018) led to the rise of K-LS NS and its leader, Marián Kotleba, into parliamentary politics in 2016. Multiple failures preceded conjunction of M. Kotleba's from regional politics, as independent runner, to national under the party's flag. In 2010 general elections his party gained only 33 724 (1.33%) votes, followed by 40 460 (1.58%) votes in 2012 snap elections. Mentioned regional elections of 2013 were the turning point, since voters elected Marián Kotleba as the President of Banská Bystrica Self-Governing Region. Despite the success in 2016 general elections, where the Kotleba – Ľudová strana Naše Slovensko gained 209 779 eligible votes, the gains in 2017 regional elections and 2018 municipal elections were minimal. Marián Kotleba has not defended his regional office in 2017. Majority of pro-democrat runners withdrew their candidacy earlier in favor of Ján Lunter, who was also a non-partisan candidate. The Slovak Government has changed the regional voting system from absolute to relative first past the post system for the President of Self-Governing Region office. K-LS NS did not gain any significant representation at regional and municipal level, despite the increase in their member base from 11 members in 2010 to 1 439 members in 2017. They have gained just one regional council seat in Banská Bystrica Self-Governing Region (Marián Kotleba, K-LS NS Chairman) and one in Nitra Self-Governing Region (Milan Uhrík, K-LS NS Vice-Chairman). Similar trend is present at municipal level. The party has gained just 1 (0.03%) mayoral office and 42 (0.20%) council seats in the 2018 municipal elections. However, the municipal representation has slightly improved compared to 2014 municipal elections, in where the party gained 33 (0.15%) council seats.

## 4 Conclusion

We can observe an increasing tendency in fragmentation of representation at municipal level during the researched period of 2002 – 2018. Type of municipal voting system and development of party system at local and national level are the cause of this trend. These main factors are enhanced by decline in voter's trust in political parties, which leads to increasing support for non-partisan candidates. Centralization of political structures caused by voting legislation change passed before 1998 general elections impacts this trend as well. Due to introduction of one nation-wide candidate list political parties became more elitist. They are not forced to develop their local representation and activities in a systematic way. Instead, they get by with a handful of party elites at national, regional or district level. It seems that the bottom-up development of political structures past 1998 is absent. This is accompanied by party centralization and quantitatively limited member base. One could say that low level of regional presence is natural for newly established subjects, however, many parties that are present for 2 and more electoral periods did not make any significant progress in creating regional and local structures. If we compare contemporary opposition and coalition parties, we can conclude that the ruling coalition of SMER-SD, SNS and Most-Híd fares better in terms of developed member base. SMER-SD has, despite declining member base since 2012, the most members (15 182 registered

members by December 31<sup>st</sup>, 2019). SNS has 7 662 and Most-Híd has 5 517 members. Thus, the ruling coalition exceeds all opposition parties in terms of member base strength altogether by multifold. This factor allows them for a more effective presence at municipal level that manifests in better municipal representation. The importance of developed local structures is documented by the split in SNS and SMK-MKP parties, and also by current experience of KDH. All mentioned subjects managed to survive their out-of-parliament period thanks to developed local structures that allowed for maintaining their influence at local level. However, the tendency of party weakening in Slovak party system continues due to absence of functionality procedures, such as party preliminaries or intra-party referendums.

Going back to trends in municipal representation we can conclude that voting participation has a sine curve character and oscillates around 48% threshold. Voter participation was at 49.51% in 2002, declined to 47.65% in 2006 and increased back to 49.69% in 2010. The 2014 municipal election brought a decrease in participation to 48.34%. In recent 2018 municipal elections it has slightly increased to 48.67%. Analysis of development in trends on municipal elections from 2002 to 2018 proves an increasing fragmentation of political representation, despite creation of various pre-election coalitions. The source of such atomization and a potential risk in observed trend is the ever-increasing representation of non-partisan candidates. Their share rose from 2 924 (13.46%) in 2002 to 2 919 (35.36%) municipal council seats in 2018. In terms of mayoral elections, the trend is similar with non-partisan candidates with an increase from 951 (32.66%) mayoral offices in 2002 to 1 232 (42.42%) in 2018. Based on presented electoral gains we can conclude that their success is at the cost of partisan candidates. This prevents creation of functioning majorities within municipal council, since the mayor and municipal council are elected separately. We can see possible reasons for creation of often blocked councils also at the side of citizens, who lack political experience and skills in contrast to their ambition to participate in municipal decision-making. Increased popularity of non-partisan candidates does not go hand in hand with increase in political competence of municipal representation expressed as the ability to integrate and carry out common goals. This fact leads to lower effectivity of public control within atomized municipal representation. High level of trust in non-partisan candidates can also be related to failed personal policy within political parties. Failed personal policy is partly caused by limited by size of particular member base. These development trends lead to clientelist parliamentarism in national party system (Klíma 2015), defined by risk of party centralization and higher level of corruption and instability in execution of power. Out of all political parties, only SMER-SD managed to resist the trend of non-partisan candidates. Its support rose continually at municipal level until 2014. KDH, SNS, SMK-MKP and Most-Híd are far behind in terms of creating municipal representation success rate. The SMK-MKP party keeps a solid ground at municipal level thanks to broad member base even in spite of earlier infighting and split. Parliamentary parties: SME RODINA – Boris Kollár, SaS, OĽaNO-NOVA and K-ĽS NS managed to make marginal gains, however their municipal representation is still below 2% of all allocated council seats. Fragmentation of political representation at municipal level hints that development of civic participation, in terms of functional political parties and movements, is fading away from Slovak party system. Political parties and movements still remain fundamental actors in linking decision-making processes at different levels, ranging from nation-wide civil service to regional and municipal level of public administration. Atomization in development of political representation pose political risks in terms of stability, effectiveness and decision-making transparency. The reasons are obvious. There is no legislation on lobbying, enforceable legislation on financing and functioning of political parties or legislation addressing conflict of interests between civil service, municipalities and private sector, 30 years after the regime change of 1989.

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**Primary Paper Section: A**

**Secondary Paper Section: AD**

## EDUCATIONAL ACTIVITIES OF SELECTED ASSOCIATIONS IN SLOVAKIA DURING THE FIRST CZECHOSLOVAK REUBLIC (1918 – 1938)

\*KATARÍNA MAYER

*Department of Andragogy, Faculty of Humanities and Natural Sciences, University of Presov, 17. Novembra 1, 081 16 Prešov, Slovakia*  
email: "katarina.mayer@unipo.sk,

The paper is a part of the research task VEGA no. 1/0303/17 "Adult Education in Slovakia in the Conditions of the Existence of Czechoslovakia (1918–1938)".

**Abstract:** The new social and political situation after the establishment of the first Czechoslovak Republic and throughout its existence (1918 - 1938) created favourable conditions for the revival and development of adult education. Apart from the first legal measures and a state-designed network of the cultural-enlightenment institutions, a number of associations and societies actively participated in adult education were being created. Their goal was to increase the level of education among the population of all Slovak regions, to teach people the ways of spending their leisure time purposefully and get them engaged in public life.

**Keywords:** the Czechoslovak Republic (1918 – 1938), history of adult education, activity of associations.

### 1 Introduction

After the establishment of Czechoslovakia, the political and social situation was rather complicated. It was necessary to build and strengthen Czechoslovak statehood, educate, and enlighten the population in order to raise their awareness of their democratic citizenship (Kázmerová et al., 2016). The new historical circumstances in the first Czechoslovak Republic (1918 - 1938), created a space for investing into the sphere of adult education. Individual societies and associations of political parties greatly contributed to the increase of the educational level among adults as they satisfied the educational needs of large masses covering the various topic areas.

In the face of the movement that emerged from the bottom up efforts, the new state created an opportunity for a specific enlightenment educational system with specific educational goals to which the state assigned a certain political content and direction in its development (Bakoš, 1996). From the state's perspective, popular education had a character of civic education carried out mainly by different associations (political, religious, sport, theatre, art, music, etc.) (Šerák, 2005).

In 1925, *Masarykov ľudovýchvny ústav* [The Masaryk Institute for Popular Education] was established in Prague with an aim to study and design methods of popular education, organize the scientific study of popular education, foster foreign relations, train qualified popular educators and publish various periodicals etc. (Bakoš, 1996). It also served as advisory body for other associations. The core members of the Masarykov ľudovýchvny ústav were: "*Svaz osvětový v Prahe* [The Enlightenment Union in Prague], *Ústřední škola dělnická v Prahe* [The Central School for Labourers in Prague], *Svobodné učení selské v Prahe* [The School of Agriculture in Prague], *Dělnická akademie v Prahe* [Worker's Academy in Prague], *Masarykova akademie práce v Prahe* [Masaryk Academy of Work in Prague], *Matica slovenská*, *Československá obec sokolská* [Czechoslovak Sokol] etc." (Šerák, 2005, p. 87). There was no similar institution in Slovakia, though. Towards the end of the first decade of the independent Czechoslovakia, Slovak enlightenment activities revolved around the development of various independent associations (Bakoš, 1996). Educational organizations enjoying the patronage of political parties played an important role too.

*Referát ministerstva školstva a národnej osvety v Bratislave* [The Slovak Office of the Ministry of Education and National Enlightenment in Bratislava] was in charge of the state enlightenment in Slovakia. *Osvetový zväz pre Slovensko* [The Slovak Enlightenment Association] was a central institution that had a dual function; it was both a methodical and coordinating

centre for institutions whose program contained enlightenment activities, such as *Československý červený kríž* [The Czechoslovak Red Cross], *Sokol* (an all-aged gymnastics education movement), *Robotnícka akademie* [Workers Academy], *Slovenská liga* [The Slovak League] etc. The most influential institutions of that kind were *Matica slovenská*, *Ústredie slovenských ochotníckych divadiel* [The Central Office of Slovak Amateur Theatres] *Živena* [a women's association], *YMCA* [Young Men's Christian Association], *YWCA* [Young Women's Christian Association], *Spolok profesorov Slovákov* [Association of Slovak Professors] and *Učená spoločnosť Šafárikova* [Šafárik's Scholar Society]" (Bakoš, 1996).

### 2 Matica slovenská

In the years 1863 – 1875, *Matica slovenská* was the most important enlightenment institution of Slovaks in the Upper Hungary. Following the official policy, the Hungarian government was very adamant in their relationship towards non-Hungarian nationalities, especially after the Austro-Hungarian Compromise of 1867, and did not allow a proper development of enlightenment activities in Slovakia. As a result, *Matica slovenská* terminated its activity in 1875. Its archive, museum, library, archaeological and numismatic collections, as well as other important documents were confiscated (Orosová, 2016).

In the larger process of restoration and re-organization of cultural life in Czechoslovakia, *Matica slovenská*, a symbol of Slovak statehood and culture, resumed its activities on the initiative of the Minister for the administration of Slovakia, Vavro Šrobár, on 1 January 1919. The character and a scope of its activities were determined by complicated political, economic, cultural, and social circumstances.

In the interwar period, *Matica slovenská* became a leading cultural, scientific, and publishing centre. After its restoration, *Matica slovenská* steadily picked up the thread of the original *Matica* in collecting books, prints, and manuscripts. The considerable amount of attention was given to Slovak expats. *Matica slovenská* established new research departments whose primary aim was to build and develop Slovak science. These departments substituted for the Academy of Sciences (which at the time was virtually non-existent) in terms of concepts, organization, or publishing. Their activities revolved around the research and publishing of unknown literary and historical texts, the research of Slovak dialects, and cultivation of Slovak language and orthography.

Extremely important was the publishing activity of *Matica slovenská*, and not only for its contribution to spreading knowledge and enlightenment. The economic aspect of the publishing activity was no less important either, since the revenues from the publishing were used to cover the cost of other *Matica slovenská*'s activities. In 1920 – 1925, *Matica slovenská* published 73 publications, a total of 11 315 pages and 214 500 printed copies. *Matica* also published several magazines and journals: *Slniečko* [Sun], *Slovensko* [Slovakia] with a supplement *Organizačné zvesti* [The Organization News] and *Slovenské pohľady* [The Slovak Views], which was restored in 1922. It was edited by Štefan Kréméry, and later by Andrej Mráz and Stanislav Mečiar. *Slovenské pohľady* was not only a literary but also a scientific journal covering the fields of visual arts, theatre, and music. Intensification of Slavic mutuality resulted in the creation of the Slavic department, which published *Slovanský sborník* [The Slavic Journal], and a series *Slovanská knižnica* [The Slavic Library] (Eliáš, 1999). Apart from the scientific journals and magazines, *Matica slovenská* also published popularizing magazines in the field of social and natural sciences. *Matica slovenská* published a broad scope of remarkable works of Slovak classics, for instance, J. Kollár, J. Matuška, K. Kuzmány, J. Král', M. Kukučín, L. Štúr, S. H. Vajanský, P. O. Hviezdoslav, etc. – from readers, reeditions of

Slovak classics, poetry, prose, and drama, to original works of fiction, translations and scholarly literature.

After the establishment of Czechoslovakia, the priority of *Matica slovenská* was to create an organizational and institutional platform for Slovak science. The first concrete information about the plans for the creation of the research and scientific departments can be found in the minutes taken at the committee's meeting held on 11 January 1920. Their formal establishment as the bodies of scientific work, however, was discussed at the later committee's meeting on 24 – 25 August 1920 (Winkler, Eliáš et al., 2003, p. 206). Gradually, the individual research departments were created to focus on literature and literary history, linguistics, ethnography, art and music, history and education. *Matica slovenská* devoted special attention to the department of ethnography, especially to saving and scientific processing of ethnographic material. Besides the publications dedicated to ethnography, very important was the work of Karol Plicka who collected and recorded over 25 000 pieces of lyrics and melodies of Slovak folk songs. He also accumulated the vast amount of photographic material that he later transformed into films *Po horách po dolách* [Through the Mountains and Valleys] and *Zem spieva* [The Earth Sings]. The films were not just ethnographic documentaries; they had a great artistic value, too. An equally important was the art department of *Matica slovenská*, which included the sections of literature, fine art, and music. This department concentrated almost all prominent figures of the Slovak art world and substituted the non-existent art associations.

The *Matica slovenská*'s department of education placed emphasis on education in Slovak schools. In cooperation with respective research departments, a committee was appointed to design textbooks and distribute them to folk, public, and secondary schools. Another activity related to education and schooling involved publishing of two editions – *Čítanie pre meštianske školy* [Reading for Public Schools] and *Čítanie študujúcej mládeže* [Reading for the Youth]. Following the authorization of the Ministry of Education and National Enlightenment, *Matica slovenská* published volumes of the prescribed list of authors that were further edited and supplemented with explanatory notes. The individual volumes were compiled by the renowned literary scientists Jaroslav Vilček, dr. Štefan Krčméry, dr. Ján Menšík, Jur Polívka, František Heřmanský and others. They also wrote introductions and notes. Some of the volumes were also used in secondary schools in Bohemia and Moravia.

The scientific and research activities of the individual departments fully developed in the 1930s, when each of the departments had its own publishing body and a publication series: *Literárno-historický zborník*, *Historický zborník*, *Pedagogický zborník*, *Filozofický zborník*, *Národopisný zborník*, *Prírodovedný zborník*, *Sociologický zborník*, *Psychologický zborník* and *Jazykovedný zborník*. The development of the research activities was determined by the current conditions. Institutions and the climate of opinion should not limit autonomy and freedom of science and research (Winkler, Eliáš et al., 2003).

In its research activities, *Matica slovenská* focused on the acquisition, preservation and making a vast number of remarkable works accessible to public, while creating a rich and well-stocked library available to researchers. The library itself contained over 150 thousand volumes and a wealth of archival material. It was built up from the collections that were kept in the Nitra county archive after the confiscation of the original *Matica slovenská*, the library collection of *Muzeálna slovenská spoločnosť* [The Slovak Museum Society] and from donations of many family, school, and church libraries (Mráz, 1936, pp. 59 – 60).

The cultural activities of *Matica slovenská* in the interwar period were initially carried out by associations especially in cooperation with the *Osvetový zväz pre Slovensko* [The Slovak Enlightenment Association]. *Matica slovenská* managed the cultural-enlightenment work through the local boards and in line

with the activities of district enlightenment boards under the supervision of *Osvetový zväz pre Slovensko*. Although, *Osvetový zväz pre Slovensko* was established on 15 September 1919, "the enlightenment activities began to develop earlier in accordance with the acts governing enlightenment activities, namely *The Act No. 67 Coll. on the Organization of Popular Courses* adopted on 7 February 1919 and *The Act No. 430/1919 Coll. on Public Communal Libraries*, and through the establishment of state institutions that were in charge of development of enlightenment work" (Winkler, Eliáš, 2003, p. 277).

*Matica slovenská* was connected to the general public and other cultural workers through organizing and mobilizing local branches, holding competitions, exhibitions (community theatre, signing) and other activities. Local branches of *Matica slovenská* were being established in towns and villages in different Slovak counties (Bratislavská, Nitrianska, Považská, Zvolenská, Podtatranská and Košická counties) and fostered development of cultural and social life. At the same time, they were involved in organization of popular education through enlightenment work. They organized lectures, courses (e.g. Slovak language courses); contributed to a development of Slovak literature, started libraries, organized amateur theatres, choir singing, etc.

*Matica slovenská* played an important role in the development of librarianship in Slovakia. *Ministerstvo školstva a národnej osvety* [The Ministry of Education and National Enlightenment]<sup>1</sup> (MŠANO) commissioned *Matica slovenská* to build a network of libraries in line with The Act on Public Libraries adopted on 22 June 1922 (*Príručka pre verejné knižnice na Slovensku*, 1929, p. 5. In: Mráz, 1936, p. 58). The year 1925 was a significant milestone in the history of Slovak librarianship. On 21 April 1925, the MŠANO issued a Decree No. 46.608 authorising *Matica slovenská* to establish *Výpravňa kníh* [The Books Dispatch Office]. The duties of the Books Dispatch Office were: to carefully prepare the selection of books; to distribute professionally processed books, or collections of books among the public libraries in towns, villages and municipalities; to issue blank forms that were needed for a proper administration of libraries; to process orders; to systematically replenish the stock with quality literature published by *Matica slovenská* and distribute subsidies from the MŠANO. The Books Dispatch Office contributed to the improvement of library services in Slovakia (Winkler, 2013; Chaloupka, Rambousek, Trnka, 1926).

*Matica slovenská* organized many cultural events, for instance, *Augustové slávnosti* [August Festivities], a traditional festival held since *Matica*'s establishment in 1863. In the 1920s, *Živena* and *Československý červený kríž* co-organized the event. During the festivities, people could take part in various social events, theatre groups and folk ensemble performances, laying wreath ceremonies at the graves of prominent national figures, organized trips, etc. In order to encourage young people, *Matica slovenská* planned to start a tradition of *Matičné študentské dni* [Matica slovenská Days for Students]. The event was held for the first time in Turčiansky Sv. Martin on 18-19 May 1929. After that, the students met on 24-25 May 1930 and then in 1938. *Matičné dni*, held for the first time in 1935 was a promotional event in its nature. The organizers wanted to inform the general public about the founders of *Matica slovenská*, their programme, and about *Matica*'s current and past activities and hoped to boost the membership. Many sporting events had the same promotional character (e.g. Football tournament in July 1936). In addition to sport, cultural and promotional aspect was emphasised too (Winkler, 2003).

Besides the cultural-enlightenment, publishing, and research activities, *Matica slovenská* participated in heritage preservation, contributed to building statues, memorials and commemorative plaques in memory of prominent Slovak figures. In 1933, *Matica*

<sup>1</sup> MŠANO – *Ministerstvo školstva a Národnej osvety* [The Ministry of Education and National Enlightenment] established in 1918 was a supreme governing body responsible for education and culture with its seat in Prague. *Referát Ministerstva školstva a Národnej osvety* [The Slovak Office of the Ministry of Education and National Enlightenment] with its seat in Bratislava governed educational and cultural enlightenment activities in Slovakia.

also contributed to the establishment of *Galéria slovenského výtvarného umenia* [Slovak Gallery of Fine Arts], the predecessor of *Slovenská národná galéria* [Slovak National Gallery] (1948). In terms of its post-1918 cultural-enlightenment activities, *Matica slovenská* played a dominant role in the development of amateur theatre, radio, and film production.

*Matica slovenská* remained active even after the establishment of the Slovak State (14 March 1939). *Matica* took over the property of closed enlightenment boards and committees and had a monopoly on organizing enlightenment activities of the Slovak State. They were, however, built on completely different ideological grounds (Orosová, 2016).

### 3 Ústredie slovenských ochotníckych divadiel - The Central Office of Slovak Amateur Theatres

*Ústredie slovenských ochotníckych divadiel (ÚSOD)* [The Central Office of Slovak Amateur Theatres] has its rightful place in the history of Slovak enlightenment. It was one of the most active popular education sections of *Matica slovenská*. The *ÚSOD* began its activity in 1922 in Turčiansky Sv. Martin. On behalf of *Matica committee*, Štefan Krčméry authorized Pavol Socháň to manage all Slovak amateur theatre groups and associations. "It a short time, around 800 active theatre associations and groups, working under the auspices of local *Matica slovenská* branches, the sections of *Živena*, worker's associations, enlightenment boards and committees, firefighter's *Jednota* [club, union] and other organizations joined the *ÚSOD*" (Pasiar, 1975, p. 227).

The *ÚSOD* promoted the creation of new amateur theatre groups, offered support in improving the quality of the amateur theatre groups, and contributed to the development of the dramatic arts and Slovak theatres in general (Škoda, Paška, 1977, p. 59). The *ÚSOD* organized different practical courses for directors, make-up artists, designers, stage managers, etc. Summer schools were very popular among amateur actors and directors from the villages and the other people who showed the interest in theatre. In an effort to help amateur theatre companies, the *ÚSOD* created costume (so-called *šatnica*) and stage prop rentals in Martin. The number of amateur theatre groups rose rapidly. While in 1922, there were around 20 theatre companies in Slovakia, in the following three years their number rose to 208 in Bratislava County and 308 in Považie. Other counties too saw the increase in numbers of theatre companies, for instance, Zvolen County (90), Košice (76) and Nitra (60). The number of theatrical performances increased too, from 47 in 1920 to 1 227 in 1923. In 1924 theatre companies put on 1 401 performances (Pasiar, 1975; Škoda, Paška, 1977).

From the time of its establishment, the *ÚSOD* organized theatre competitions - *Divadelné závody* [Theatre Contest], first on a nationwide level in Martin, and then on the district and local level co-organized by the respective departments of *Matica slovenská* and enlightenment committees. Decentralization proved to be a success since it contributed to the improvement of amateur theatres, especially in villages where plays of higher value were being performed. The nationwide contest held in Martin was open only to the winning theatre companies from the local competitions. Ivan Stodola, a chairman of the *ÚSOD*, proposed that the winners of the nationwide competition got a chance to perform on a stage of *Slovenské národné divadlo (SND)* [Slovak National Theatre] in Bratislava. The first such performance (*Čestný veniec víťazov* [Honorary Wreath of Victory]) took place in January 1936 and later these performances on a stage of SND became a tradition. The theatrical performances were judged by the panels of judges consisting of actors, directors, representatives of the Czech amateur theatres who worked in Slovakia as teachers, and popular educators from Slovakia. The *ÚSOD* played a crucial role in introducing a positive and progressive aspect into the dramaturgy of amateur theatres, which became evident in putting together more challenging and progressive performances. The competitions along with the exhibitions and festivals ranked

among the most impressive activities that the *ÚSOD* conducted (Pasiar, 1975; Škoda, Paška, 1977).

The *ÚSOD* also published magazines that contributed to the development of performing art in Slovakia, namely *Slovenský ochotník* [Slovak Amateur Performer] (1925 - 1927) and *Naše divadlo* [Our Theatre]. *Slovenský ochotník*, edited by Štefan Krčméry and Zdeněk Novák, was more of a practical than theoretical nature and focused on methodology and training in amateur theatrics. The magazine *Naše divadlo* was more elaborate and contained articles of great importance as well as methodological advice and play analyses and reviews (Pasiar, 1975, p. 230).

In 1935, the *ÚSOD* organized 12 courses for directors and theatre competitions (Mráz, 1936).

### 4 Živena – Slovak Women's Association

*Živena* played a vital role in the life of the Slovak nation and in the emancipation process of Slovak women. *Živena* was formed as a nationwide association uniting women, regardless of their political or religious affiliation. Women's emancipation in Slovakia had educational character. Elena Maróthy-Šoltéssová, a chairwoman of *Živena*, pushed for its activities to remain apolitical. *Živena* focused on publishing and supporting activities. "Throughout its existence, *Živena* has strived: to defend the right of girls to secondary education; to support the publishing of books, calendars and magazines for women; to unite Slovak women and motivate them to become more involved in public life; to educate adult women" (Tokárová, 2003, p. 98).

*Živena's* activities revolved around the magazine of the same name. The association had its seat in Turčiansky Svätý Martin. *Živena* closely cooperated with its many branches, local branches of *Matica slovenská* and other cultural associations and societies and focused on popularization of literary endeavours of Slovak women and exposing women to various forms of art. Women in *Živena* also devoted their time to everyday matters such as sewing, cooking, clothing, social education, child rearing, reading comprehension, etc. (Škoda, Paška, 1977).

After a half century-long struggle, the interwar period created the favourable conditions for *Živena* to establish schools for girls and women. The association's structure had undergone some changes; local branches and schools for girls were created in many Slovak towns. In 1921, there were 30 local branches and 10 schools for girls. In 1927, a school for female professions was established in Prešov. The greater emphasis was placed on social work; female instructors were trained to teach courses for women. Surely, there were problems related to the organization of such courses (instructors and lecturers were hard to find, a choice of appropriate topics, etc.). On 7 May 1928, the Central office of *Živena* sent out a letter to the *MŠANO* asking for their support. One of *Živena's* activities was to establish nurseries for the children of working women. The first nursery was opened on 28 October 1922 in Martin and for a while, it was the only nursery in Slovakia. In 1919, *Živena* founded its own school for female occupations in Turčiansky sv. Martin and a family school in Kremnica. From 1921, both schools were under the state administration (Koncošová, 2014). In 1926, Elena Maróthy-Šoltéssová and Alica Masaryková played a crucial role in founding *Ústav Milana Rastislava Štefánika* [The Institute of Milan Rastislav Štefánik], known as *Štefánikov ústav* [Štefánik's Institute] – a school training female teachers for women's schools in Turčiansky sv. Martin. The school consisted of two departments: *Župný ústav pre vzdelávanie učiteliek gazdinského odboru ženských odborných škôl* [The County Institute for Education of Female Teachers for Housewives] and *Župná dvojročná škola pre sociálno-zdravotnú starostlivosť* [Two-year County School for Social and Health Care] (Tokárová, 2003, p. 120).

The most prominent figures of *Živena*, both female and male, were Anna Pivková, Elena Maróthy-Šoltéssová, Anna Halašová,

Žofia Nováková, Jozefína Sabľáková, Margita Paulíny-Tóthová, Tatiana Štefanovičová, Ema Gildpergerová, Anna Mudroňová, Ambro Pietor, Svetozár Hurban-Vajanský, František Mareš, etc. (Tokárová, 2003).

## 5 YMCA and YWCA

After the establishment of Czechoslovakia, youth associations, such as the YMCA<sup>2</sup> and YWCA<sup>3</sup> carried out cultural and educational activities too. They organized courses, lectures, theatrical performances, social and sporting events.

The YMCA in Czechoslovakia was established in 1920. In Slovakia, the YMCA was active mainly in Bratislava, Banská Bystrica, and Lučenec where the institution had its own buildings or in places where they held summer camps (Červený kameň, Oravský Podzámok, Lučatín). In 1923 – 1933, The YMCA in Bratislava organized 298 language courses (Slovak, Czech, German, Hungarian, English, French, Spanish, Russian and Finnish) attended by 4 067 students.

A large numbers of Slovak language courses contributed to the improvement of language skills among administration staff who attended these courses because of their insufficient knowledge of Slovak grammar and spelling. The YMCA organized other professional courses too – for secondary school entry exam preparation, Maturita preparation courses, driving courses, bookbinding and art courses, courses for chemists or bricklayers, swimming courses including first aid courses, etc. They also organized one-year or two-year business courses, courses of typing, stenography, and bookkeeping.

The YMCA and YWCA organized various lectures. The most popular were travelogues that were often accompanied by projections of slide transparencies or films. They also held lectures of ideological nature that were followed by discussions. The lectures covered topics of history or promoted physical education and sport.

Theatre performances organized by the YMCA had a considerable educational impact too. The greatest number of theatre shows was put on in the first years of the YMCA activity. Later the number was dropping. The theatre performances were sometimes complemented by *academies* with short theatrical scenes, singing, music and even gymnastics displays. Very popular were puppet shows (since 1929) and story reading afternoons with a projection of slide transparencies (since 1933) for children.

The YMCA has a long tradition of organizing various theme evenings, such as St. Nicolas Day (6.12), *Deň matiek* [Mother's Day] (since 1920), *Večer otcov a synov* [Father-Son Evening] (intergenerational understanding, since 1925), events commemorating the birth of T. G. Masaryk, or international *Day of Goodwill* (since 1925). Gymnastics and other sporting activities were popular promoting harmonization of physical and intellectual education (Perútko, 1993).

The rich and diverse cultural and educational activity of the YMCA and YWCA in all of their centres contributes significantly to improving levels of educational attainment among the youth.

## 6 Spolok profesorov Slovákov – The Association of Slovak Professors

Teachers began to organize themselves around teacher's associations not long after the establishment of the Czechoslovak Republic with the goal to protect their interests and have an opportunity to positively influence school policy. Secondary school professors created *Ústredný spolok československých profesorov (ÚSČSP)* [The Central Association of Czechoslovak Professors]. An independent *Spolok profesorov Slovákov (SPS)*

[The Association of Slovak Professors] was established in 1921. The SPS was created for practical reasons, both professional and national. Slovak professors (a professor was a term that was also used to refer to secondary education teachers) rejected the ideology of "Czechoslovakism" adopted and promoted by the *ÚSČSP*. They also disagreed with inequality between Slovak and Czech professors. Slovak professors were disadvantaged, for instance, in the way their contracts of employment were concluded. They were employed on a temporary basis as professors on "*zmluvný pomer*" [contractual temporary employment].<sup>4</sup> On the other hand, Czech professors employed in Slovakia had so called "Slovak advantage". The article "Equality in the practice" published in *Sborník SPS* [Journal of the SPS] pointed to the composition ratio of professors at Slovak secondary schools (Kratochvílová, 1975, p. 151).

The same holds true for appointments of the Slovak school's principals, where the Czech professors took preference at the expense of the Slovak professors, who were often more suitable candidates for the said offices. The delayed publication of the regulation stipulating the date for taking a language exam meant that Slovak professors did not have time to register for the exam and missed their opportunity to apply for vacant teaching positions in Slovak secondary schools. Therefore, they could only be employed on "*zmluvný pomer*" basis. Slovak professors also experienced injustice in terms of suppressing the Slovak language and undermining their scientific education. All this only intensified the feeling of wrongdoing among the Slovak professors and led them to the establishment of their own independent association. The idea for creating an organization of Slovak professors was proposed for the first time during the informative course for professors held in Prague in 1921. On 4 August 1921, the preliminary meeting was held in Ľubochňa. The general assembly approved the establishment of *Spolok profesorov Slovákov* [The Association of Slovak Professors] on 5 August 1921.

In the interwar period, Karol Murgaš, Anton Mišík, Ján Beniač, Jozef Martinka, Štefan Bezák, and Pavol Florek headed the SPS. The *SPS Regulations* were approved on 2 December 1921 with the Decree No. 24691/1921 issued by the *MSaNO*.

The *Regulations* clearly defined the programme and goals of the SPS: to defend general national, material and moral professional interests of Slovak professors; to promote and popularize science and art in Slovak language in magazines and books under the auspices of *Matica slovenská*; to publish scholarly journals and design Slovak textbooks and handbooks.

In 1922, the SPS started to publish a periodical of education *Sborník spolku profesorov Slovákov* [Journal of the Association of Slovak Professors] in Košice. It provided a space for professors in the field of pedagogy, philosophy, linguistics, anthropology, geology, and other fields to publish their papers. The journal promoted new books and published their reviews, brought news from the educational theory and practice both home and abroad, fostered contacts among professors and informed the general public about the activities of the SPS. (Kratochvílová, 1975).

Apart from the above-mentioned problems related to their profession, the SPS members had to face other pressing issues too: elimination of the "*zmluvný pomer*", ensuring permanent contracts of employment for the SPS members, filling the vacancies of school principals, professors and janitors by the Slovak applicants, improvement of the financial status of professors, granting scholarships to poor students and fighting against laying off women from school services.

<sup>2</sup> YMCA – Young Men's Christian Association founded in 1844 in London.

<sup>3</sup> YWCA – Young Women's Christian Association

<sup>4</sup> "Zmluvný pomer" – a decree appointing a professor that read: "I appoint you a temporary professor for a school year .... on *zmluvný pomer* without being entitled for any pension ... the Ministry reserves the right to another appointment after a successful one-year performance". Kratochvílová, E.: *Dejiny Spolku profesorov Slovákov*. In *Jednotná škola*, No. 2, p. 150, 1975.

Their tireless activity bore fruit and the *SPS* succeeded in, for instance, obtaining a special status for secondary school professors in Slovakia, eliminating constant movement of some professors from one place of work to another, re-employing substitute teachers [referred to as “*suplents*”] who had been dismissed from their services, maintaining contacts with university students and in opening a dormitory in Košice.

Slovak professors organized around the *SPS* directed their attention to cultural, scientific, as well as publishing and editing activities. They were involved in various cultural and humanistic associations, published scholarly and scientific articles, handbooks, books and dictionaries, provided secondary school professors with all sorts of publications, and conducted translation activities. In 1923, the *SPS* started the collaboration with all professional sector associations in Slovakia to create one united organization called *Sdruženie slovenských odborových organizácií* [The Association of Slovak Trade Organizations].

Apart from the *Spolok profesorov Slovákov*, other teachers' associations were established in Slovakia too. They were: *Zemský učiteľský spolok* [Land Teachers Association], *Zväz slovenských učiteľov* [Association of Slovak Teachers], *Spolok evanjelických učiteľov* [Association of Evangelical Teachers], *Spolok ukrajinských a ruských učiteľov* [Association of Ukrainian and Russian Teachers], *Spolok maďarských učiteľov* [Association of Hungarian Teachers], *Spolok židovských učiteľov* [Association of Jewish Teachers] and *Spolok učiteľov penzistov* [Association of Retired Teachers].

## 7 Učená spoločnosť Šafárikova - Šafárik's Scholar Society

Establishing a research and scientific institution in the academia was an important achievement in the professionalization of Slovak science. The preliminary talks about the establishment of the Czechoslovak university in Bratislava commenced already in 1919.

In accordance with the Act on Abolition of the Hungarian Elisabeth University issued on 11 July 1919, the Czechoslovak State University was established in Bratislava. It was later renamed to the Comenius University. The University was divided into three faculties: the Faculty of Medicine – first professors were appointed on 31 July 1919, the Faculty of Law – the president appointed first professors on 20 May 1920, the Faculty of Arts – first professors appointed on 14 September 1919. The education at the University began on 9 December 1919. Having established the Comenius University in Bratislava, the professional circles started to ponder the idea of a scientific society that would become a centre for all scientific workers living in Slovakia whose research expertise revolved around Slovakia and the pressing problems our country had faced. Professor Albert Pražák, the man behind this idea, proposed it at a meeting of the Academic Senate of the Comenius University held on 28 April 1925.

The Academic Senate and all faculties of the Comenius University unanimously accepted Pražák's proposal. On 29 November 1926, the Ministry of Interior issued a Decree No. 77.673 establishing *Učená spoločnosť Šafárikova (USŠ)* [Šafárik's Scholar Society]. Rector of the Comenius University, Dr. Otakar Somr opened the formal founding meeting that was held on 2 December 1926 in the Great Auditorium of the University. Members of the government, representatives of several scientific and public corporations, different offices, and students attended the meeting.

*Učená spoločnosť Šafárikova (the USŠ)* was a professionally managed scientific society in Slovakia, which closely collaborated with other associations both at home and abroad, whenever it was in the public interest. The aim of *Učená spoločnosť Šafárikova* was: to systematically organize scientific research into Slovakia and Carpathian Ruthenia, to establish and maintain scientific contacts with the rest of the Slavic world, to share knowledge about Slovakia with foreign countries, to support the efforts of young Slovak scientists, to inform about

scientific research findings and discoveries at home and abroad through lectures and publications, and to cooperate with *Matica slovenská* (Anonym, 1926). The first members of the *USŠ* were professors and associate professors who worked at the Comenius University in Bratislava, other scientists and researchers from among the future Intelligentsia educated at Czechoslovak institutions of higher educations joined soon after. Through the gradual development of research activities and achieved scientific success, the *USŠ* attracted many prominent researchers and scientist from foreign countries in and outside Europe.

The *USŠ* was divided into two sections: humanities encompassing the study fields taught at the Faculty of Law and the Faculty of Arts and natural sciences covering the study fields provided by the Faculty of Medicine and the future Faculty of Natural Sciences and Technical Faculty. Prof. dr. August Ráth was elected the first chairman of *USŠ*, prof. dr. Albert Pražák was the general secretary. After Pražák's appointment as a professor at the Charles University in Prague, prof. dr. Vladimír Klecanda was named his successor. The Humanities section was headed by prof. dr. Jozef Hanuš. After his retirement, this position was held by prof. dr. Václav Chaloupecký. The first head of the Natural sciences section was prof. dr. Kristián Hynek who was replaced by prof. dr. Stanislav Kostlivý.

One of the *USŠ*'s tasks was to create professional committees that would address any specified scientific questions. These were:

1. The Committee for Limes Romanus researching issues pertaining to Limes Romanus in Slovakia and the former Hungarian Kingdom;
2. Department of Linguistics with working committees of orthography, dialectology and a committee responsible for compiling dictionaries;
3. Department of Literary History with a committee for literary research of Slovakia;
4. Department of Law.

From 1927, *Učená spoločnosť Šafárikova* published a magazine *Bratislava* dedicated to a research of Slovakia and Carpathian Ruthenia. They also published three editions of individual publications: *Práca USŠ* [USŠ's Activities], *Prameny USŠ* [USŠ's Sources], and *Prednášky USŠ* [USŠ's Lectures]. In order to inform the foreign scientific circles, the *USŠ* published the *Bulletin international de la Société Savante Šafárik* (Horna, 1967). The *USŠ* planned to publish a new series of publications entitled *Slovenský archív* [The Slovak Archive] in which they intended to publish important archival documents related to the history of Slovakia and Carpathian Ruthenia.

*Učená spoločnosť Šafárikova* also published a vast array of scientific works of different nature (archaeology, linguistics, literary history, legal history and many works from the fields of natural and medical sciences that were well received far beyond the borders of Slovakia). The *USŠ* also established an academic library, which, in addition to their own publications, held plenty of significant books published by foreign scientific associations. Since the foundation of *Učená spoločnosť Šafárikova*, the members included regular and adjunct professors, *suplents* from Charles and Masaryk Universities, associate professors and lecturers. From 1933, the *USŠ* had also honorary and foreign members.

*Učená spoločnosť Šafárikova* ceased to exist in 1939. Its successor, *Slovenská učená spoločnosť* [Slovak Scholarly Association] was established in 1949 and became known for publishing *Slovenská vlastiveda* [Slovak Natural History and Geography] and other scientific periodicals. It was this association that was behind the initiative to establish *Slovenská akadémia vied a umení* [The Slovak Academy of Sciences and Arts] in 1942. It was a direct predecessor of the present-day *Slovenská akadémia vied* [The Slovak Academy of Sciences] that built on a long tradition and the complicated history of science and research in Slovakia as well as on the work of leading figures of Slovak history and science.

## 8 Conclusion

The establishment of the Czechoslovak Republic created an opportunity for restoration of the activities of some associations and for the establishment of the new ones. Their goals were closely linked with the historical context and social and political situation. It was necessary to strengthen statehood, democracy and a principle of equality. Thus, the different associations took on a task of educating and spreading knowledge among the public. At the same time, they promoted the scientific development as well as created and maintained contacts with foreign institutions.

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Primary Paper Section: A

Secondary Paper Section: AB

## SELF-EFFICACY OF STUDENTS – FUTURE TEACHERS IN THE COOPERATION WITH STUDENTS' PARENTS

<sup>a</sup>ELEONÓRA MENDELOVÁ, <sup>b</sup>HANA ZELENÁ, <sup>c</sup>ANNA TIRPÁKOVÁ

<sup>a,b</sup>Constantine the Philosopher University in Nitra, Faculty of Education, Department of Pedagogy, Dražovská cesta 4, 949 74 Nitra, Slovakia

<sup>c</sup>Constantine the Philosopher University in Nitra, Faculty of Natural Sciences, Department of Mathematics, Tr. A. Hlinku, 949 74 Nitra, Slovakia  
email: <sup>a</sup>emendelova@ukf.sk, <sup>b</sup>hzelen@ukf.sk, <sup>c</sup>atirpakova@ukf.sk

Study is the partial outcome of the research project VEGA no. 1/0098/17 called Individual Conception and Strategy of Education Within the Context of Teacher's Professional Development.

**Abstract:** The cooperation between family and school is an important activity that helps to create the relationship of parents to teachers and school. The preparation for this area of the teaching profession represents an inseparable element of the pregraduate preparation of future teachers. The article presents the research aimed at the examination of the self-efficacy of students – future teachers in their cooperation with pupils' families. The research also focuses on the evaluation of their competences and assumptions for this cooperation with families. We processed the research results through chosen statistical methods, and we found out that there are statistically significant differences in the self-efficacy of students – future teachers for the primary and secondary level of education in the area of cooperation with pupils's families.

**Keywords:** self-efficacy, cooperation between school and family, Wilcoxon Rank Sum Test, Kruskal - Wallis test.

### 1 Introduction

Cooperation with pupils' families represents an indispensable part of teachers' work. Several authors (e.g. Polovina – Stanišić, 2007; Emmerová – Rabušicová, 2001; Frýdková, 2010; Čapek, 2013) think that, nowadays, this cooperation between family and school has been changing. The current schools start to be aware of the need for cooperation with other institutions (local authorities, civic associations, and mainly with pupils' families). They want to open their door and cooperate with the broad public closely. In order to form a modern and progressive school system, schools should be open to cooperation with pupils' parents and they should provide help and advice in the education of children. For this reason, it is desirable so that, within the pregraduate preparation, students – future teachers acquire competences necessary for the active cooperation with pupils' families with the perspective of their further personal development in the educational practice.

### 2 Self-efficacy of teachers (future teachers)

Teachers' abilities, assumptions, as well as their convictions about their qualities for this profession, determine all their activities. In general, this image people have about themselves, creates a conviction about their possibilities to carry on certain activities. This psychological process, denoted with the concept of self-efficacy, is closely connected with the American psychologist Bandura. The author understands this concept as part of the theory of social – cognitive learning, which emphasizes the role of conviction people have about themselves. According to this theory, thinking and acting of people are perceived as a result of a dynamic synergy between the personality, environment and behaviour of people (Bandura, 1997). Gavora (2008, p. 225) thinks that self-efficacy includes two concepts: 1. personal teaching efficacy (teachers believe in their abilities to influence the behaviour and learning of their pupils); 2. general teaching efficacy (the way how teachers evaluate their success in the teaching process). We can say that self-efficacy expresses the evaluation of teachers' possible qualities which determine their performance of the teaching profession. It is the personal belief that one is capable of performing appropriately and effectively to attain specific goals (Ormrod, 2006). It is the teachers' conviction and confidence in their competences, however, we do not talk about their real competences as such. (Majerčíková et al., 2012, p. 14).

Furthermore, teachers' self-efficacy influences their teaching behaviour and their students' motivation and achievement (Skaalvik & Skaalvik, 2007). According to Gavora (2010), teachers' self-efficacy is a powerful self-regulatory characteristic feature that enables teachers to use their potentials.

The self-efficacy of future teachers is formed relatively early – already during their preparation for the teaching profession at university, and it develops at the beginning of their teaching practice. The teachers' competence to cooperate with parents of their pupils represents one area of teachers' self-efficacy.

### 3 The family-school partnership

The school-family relation is currently a topic of interest among parents, teachers, policymakers and all those involved in childhood education. It is the subject of several researches at the provincial, national and international levels as well. Cooperation between family and school represents an essential part of the teaching profession. School and teachers should develop, support and motivate pupils' parents to participate actively with school (Kurincová, 2001; Frýdková, 2010).

Many authors (Henderson & Mapp, 2002; Christenson – Sheridan, 2001; Rabušicová, 2004; Felcmanová, 2013; Pecháčková, 2014) confirm that good cooperation between family and school positively influences the results of children at school, and it also helps to achieve better effectiveness of education and formation. In this context, Vališová (2011, p.333) thinks that thanks to effective communication and cooperation with pupils' parents, the current modern and progressive school opens to the broad public, what improves the reputation of the school. Many research studies even point out at the fact that pupils are more satisfied and happier at school, and they achieve better study results thanks to this good relationship between family and school (Čapek, 2013, p. 16-17). Christenson (2001) also emphasizes well-functioning relationships between family and school and describes them as a safe „network” which supports learning and acquiring experience. At the same time, this good cooperation represents a form of prevention against failure at school.

Epstein's conceptual model of “overlapping spheres” (Epstein, 1987) explains the significance of cooperation between family and school. Epstein's theory of overlapping spheres of influence emphasizes the importance of schools, families and communities working together to meet children's needs. The theory includes internal and external structures. The external structure can be pushed together or pulled apart by factors such as the beliefs, experiences and practices of families, schools and communities and by the students' ages and grade levels.

According to the experience from last years, the partnership of family and school has been changing. In our region, before the year 1989, pupils' parents perceived school mainly as an institution where the professional guidance of teachers influenced the culture and education at school. Parents did not interfere in the school life and its management. Nor did the school require it from them. Průcha (2005, p. 420) describes this period, and he emphasizes that cooperation between family and school was based mainly on the authoritative approach of school to parents. Parents played a subordinate role in this relationship, and they were not allowed to interfere in the educational process. Currently, people prefer the opinion that pupils' parents should not be only passive observers of school activities, but they should support and cooperate with school. Majerčíková (2012, p.51) even mentions that teachers should behave to parents in such a way that parents feel as equal „players” together with teachers in their joint effort. The traditional model where „parents are clients” (receivers of services) has been changing into the model where „parents are partners” of school. In this context, Rabušicová (2001) uses the concept „parental

participation" that includes several levels: involvement of parents in the educational process at school, mutual communication and shared activities, as well as the level of education of parents.

Polovina and Stanišić (2007) focus on the complexity of the relationship between family and school, which derives from the fact that this cooperation is a confluence of many other complex phenomena and permanently interlinked processes. It includes: (a) internal academic variables (school attendance, tuition, learning process, academic performance, behaviour) and internal family variables (nourishment, emotions, development and growth, learning, knowledge, independence); (b) developmental processes of change and change of the environmental conditions. Despite the well-set rules of this cooperation and teachers' effort to involve parents in school life, there can occur situations with problematic communication. Several authors (Carter, Dyches, and Prater, 2012; Felemanová et al., 2013) emphasize the requirement that teachers should have the possibility to participate in the schooling and learn how to develop competences necessary for the effective communication with parents. They should learn the ways supporting mutual communication so that they can use them in the educational reality.

It is indisputable that relationships between school and parents represent a significant part of school life. This cooperation has its justification and brings many positive aspects for pupils, parents, and teachers. Therefore, the orientation of this cooperation should reflect the needs of teachers and parents, and all activities should primarily take into consideration the interests of children.

#### 4 Research of the self-efficacy of students to cooperate with pupils' families

##### 4.1 The project of the research

All teachers possess specific competences, qualities, skills and abilities they acquired during their preparation for the teaching profession. Students of the pedagogical field of study develop these skills in their educational practice and, thanks to them, they should be able to cope with all the tasks and situations they will have to solve during their pedagogical practice. In general, activities of teachers are not related only to the teaching process, but also to the cooperation with pupils' parents. This area is not just a complement to the teachers' obligations. On the contrary, this cooperation with pupils' parents represents a significant activity which helps to create the relationship of parents to teachers and school.

Based on the above mentioned theoretical concepts, we aimed our research at the self-efficacy of students – future teachers to cooperate with pupils' parents. The objective of our research was to find out what self-efficacy students of teacher training programmes have in the area of this cooperation. We were interested in their ideas about themselves and their cooperative competences. We also wanted to find out how they evaluate their assumptions or possible qualities for the cooperation with pupils' families. For this reason, we set the following research questions:

- How do students (future teachers) evaluate their self-efficacy to cooperate with pupils' families?
- Do students feel adequately prepared for the area of cooperation with pupils' families?
- Are there any differences in the self-efficacy of students to cooperate with pupils' families related to their study programme?

The *research sample* consisted of 140 students of the first year of master study in Teaching Training programmes at Constantine the Philosopher University in Nitra. 86 students were students of lower and higher grade of secondary education (SSE) and 54 students prepared for primary education teaching (SPE). They answered a questionnaire by J.Majerčíková et al. (2012) called

„Self-efficacy of teachers to cooperate with parents“. The questionnaire contained 24 questions. Answers to all questions were in the scale 0-1-2-3-4-5, where 0 meant no skills and 5 represented excellent skills.

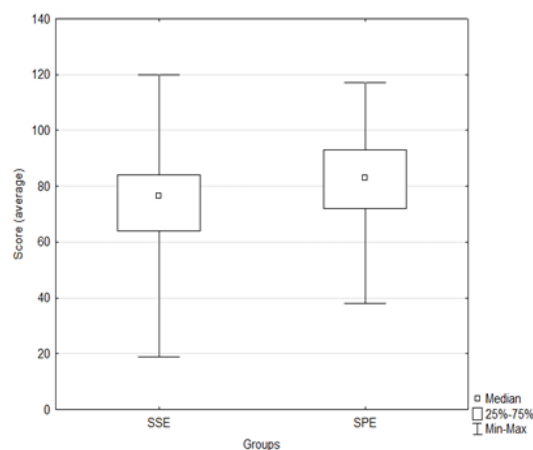
The questionnaire topics were related to five dimensions according to the given areas of cooperation between school and family. The results, obtained from the questionnaire, were processed through statistical methods: Wilcoxon Rank Sum Test, Kruskal - Wallis test.

##### 4.2 The analysis of the research results

In our research, we mutually compared two groups of students – future teachers: students of the study programme Teacher Training of Academic Subjects, i.e. students of Secondary Education (SSE) and students of Teacher Training for Primary Education (SPE).

First, we calculated the so-called total score as a sum of points from all answers (points in the scale) for every student in both groups of students (SSE and SPE). Subsequently, we calculated the average values of the score for every group. Since the objective of our research was to compare and find out differences between these two groups of students (SSE and SPE), we compared both groups taking into account the obtained average values of the score. We used the non-parametric method in the programme Statistica. After entering the input data, we obtained the following results in the output set of the computer: the value of the testing criterion Z Wilcoxon Rank Sum Test ( $Z = 3,0009$ ) and the value of  $p$  ( $p = 0,00269$ ). We evaluated the test results using the  $p$  value. Since the calculated value of probability  $p$  that is smaller than 0,01, we can state that there are significant differences between students SSE and SPE according to the achieved total score in the self-efficacy to cooperate with pupils' families. We depicted the results in the picture no.1. From the achieved results and the picture no.1, it is evident that students of primary education (SPE) reached a higher score than students of secondary education (SSE). Consequently, the self-efficacy of SPE students to cooperate with pupils' families is higher than the self-efficacy of SSE students. It means that they feel to be better prepared to cooperate with pupils' parents.

Picture no.1 The average score values of SSE and SPE students



Since the Wilcoxon Rank Sum Test confirmed the statistical significance of differences between both groups of students (SSE and SPE) – future teachers of primary and secondary education in the total score of self-efficacy to cooperate with pupils' families, we wanted to find out in which dimensions these mentioned differences are the most evident. We set five dimensions based on the division of 24 questions in the questionnaire (Table no.1).

Table no. 1 Dimensions of self-efficacy to cooperate with pupils' families

|   | Dimension  | Number of a question |
|---|--|----------------------|
| A | Ability to inform parents about the child's progress at school     | 1,8,13,19,24         |
| B | Ability to explain the functioning of the school as an institution | 5,12,14,15,20        |
| C | Ability to advise parents about educational issues                 | 2,6,9,21,22          |
| D | Ability to be transparent to pupils' parents                       | 3,11,16,23           |
| E | Ability to persuade parents to cooperate with school               | 4,7,10,17,18         |

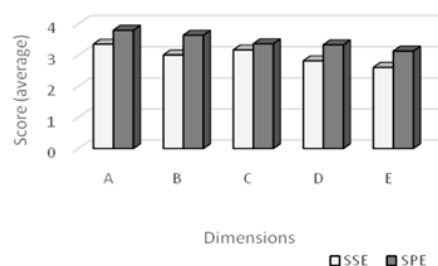
To verify the statistical significance of differences between the groups of SSE and SPE students in the achieved score in particular dimensions, we used the Wilcoxon Rank Sum Test as well. Through its processing in the programme Statistica we got the value of the testing criterion  $Z$  and the value of probability  $p$  for each dimension. We recorded the results in the following table (Table no.2).

Table no. 2 Results of Wilcoxon Rank Sum Test (students SSE and SPE)

| Dimension | $Z$     | $p$     |
|-----------|---------|---------|
| A         | -2,5287 | 0,0115* |
| B         | -3,1460 | 0,0017* |
| C         | -1,1231 | 0,2614  |
| D         | -2,9498 | 0,0032* |
| E         | -3,3692 | 0,0008* |

We marked values pointing at the statistically significant difference between the groups of SSE and SPE students with \* in the Table no.2. There are statistically significant differences in four dimensions: A, B, D and E. In the dimension C, the differences between groups of SSE and SPE students in the self-efficacy to cooperate with pupils' parents are not statistically significant. We depicted the results in the picture no.2.

Picture no. 2 Average score values of SSE and SPE students in dimensions

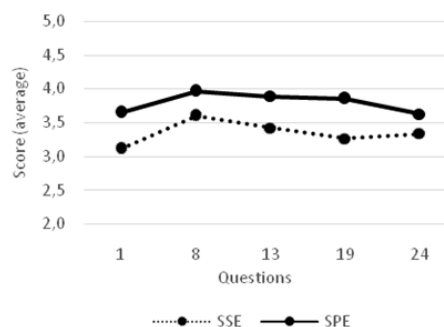


From the results and also from the picture no.2, it is evident that both groups of students evaluated their abilities to inform parents about their children as their most potent abilities (dimension A). However, SPE students rate their abilities higher than SSE students. The ability to advise pupils' parents about educational issues in their families (dimension C) represents the second most potent ability for students of primary education (SPE). In contrast, students of secondary education (SSE) think that this ability is their third evaluated ability. This dimension aims at the advising competence of teachers. The ability to explain the functioning of the school as an organisation (dimension B) finished on the third place by SSE students – future teachers of secondary education, whereas SPE students rated this dimension as their second most potent ability. This dimension focuses on examining the self-efficacy of students in explaining the work of the school and local authorities. It also clarifies the issues of school financing. Students of both study programmes rated the ability to be transparent to parents (dimension D) as the fourth one out of five examined dimensions in the cooperation between teachers and pupils' parents. This dimension centres on the

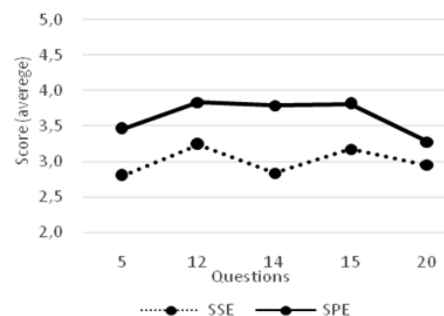
ability of teachers to provide parents with information about the school reality, to motivate them to participate in school life and to show them all what is happening at school. The ability to persuade parents to support school (dimension E) finished on the last fifth place. In this dimension, we examined possible qualities of future teachers to persuade parents to support the school with their participation, as well as materially or financially. Where appropriate, they could apply their specific abilities related to their hobbies or professions.

We calculated and compared the average values of SSE and SPE students in these dimensions (pictures no. 3 - 7)

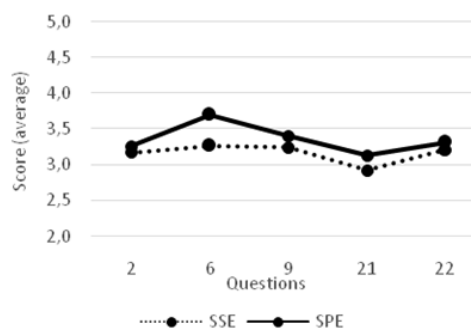
Picture no. 3 Average score of self-efficacy of SSE and SPE students in dimension A



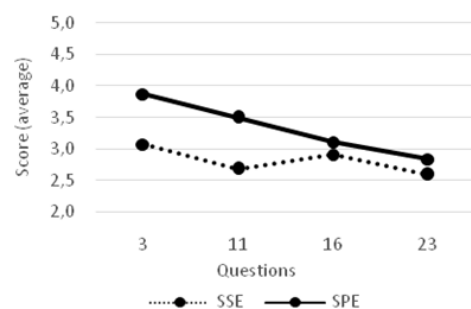
Picture no. 4 Average score of self-efficacy of SSE and SPE students in dimension B



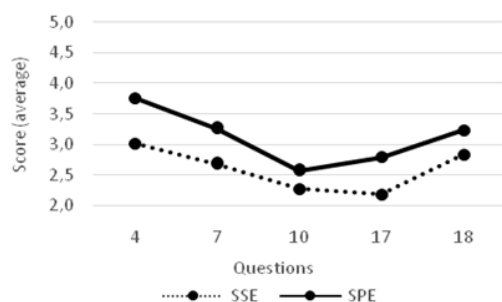
Picture no. 5 Average score of self-efficacy of SSE and SPE students in dimension C



Picture no. 6 Average score of self-efficacy of SSE and SPE students in dimension D



Picture no. 7 Average score of self-efficacy of SSE and SPE students in dimension E

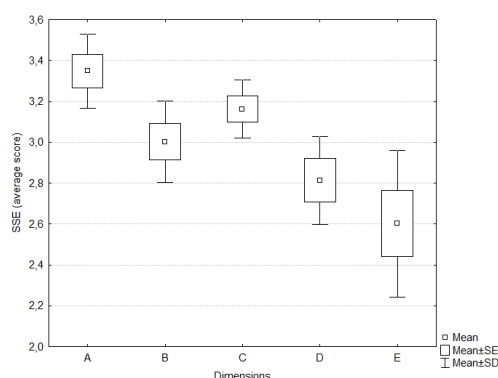


In the pictures no. 3 - 7 mentioned above, we can see that the average score values of SPE students were higher in all dimensions. Even in all 24 questionnaire questions, SPE students achieved higher average score when compared with SSE students. Based on these results, we can say that future teachers of primary level of education feel better prepared for the cooperation with parents because they evaluated their abilities and possible qualities to cooperate with pupils' parents higher than students of teacher training for secondary level of education.

We analysed the research results specifically for these groups of students – future teachers of primary and secondary level of education. Subsequently, we processed the obtained results in the statistical analysis of their self-efficacy in the given dimensions. We used the Kruskal - Wallis test for testing the statistical significance of differences between both groups in these dimensions. This test helped us to verify whether the average score values of SSE students in the given dimensions are statistically significantly different. We did the Kruskal - Wallis test in the programme Statistica as well. We obtained the following results for the group of students - future teachers of secondary education: the value of the testing criterion  $H=15,407$  and the value  $p=0,004$ . Also, in this case, we evaluated the test results using the  $p$  value. Based on the test results, we can state that the difference between the questionnaire dimensions is statistically significant by SSE students. We depicted the given situation in the picture no.8.

The test confirmed that SSE students rated their abilities to cooperate with pupils' families in particular dimensions in a statistically significantly different way. The average score values in the given dimensions (picture no. 8) show that SSE students evaluated the ability to inform parents about the progress of their children at school as their most potent ability. The following ability is the ability to advise parents about educational issues. On the third place, finished the ability to explain the functioning of the school as an organisation. SSE students think that their weakest abilities are the ability to be transparent to pupils' parents and the ability to persuade them to cooperate with school.

Picture no. 8 Average score values of SSE students in self-efficacy dimensions



We also examined which dimensions of self-efficacy of SSE students to cooperate with pupils' families are statistically significantly different. Using the Kruskal - Wallis test of multiple comparing in the programme Statistica, we obtained two tables in the output set: the first table records the  $Z$  - score and the other one records the related  $p$  - values. We only mention the table with values of probability  $p$  since we evaluate the test using the value  $p$  in this case as well (table no. 3).

Table no. 3  $p$  - values of Kruskal - Wallis test of self-efficacy dimensions by SSE students

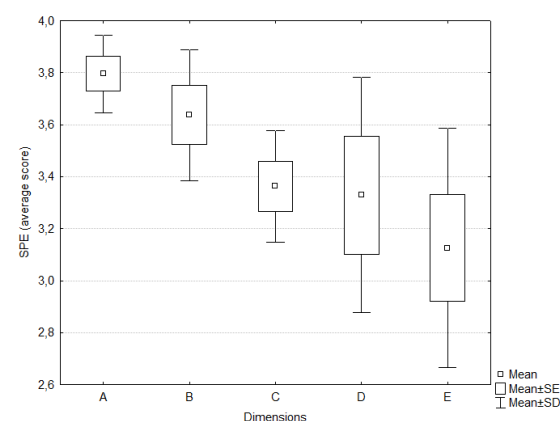
| SSE | B     | C     | D      | E      |
|-----|-------|-------|--------|--------|
| A   | 0,442 | 1,000 | 0,049* | 0,006* |
| B   |       | 1,000 | 1,000  | 1,000  |
| C   |       |       | 0,599  | 0,148  |
| D   |       |       |        | 1,000  |

\*values are statistically significant

In the table no.3 we can see statistically significant differences between the dimensions A and D, as well as A and E in the self-efficacy of students – future teachers of secondary education.

In analogically similar way, we examined whether the average values of students – future teachers of primary education (SPE) in the given dimensions of self-efficacy to cooperate with pupils' families are statistically significantly different.

Picture no.9 Average score values of SPE students in self-efficacy dimensions



Using the Kruskal - Wallis test, we obtained the following results: the value of the testing criterion  $H = 10,086$  and the value  $p = 0,040$ . Since the calculated value of probability  $p$  is smaller than 0,05, we can say that the difference between self-efficacy dimensions is statistically significant by students – future teachers of primary education. We depicted the given situation in the picture no.9.

As in the group of SSE students, we also examined which self-efficacy dimensions to cooperate with pupils' families are statistically significantly different in the group of SPE students. Using the Kruskal - Wallis test, we calculated the following values of probability (Table no. 4).

Table no.4  $p$  - values of Kruskal - Wallis test of self-efficacy dimensions by SPE students

| SPE | B     | C     | D     | E      |
|-----|-------|-------|-------|--------|
| A   | 1,000 | 0,336 | 0,606 | 0,045* |
| B   |       | 1,000 | 1,000 | 0,466  |
| C   |       |       | 1,000 | 1,000  |
| D   |       |       |       | 1,000  |

In the table no. 4, we can see statistically significant differences between the dimensions A and E in the self-efficacy of students – future teachers of primary education.

#### 4 Discussion and conclusions

In the presented study, we aimed at the self-efficacy of students – future teachers to cooperate with pupils' families. All teachers should have abilities to motivate and lead pupils' parents to cooperation since the ability to communicate with pupils' parents and make a relationship with them belongs to the most challenging abilities in the teaching profession.

Based on our research findings, it is evident that future teachers of primary level of education feel better prepared for the cooperation with pupils' parents because they evaluated their abilities and possible qualities higher than students of Teacher Training for Secondary Education. They are more convinced about their adequate abilities to cooperate with pupils' parents. The reason can be the fact that students – future teachers of primary education have more experience from the direct teaching practice, they have better subsidised pedagogical practice (already at the bachelor level of study). Moreover, the study programme Teacher Training for Primary Education is parallelly aimed at the preparation to work in non-formal educational institutions where students can meet with pupils' parents and personally communicate with them. These findings point out at the fact that their preparation is more favourable for developing such competences which are necessary in order to communicate with pupils' parents.

However, based on the obtained data, we have to say that, in general, observed students (regardless their study programme) are not convinced about their abilities to cooperate with pupils' parents, they evaluate these abilities as insufficient. They do not believe they have adequate abilities to handle the cooperation with pupils' parents well. At the same time, we must emphasize that obtained data do not represent the real abilities which students – future teachers will apply in their future educational practice when cooperating with pupils' parents. We only deal with students' conviction and self-confidence to carry on this cooperation.

Our research sample did not have such parameters so that we could generalise the research findings. However, the obtained data represent a predictor of preparation of future teachers for the area of cooperation with pupils' parents. They lead us to reflections on strengthening their preparation for this type of cooperation. They emphasize the need for more thorough preparation of future teachers to cooperate with pupils' families. The quality of teachers' competences at primary and secondary level of education is, undoubtedly, influenced by the pregraduate preparation at university. During this preparation, students – future teachers develop competences required for the cooperation with pupils' families through acquiring theoretical knowledge and practical abilities. From our study of specialised literature, as well as our experience from the educational practice it is evident that the pregraduate preparation of students of teacher training is still focused mainly on the teaching process, i.e. on didactic competences. Other competences, such as advising, communicative, and cooperative competences, do not receive such attention. For this reason, it is desirable to deal more intensively with the acquisition of competences necessary for the cooperation with pupils' families within the pregraduate preparation for the teaching profession.

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#### Primary Paper Section: A

#### Secondary Paper Section: AM

## RELATIONSHIP BETWEEN PERCEIVED IMPORTANCE OF CONTROL(-LING) IN ORGANIZATIONS AND ATTITUDES TO CONTROL(-LING)

<sup>a</sup>JURAJ MIŠÚN, <sup>b</sup>PAULÍNA PAPRSKÁROVÁ, <sup>c</sup>IVANA MIŠUNOVÁ-HUDÁKOVÁ

*University of Economics in Bratislava, Faculty of Business Management, Dolnozemska cesta 1, 852 35 Bratislava*  
email: <sup>a</sup>juraj.misun@euba.sk, <sup>b</sup>paulina.paprskarova@euba.sk, <sup>c</sup>ivana.misunova@euba.sk

This paper is an output of the research project "Trends of internal control in business entities in the light of new challenges" (VEGA 1/0135/17) funded by the Slovak scientific grant agency VEGA.

**Abstract:** The business environment has been very turbulent in recent years and businesses need to be able to respond flexibly to different changes and situations in this environment. It is particularly important to streamline business processes and their control. At the turn of 2016 and 2017 we examined changes in the managerial function of controlling in companies operating in the Slovak republic. Aim of the research was find out which new methods, tools and procedures were introduced into controlling in chosen companies. The aim of this article is to determine the relationship between the perceived importance of controlling allocated to it by the respondents considering their attitude to controlling when they are in the situations of performing controlling and being exposed to control by a higher situated entity.

**Keywords:** Control, Controlling, Management Accounting, Management function.

### 1 Introduction

Controlling has become increasingly important over the last decade, as many businesses and managers have begun to see control as a way to streamline business processes, but also to maintain or increase market value in a highly competitive business environment. Companies that wanted to maintain or increase their market value were forced to allocate and use their resources efficiently, so they needed to identify the reserves and shortcomings of the individual business processes and subsequently address these shortcomings.

Gradually, not only business owners, but also managers themselves see the importance of controlling in the business, whereas it gives them greater insight into the work performance of their subordinates and the progress of individual business processes and the achievement of business objectives. Attitudes of managers (and key employees) to control when they are controlled by another entity (the object of control in the Eastern approach) are also gradually changing and are beginning to see control as an opportunity to transfer responsibility for their own work performance and quality to their supervisor, thus working under less pressure.

Similarly, the requirements for the competencies of managers have changed (with changes in the last sequential management function). Managers should know the business processes they want to control, they should also have sufficient competence to design and implement corrective actions. In the context of increasing pressure from the state and other institutions from the external environment of the organization in external controls (another Eastern approach term: subject and object of control coming from different systems) and their scope, organizations seek to minimize the risk of negative external control outcomes by introducing various forms of internal control (both subject and object are from the same system).

### 2 Theoretical aspects of controlling

"There is a mess in control theory," Mike C. Jackson, one of the keynote speakers, told us at the Strategica conference held in October 2019 in Bucharest, Romania. We presented a paper on current theoretical problems of control. From the meta-level, it may seem that control theory is settled. The chapters on control in internationally recognized textbooks on management (e.g. Boddy, 2017; Schermerhorn & Bachrach, 2018; Bateman, Snell & Konopaske, 2019; Jones & George, 2019; Kinicki, & Williams, 2019) do not differ significantly from each other.

However, if we carry out a deeper analysis, we find that in many areas, even after a century of history, there are many controversial issues. In 1916, Henri Fayol, "formulated his experiences in a pathbreaking text on organization: Administration Industrielle et Générale (Hofstede, 1994)." This was the year when we first met the five management functions, but it lasted until 1949, when the work was translated into English and gained the status it has today. Although there have been efforts to replace his model of management functions with other models (Mintzberg, 1973; Kotter, 1982; Hales, 1986), ultimately Fayol has passed the test of time (Fells, 2000). Currently, almost every textbook that prepares students for managerial positions is structured according to management functions.

If certain theoretical foundations can survive for more than a century, how can there be a mess? Well, the answer is simple: there is still no global understanding, and many countries not only add their own color, but also come up with incompatible elements. Unfortunately, the world has become small, to which the Internet has contributed, as has the rapid emergence of English as a global language. The world's leading scientists no longer consider in what language to publish their works, and the same applies to aspiring followers.

We mentioned above the Eastern approach to control (Mišún, 2017), which we consider to be a legacy of many countries where control played – and in some cases still plays – a key role in maintaining discipline. Compared to the Western approach, there are significant differences and a great emphasis on formal control. This can also contribute to the mess. The same could be said about the term control(-ling) in the title. Which author would not like to have his/her own technical term in addition to his/her own definition? However, we hope that our term, which serves to highlight the fact that there is no difference between control and controlling, will really be only temporary.

The mess began to develop much earlier than the Fayol's control function theory itself emerged. Essentially, it concerns the very concept of control. Our research in recent years (Mišún & Mišunová Hudáková, 2018) shows that the concept of control has varied considerably in the past. The meaning of control is closely linked to two different directions: to perform control and to have control. While in the first case, any deviation between the desired and actual state may end in simply providing information to someone else, in the second case there is a direct corrective action in response to the deviation. A simple example is a car service and vehicle driver. The service station checks the technical condition of the vehicle and informs the owner that a particular part needs to be replaced. The corrective action is the responsibility of the vehicle owner. In the case of the driver, the situation is different, he controls his car. As soon as he encounters an obstacle on his road, he takes a corrective action and prevents a collision.

The same applies to management. While a large number of employees may be involved in the control process (determining of standards, measuring actual performance, comparing the standards and performance, suggesting possible corrective actions), the manager is in charge of deciding on important corrective activities. Simply put, employees often perform control, while they do not have the controlled object under control. In other words, "control (...) is always purposive; that is, it regulates a system so that the system fulfills some purpose, conscious or unconscious (Green & Welsh, 1988)."

The above-mentioned two directions as well as various historical developments associated with the word control also caused the development of two controlling terms. One is Anglo-American and refers to the management function (e.g. Leung & Kleiner, 2004) and the other comes from German speaking countries and refers to a management subsystem (e.g. Guenther, 2013). Our

current survey conducted through the professional network for scientists and researchers (Mišún, 2019) shows that there is a great consensus among German-speaking scientists that German controlling is not translated into English as controlling. What is more interesting, however, is that the reason why it is not translated this way is mostly unknown. Our assumption, which we want to examine in the near future, is that the position of management theory (Unternehmensführung) in Germany is not at the same level as in the US or the UK and only fulfills a subordinate role to the business economics.

It is due the German theory of controlling that we need to temporarily use the term control(-ling). In its literature, it is very common to state that the German term "Kontrolle" cannot be equated with the term "Controlling" (e.g. Schierenbeck, 1995; Brockhoff K. 2002; Buchholz, 2013). Although the meaning of the German word "Kontrolle" has changed and approached the English word "control" (Schwarz, 2002), the technical meaning of "Kontrolle" does not reflect this change. Central and Eastern European authors, mostly with a very good knowledge of German language, are very fond of taking this phrase, but when translating into English they do not consider the fact that "control" and "controlling" are synonyms in English and the meaning of these word has not changed significantly since the rule of Tudors in the late 15<sup>th</sup> century. Here we have to return to the problem that English has become the global language of science. The German word controlling is of English origin (Binder, 2006), but as mentioned above, German-speaking authors translate controlling into English differently, most often "management accounting and control". However, as the authors do not address this problem in their publications, we are starting to grow a lot of confusing literature.

With this mess, we are only at the beginning, when confusing resources are mainly in journals that have only started to be published in the last decade. However, there are already papers in WoS and Scopus indexed journals. In addition, English-language study programs are on the rise in many countries, aggravating the problem, as students will be taught one theory, while practice will expect skills in another.

In our understanding, controlling is a constantly ongoing process by which every manager aims to increase the predictability of future developments and results. The process consists of designing standards, measuring performance, comparing the performance with standards, and implementing corrective actions to ensure effective and efficient running of the organization's activities. Controlling might be considered as a convergence point between accounting, business policy and management theory (Daft & Macintosh, 1984).

In the context of our paper, it is certainly necessary to define the concepts of subject and object of controlling, as they are used differently in the Eastern and Western approaches. The term of control subject simply answers the question "who performs control?" With the advance of artificial intelligence the question might also be "what is performing control?". By conducting relevant control activities and employing specific control techniques, "control subjects execute control in an organizational setting (Hutzschenreuter, 2009, pp. 27-28)." In management, the subject of control has the competence to decide on corrective actions.

Object of control answers the question "who or what is being controlled," whereas the Eastern approach has no problem using the term object for human beings. It is crucial, especially in management, that the subject has the prerequisites to influence the object in setting and modifying its objectives. In the Eastern approach to control we distinguish internal and external subjects of controlling, based on their relationship. Subsystems of a system are the objects of internal control, while an external subject is outside of a given system. External controls ensure the necessary balance between different systems.

### 3 Materials and Methods

The aim of this paper is to determine the relationship between the importance of controlling allocated to it by the respondents considering their attitude to controlling when they are the subject or object of control.

Collection of research data took place at the end of 2016 and beginning 2017. Data were obtained through a questionnaire survey. The questionnaire was filled in by respondents who were given URL on the Google website (tool Google Forms), i.e. the survey was not accessible to the wider public. The final research sample had 395 respondents, although ultimately only 331 were used for further processing. We excluded several respondents from same companies and few questionnaires with errors. Our research sample has following characteristics (n=331):

- size of company (EU recommendation 2003/361), (employees in 2015): 115 microenterprises, 90 small, 56 medium-large, 70 large companies;
- respondent's management level: 43 informed employees (staff members responsible for control related activities or employees with valuable information about the organization), 116 lower level managers, 52 middle level managers and 120 top level managers;
- most frequently represented sections according to the SK-NACE classification: 69 industrial production, 66 wholesale and retail trade and repair of motor vehicles, 46 professional scientific and technical activities, 25 information and communication, 21 accommodation and catering services;
- higher territorial unit of Slovak Republic: 174 Bratislava (capital city and surrounding districts), 33 Trnava, 24 Nitra, 23 Trenčín, 30 Žilina, 17 Banská Bystrica, 22 Prešov, 8 Košice;
- legal form: 222 private limited liability companies, 66 joint-stock companies, 30 self-employed individuals, 5 branches of foreign enterprises, 4 cooperatives, 4 other legal forms;
- economic result in 2015: 254 profit, 52 loss, 20 balanced, 3 companies founded in 2016, 2 n/a;
- turnover (EU recommendation 2003/361) in 2015: 164 ≤2M Euro, 43 2M≤10M Euro, 60 10M≤50M Euro, 50 ≥50M Euro, 14 n/a.

Besides basic scientific methods, in evaluation of the questionnaires we used mathematical-statistical methods and tools, such as Kolmogorov Smirnov test of normality of data distribution. We also used Kendall tau, Spearman Correlation, Pearson's R and Eta coefficient. These methods are used to determine the relationship and its strength between two ordinal variables. The quantitative questions were supplemented by explanatory qualitative questions (justifications) that serve to better understand the results of research or the point of view of individual respondents. There were two rating scales: one was from 1 to 5 and the second rating scale was from 1 to 3. Lowest number represented negative or low values and the highest number (3 or 5 depending on rating scale) represented positive or high values.

In this paper, we focus on selected aspects of our research, yet we would like to point out some interesting findings and facts from our findings so far. Almost half of our respondents (46%) experienced an increase in intensity of control by another subject (i.e. tax office or their supervisor) and almost 69% of respondents had increased their efforts in controlling over the previous year. We also found out that the perception of a change in the business environment affecting controlling does not mean that the organization will introduce new methods, tools or procedures in control. Therefore, there is no correlation between these two variables, only 81 respondents (24%) had seen changes in environment and also introduced new methods and tools into controlling.

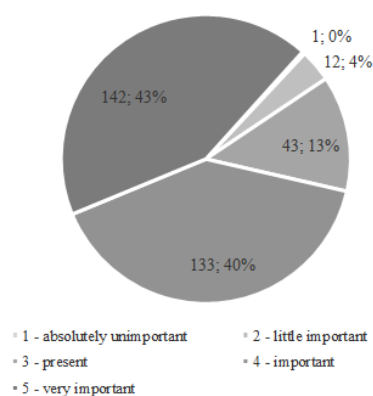
#### 4 Results and Discussion

As part of our research, we analyzed a number of questions from different areas of controlling. Respondents rated the importance of control on a scale of 1 to 5, where 1 meaning absolutely unnecessary and 5 meaning very important.

Only one respondent (0.3%) assigned the importance 1. The reasoning behind this assessment is that the organization is a small family company and does not consider having a special job position for control to be necessary. The director or deputy director solve any defects and problems in production. However, the problem with this justification is that the respondent does not understand he is actually doing control by having things under control. In the Eastern theory of control we call this a professional approach. Its problem is that "control is personified, which means that the term is not understood as its content – control activity, but as a specialist or an institution (Kráčmar et al., 2013, p. 15)."

A further 12 respondents (3.72%) assigned a value of 2 (little needed) to controlling. Our respondents stated that they consider control to be a formal process; they prefer to use self-control by each of their subordinates and the professional approach has reappeared. Many of respondents cited the size of the company and the associated lower number of employees or the fact that they had no subordinates in the company as a reason for the low level of importance of control. Up to 43 respondents (13%) assigned importance to control 3 (present). Often the reason was that they were aware of the importance of control, but at the same time had high trust in their subordinates and that control was carried out just to the necessary extent due to cost; or it would be difficult to control so many and complicated processes. In addition, an opinion emerged that control is rather a supportive than the main function of management in the organization. 133 respondents (40.28%) attributed the importance 4 (important) to controlling. It was believed that control helps in managing and improving of business processes. The manager is responsible for the controlled activity and for taking corrective action and has the duty for achieving results and adhering to rules, so it is also necessary for him/her to perform control. The remaining 142 respondents (43%) assigned the highest importance (5 – very important) to controlling. The reasons mentioned were the size of the organization; the large number of employees; the business sector in which a thorough control is needed.

Figure 1: Importance of controlling



Source: Own Work

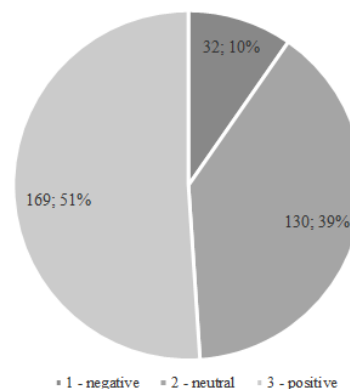
The average value assigned to the importance of controlling was 4.22 point. 275 respondents assigned higher values of importance (4 and 5), which is 83.1% of the research sample. The perceived importance of control in companies in the Slovak Republic can be therefore considered as undeniable.

Another area examined in our research was differences in attitudes to control when a manager or an informed employee is a subject or object of control. Respondents rated their attitude on

a scale of 1 to 3, with the value 1 expressing a negative attitude, 2 being a neutral attitude and 3 denoting a positive attitude to control.

In the situation a manager or an informed employee was controlled, the least represented category was a negative attitude to control (32 respondents; 9.67%). They explained their position by over-strict control by their superiors, exaggerated control, and lack of competence of superiors or disregarding quality and qualitative information in controlling. Another category was respondents with a neutral attitude to control (130 respondents; 39.27%). Respondents declared that while they do not feel comfortable to be controlled, they understand the reasons why control is necessary. In many cases, they do not have a more positive attitude towards control, also because control is often impersonal and does not control every step of controlled process, but only the result itself and its quantitative characteristics. 169 respondents (51.06%) stated that they have a positive attitude to control even in situations they are controlled by a hierarchically higher-ranked entity. There were several reasons for their attitude. Among them, supervisors' control helps professional growth, competence improvement and constructive feedback is important in the work process. In addition, control helps to those who perceive control as a "warning" of what they do wrong or to those who wants to be better and improve their performance. The one who perceives control as criticism is stagnant. However, too much control can be annoying. Therefore, control has to be balanced considering the needs of both managers and subordinates.

Figure 2: Attitude to control when the respondent is the object of control



Source: Own Work

The average attitude of managers and informed employees in the role of object of control was 2.41. Our primary assumption was that managers and employees feel bad when they are controlled, but the results of our research have shown that the opposite is true. Feelings during the exposure to control may be bad, but ultimately the high degree of responsibility wins and results in a positive attitude to control. This means, control is seen as a beneficial feedback and source for further growth.

Table 1: Kendall's tau-b, Kendall's tau-c, Spearman Correlation, Pearson's R

| Category             | Statistic            | Value | Asymp. Std. Error | Approx. T |
|----------------------|----------------------|-------|-------------------|-----------|
| Ordinal by Ordinal   | Kendall's tau-b      | ,16   | ,05               | 3,16      |
|                      | Kendall's tau-c      | ,15   | ,05               | 3,16      |
|                      | Spearman Correlation | ,18   | ,05               | 3,32      |
| Interval by Interval | Pearson's R          | ,19   | ,06               | 3,50      |
| N of Valid Cases     |                      | 331   |                   |           |

Source: Own Work

The importance that respondents assign to control is only slightly related to their attitude to control when they are controlled (Kendall's tau  $c = 0.15$ ).

Table 2: Eta coefficient

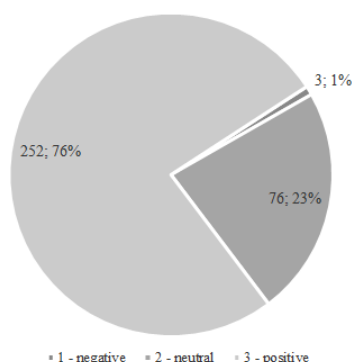
| Category   | Statistic | Type                  | Value |
|------------|-----------|-----------------------|-------|
| Nominal by | Eta       | Importance of Control | ,19   |
| Interval   |           | Dependent             |       |
|            |           | Object of Control     | ,23   |
|            |           | Dependent             |       |

Source: Own Work

Given the results of the Eta coefficient, only 3.6% of the assigned importance depends on the attitude to control when respondents are in the role of objects of control.

Only three respondents (0.9%) perceive control negatively in the situation they are the subjects of control. They explained that control takes too much of their time or is used for constant searching and correction of mistakes of other employees. 76 respondents (22.92%) have a neutral attitude to control when they control others. They consider control as a tool by which they can improve the quality of work processes and outputs and avoid errors. In addition, they stated that they did not pay much attention to control of their subordinates or perceived it as necessary yet not that important. The remaining 252 respondents (76.18%) said their attitude to performing control was positive. They consider the main benefits of controlling to be the following: increasing the quality and effectiveness of the work of their subordinates, reduction of errors and related complaints, ensuring the smooth running of the business.

Figure 3: Attitude to control when the respondent is the subject of control



Source: Own Work

The average attitude towards control when the manager or informed employee was the subject of control is 2.75, a positive attitude to control.

Table 3: Kendall's tau-b, Kendall's tau-c, Spearman Correlation, Pearson's R

| Category             | Statistic            | Value | Asymp. Std. error | Approx. T |
|----------------------|----------------------|-------|-------------------|-----------|
| Ordinal by Ordinal   | Kendall's tau-b      | ,28   | ,05               | 5,29      |
|                      | Kendall's tau-c      | ,20   | ,04               | 5,29      |
|                      | Spearman Correlation | ,30   | ,05               | 5,70      |
| Interval by Interval | Pearson's R          | ,32   | ,06               | 6,17      |
| N of Valid Cases     |                      | 331   |                   |           |

Source: Own Work

The importance attached to control by respondents is related to their attitude to control when they are controlling subordinates only slightly (Kendall's tau  $c = 0.20$ ).

Table 4: Eta coefficient

| Category   | Statistic | Type                  | Value |
|------------|-----------|-----------------------|-------|
| Nominal by | Eta       | Importance of Control | ,34   |
| Interval   |           | Dependent             |       |
|            |           | Subject of Control    | ,33   |
|            |           | Dependent             |       |

Source: Own Work

Given the results of the eta coefficient, only 11,56% of the assigned importance depends on the attitude to control when respondents are subjects of control.

The attitude to control did not change depending on whether or not the respondent was a control subject in 197 cases (59.51%) and thus remained the same in both cases. Most respondents remained the same positive attitude (151 respondents; 45.62%), the neutral attitude remained the same for 45 respondents (13.59%) and the negative attitude remained the same for one respondent (0.3%). The attitude to control was worse if the respondent was the subject of control for 20 respondents (6.04%), while from negative to positive attitude it improved for two respondents (0.06%) and from neutral to positive for 18 respondents (5%). The attitude to control was better when the respondent was the subject of control altogether for 119 respondents (35.95%), while from positive to negative attitude deteriorated for 18 respondents (5.4%), from positive to neutral attitude for 83 respondents. (25.07%) and from neutral to negative attitude for 18 respondents (5.4%).

## 5 Conclusion

The mess in control theory is likely to persist for a few more years. It is often the case that we lose perspective in a broader context when dealing with very specific partial problems. Many scientists are currently relying on the fact that control theory is stable and does not see local differences not being invisible any longer. The basic term and its definition are becoming unclear. Is controlling one of the basic functions of a manager? Is it the management subsystem in which the controller plays an irreplaceable role? Is it cooperation between manager and controller? If we answer positively to the last two questions, why are we still teaching future managers that a positive answer should only be to the first question?

In this paper we dealt with controlling as understood by Anglo-American management authors, therefore it is necessary to take its results in this context. Using mathematical-statistical methods and tools, we have found that there is a slight relationship between the importance that respondents have given to control and their attitude to control, depending on whether they are an object or subject of control. A stronger relationship is between the importance assigned to control and the attitude to control when the manager or the informed employee is the object of control, however the relationship is still slight.

An interesting finding is that around 83% of our respondents consider controls to be very important or important. Managers are aware of the important role of control in the business. Many of them realize that they can monitor the performance of their subordinates or business processes through controlling, motivate and improve the performance of their subordinates through constructive feedback, while eliminating or minimizing errors in their work performance. However, control should not be excessive, costly and unnecessarily burden employees. At the same time, the manager should have sufficient competence to perform control.

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**Primary Paper Section: A****Secondary Paper Section: AE, AH**

## PREPARATION FOR OLD AGE AS PART OF THE ADAPTATION TO OLD AGE

<sup>a</sup>MARIANNA MÜLLER DE MORAIS

*Constantine the Philosopher University in Nitra, Department of Pedagogy, Drážovská cesta 4, 949 74 Nitra, Slovakia*  
email: <sup>a</sup>mmdmorais@ukf.sk

The study presented here was published within the research task VEGA of the Ministry of Education, Science, Research and Sport of the Slovak Republic and the Slovak Academy of Sciences no. 1/0001/18 called *Preparation for ageing and old age - possibilities of andragogical intervention*.

**Abstract:** Preparation for old age as part of lifelong development and education represents one effective tool for ageing successfully. Its aspects lead to a successful life at retirement age and they improve the quality of life for ageing people. In our study, we pay attention mainly to the psychological - andragogical aspects which influence the preparation for old age (adaptation to old age, adaptation strategies, successful versus unsuccessful ageing, and possibilities of andragogical intervention in the area of preparation for ageing and old age). These psychological - andragogical phenomena create conditions for successful ageing. In our project VEGA no. 1/0001/18 called *Preparation for ageing and old age - possibilities of andragogical intervention*, we focus on the period of older adulthood and senior age. We think that education and its programmes can be used also in the preparation for ageing in this target group.

**Key words:** older adulthood, seniors, education, successful ageing, adaptation, adaptation strategies, personal adaptation;

### 1 Introduction

Many current conceptions of successful ageing emphasize maintaining a decent amount of activity. Negative impact of inactivity, motivational and emotional deprivation are much more evident at old age and they lead to faster involuntary changes. Inactivity is pathogenic not only at the physical level, but also at the psychological and social levels. Research (Langmeier & Krejčířová, 1998) supports the idea that adequate activation can help older people to achieve a performance in the tests of fluid intelligence that is fully comparable to the performances of many younger people. We agree with Vágnerová (2000) that personal development can continue at old age, as well as wisdom achieved with experience. There are people who start learning a new language, Braille alphabet or working with a PC at old age. When old age occurs, there are many psychological changes that depend on biological, as well as socio-cultural aspects. However, the time when these changes, their dynamics and reactions start to become evident, are individually differentiated.

On the other hand, old age brings along the period of the biggest life crisis. Older people are no longer performing their professional roles and they start losing their previously acquired contacts. Their perspectives and value systems undergo many changes as well. They have to accept many changes, such as leaving of children from home, the death of the life partner, friends and acquaintances. All these situations increase their social isolation. Their financial situation changes as well, their health condition is worsened and they are not able to look after themselves. In this way, their quality of life is worsened, too (Balogová, 2005).

Bromley (1974) says that disappointment felt throughout the period of late adulthood and old age can be the result of several causes:

- *unfavourable physiological changes and restriction of activity;*
- *overload at work;*
- *inability to overcome a lower level of professional aspirations;*
- *worsening of the quality of life;*
- *inability to keep in touch with the scientific, technical, cultural and social progress which results in the feeling of being out of date;*
- *lack of contacts;*
- *loss of energy and freedom;*
- *unpleasant perspectives for the future at old age;*

- *loss of important emotional relationships (death of close people);*
- *difficult problems and situations. These are often caused by others and there is no possibility to avoid them, etc.*

These changes in life should be gradual and not forced, therefore there is a need for preparation for ageing, retirement and senior age. Based on her theoretical and empirical research, Balogová (2005) proposed a system of purposeful preparation for retirement (preparation for all society, preparation for companies, social preparation). Her research from 2013 confirmed that the group of prepared seniors achieved a higher quality of life in several aspects than the group of seniors who were not prepared for ageing. Prepared seniors showed higher personal life satisfaction, higher levels of positive emotions, and higher satisfaction with life in Slovakia. The research also confirmed a higher quality of life for prepared seniors from the point of view of demographic aspects (gender, living, health condition, financial situation).

According to several research findings (Határ, 2013), education for seniors and their surroundings is perceived as:

- *prevention against social segregation of seniors;*
- *prevention against psycho-somatic diseases;*
- *a tool for elimination of consequences of diseases;*
- *a tool for creating a society that is based on knowledge;*
- *a way of personal development and maintaining personal activity;*
- *a meaning of life for seniors;*
- *a way to solve real or possible problems of seniors;*
- *a tool for elimination of ageing processes;*
- *a tool for forming new patterns of behaviour in intra- and intergenerational communication;*
- *a tool for social mobility of seniors;*
- *a tool for improving the quality of life for seniors, etc.*

Balogová (2005) says that management of human resources starts to become more important in Slovakia. However, attention is paid mainly to employees at young and middle ages, and only very seldom it is aimed at older population. For this reason, we focus on the older adulthood and senior age when solving the project VEGA no. 1/0001/18 called *Preparation for ageing and old age - possibilities of andragogical intervention*.

### 2 Adaptation to old age

Adaptation is considered to be one of the basic social-psychological mechanisms of socialization. Adaptation is a concept that expresses a dynamic process how people adapt to their surroundings. The result of this process is their state of being adapted (Machalová, 2017). A decisive factor is the activity that people must do in order to overcome previous patterns of behaviour. They need to acquire new ones that will help them to cope with new situations. They cannot accept living conditions only in a passive way. They must try to adapt to these conditions with their personal needs, hobbies, values and aims. In these assimilation processes, people try to modify their surroundings so that they are more suitable and less stressful for them. In accommodation processes, people try to accept all conditions and requirements of their surroundings because their change could mean excessive or useless effort for them (Kubáni, 2005). Social - psychological adaptation is connected with the psychological and social development. The social level of people depends on the social level of surroundings they live in. Their adaptation to the specific social reality is beneficial for their psychological and social development (Machalová, 2017). The concept of adaptability is also related to the adaptation. Adaptability represents individual assumptions of people when they cope with changes of outer surroundings. It is created in the process of personal development and its basis is the plasticity of the nervous system and the psychological activity, in general (Kubáni, 2011). The level of adaptation can be expressed in the

following ranges: suitable - unsuitable (Provazník et al., 2002, in: Kubáni, 2011), good /optimal - bad (Bromley, 1974). These are the basic features of adaptation: life optimism, a realistic attitude to new conditions, a realistic perception of oneself, a realistic self-evaluation, social and emotional maturity, self-acceptance, adequate self-control (Provazník et al, 2002, in: Kubáni, 2011).

According to Balogová (2005), the proper problem of adaptation to old age begins when people realize that they are getting old. Several factors influence the process of adaptation. Attitudes to old age depend on the personality, temperament and level of adaptability (Hrozenská 2008, in: Sabolová Fabianová & Žiaková, 2019). In addition to their personalities and physical conditions, there are also social factors such as social atmosphere, family, preferred lifestyle, retirement and change of the social status, and the loss of the life partner. All these factors contribute to a better or worse process of adaptation. However, there can occur such a situation that somebody will not adapt to old age at all. In such case we talk about the maladaptation or about the maladaptive geriatric syndrome (Balogová, 2005). For this reason, we can agree that the main task of old age is the acceptance of these limitations and irreversible changes in such a way that people are able to keep their minds and bodies fresh, maintain their activity, accept new and adequate aspirations to their personal possibilities. They should try to maintain their personal continuity and live this life period as a natural termination of their unique life stories (Árochová 2001, in: Sabolová Fabianová & Žiaková, 2019).

The study of Reichard (1962, in: Bromley, 1974) describes five strategies how to cope with the fact of getting old. Every type represents a composed factography and identified personal characteristic features express the probability of belonging to one type of these strategies. Bromley (1974) says that each type has something in common with one or more strategies. It means that these types of personalities represent relatively frequent patterns of adaptation, but they are not exclusive nor restrictive categories. There can be differences even within one type of a particular strategy:

*Constructive strategy* is getting close to the ideal standard of adaptation of older people. The result can be seen in well-balanced seniors who are neither afraid nor neurotic. They enjoy life and they establish friendly relationships with other people. They have a sense of humour, they are tolerant, adaptable, and self-confident. They are aware of their mistakes and perspectives. These people are quite satisfied with their success. They are assertive, but not aggressive. They are able to express their emotions adequately, they can control themselves and they do not feel restricted. They can understand the mistakes of other people. They accept all aspects of old age, including the leaving from work and retirement. They accept death without feeling hopeless. These seniors have a constructive and optimistic attitude to life that is open for the future. They have a good health condition and they are independent in the given situation. They have a stable character and they act responsibly. They follow their long-term aims and they want to achieve long-term success. Therefore, these seniors are able to plan and foresee their future. For this reason, they are able to cope with temporary failures, worries and disappointment. Their ambitions are meaningful and purposeful. They have stable and friendly relationships. They have overcome all unfriendly emotions to people who hurt them in the past. These seniors are satisfied and self-confident. They can rely on the support of other people around them. They know that there are not many things to regret. They are optimistic about their future.

*Strategy of dependence* is also socially acceptable. However, this strategy leads to passivity and dependence, rather than to activity and independence. These people are relatively balanced (they are neither afraid nor neurotic). They rely on others who should look after their material well-being and emotional support. They do not enjoy their work a lot. They like eating and drinking, they enjoy playing table games, they prefer a higher standard of living, they look forward to bank holidays and vacations. These

seniors accept opinions of others willingly. They easily get tired and they like to relax at home. Their resignation and passivity is also reflected in their partnerships because they are rather submissive. Their relationship to other people is a mixture of passive tolerance, opportunism, insecurity and unwillingness to establish new relationships that can disturb their safety and comfort. They evaluate their own qualities and activities relatively well. They are not usually worried, disappointed, or unfriendly. Their feelings of general satisfaction with the world overlap with their tendency towards irreality, excessive optimism and stubbornness. Generally, this strategy of dependence is less favourable. However, it is equally acceptable from a social point of view.

*Defending strategy* is a less acceptable way of adaptation to old age that is reflected in the postponing of retirement and focusing on different activities. This attitude to old age is also relatively frequent. These people can be described as overly controlled, conventional and excessively active people. They are afraid of possible dependence and relative inactivity. Their attitudes to old age are usually pessimistic. They are aware of some of the advantages of being old, but they envy young people, even though they have been satisfied with their lives and achieved success. They deny their unfriendly and angry behaviour to their relatives and friends. These seniors had an adequate professional career and they were well adapted to work. They actively participated in social organisations and they were prepared for possible financial problems at old age. They worked hard, but they seemed to have other (defending) reasons for it. These people were not satisfied and really interested in their work. They were independent, they usually refused the help of others just to prove that they do not rely on them. They accepted old age only if they were forced to do it in specific situations. Until that time they ignored old age and its ending - death. They try to overcome them with their hard work and activity.

*Strategy of hostility* can be seen in their unfriendly and angry attitude to others. These people tend to blame other people for their own failures. They are often aggressive and suspicious. They often complain and compare themselves to others. They are used to behave according to their convictions and they do not change their opinions and evaluations easily. They have unreal images about themselves and the world. This attitude supports their isolation and wish to live in seclusion. They deny ageing because they think that old age is a lamentable decay of physical and mental qualities, finishing in death. Their defending reaction to these pessimistic perspectives for the future can be reflected in their hard work. These seniors tend to postpone their leaving from work as long as possible. They lack the ability to adapt to old age in a constructive way. They refuse ideas of relax and dependence on others. They quickly find manifold excuses or reasons to apologise their unsuitable and unreal behaviour. As in the defending strategy, these seniors also try to overcome the influence of ageing by means of maintaining their activity. They refuse to relax and they maintain their relatively stable programme of activities. They strictly follow certain rules and disciplines. These seniors react to everything with some hostility, they envy young people and they behave towards them in an unfriendly and hostile way. They do not see any positive aspects of old age. They are unable to accept it and they are afraid of death.

*Strategy of self-hatred* differs from the previous strategy only in the way how older people react to aggression. In this strategy older people start hating themselves. They look at themselves critically or even dismissively. They do not wish to live their lives once again. These people neglect social contacts and their overwhelming emotions are remorse and self-blaming. When they were younger, they were passive and they lacked initiative. They were not able to deal with money and they were not responsible enough. They only seldom had some hobbies, they were not practical, and they overestimated their skills. They accepted the process of ageing, but they are not able to look at it in the optimistic and constructive way. They were not ambitious and they did not believe that they could influence something or change somebody. They considered themselves to be victims of

the given situations. They are not afraid of death because they perceive it as a merciful rescue from a very unpleasant situation.

We have described five models of adaptation. In fact, there exists a much bigger variability of strategies of accepting one's own old age. The way of coping with these changes is always completely individual (Langmeier & Krejčířová, 1998). In most cases it is not possible to evaluate any style as a better or worse one. Every unique style, if it corresponds with the personality of a person, should be completely accepted by other people. They should also accept every individual way of coping with emotions or dealing with serious events at all ages (Bromley, 1974). Critical episodes in every life period can bring along new attitudes and new ways of adaptation. People overcome these situations in a dramatic way (e.g. if they suddenly lose their job or they get divorced, their health condition is worsened, etc.). These situations represent or symbolise a certain milestone. Similar episodes can be short periods of conflicts, or unsuccessful plans and they result in a significant reorganisation of reasons and activities. They usually leave a scar in the soul. However, they do not have to undermine the emotional stability of people. On the contrary, they can strengthen it (Bromley, 1974).

### 3 Successful versus unsuccessful ageing

The theory of successful ageing is an expression of conditions of individual and social life. Within them people reach a maximum feeling of satisfaction and happiness and society keeps an adequate balance in the satisfaction for different age groups of its inhabitants (Havighurst, 1961). There arise many questions about the character of these conditions and they have to be answered in order to understand how people can reach this feeling of satisfaction and happiness. There were formed two contradictory theories of successful ageing: *the theory of activity* and *the theory of seclusion*. In the theory of activity, successful ageing is based on maintaining previous activities and attitudes as long as possible. In the theory of seclusion, successful ageing is based on the acceptance of the process of leaving from active life. Most experts in the area of gerontology prefer the theory of activity and they think that people should maintain their activities and attitudes as long as possible. After that they should find some substitution for those activities they have to give up when they retire. They should try to find new social contacts because the old contacts usually get weaker and many of their friends and relatives die (Havighurst, 1961).

Ageing successfully does not touch deeply on the impact of physical health or economic well-being, both of which certainly affect one's psychological state and may not be under one's control (Baltes & Baltes & Pasupathi, 2019). However, it is indispensable so that society provides the material and immaterial basis of successful life for all age categories and population. Only in this way it is possible to fulfil the practical purpose of gerontology that is „adding life to the years“ in the second half of the human life. This concept of “adding life to the years” is based on helping people to enjoy their life and feel satisfied with it (Havighurst, 1961).

Reichstadt et al (2007, in: Ráczová, 2014) supported the theory of successful ageing. They found out that psychological factors are important for most seniors because they want to be flexible and able to adapt to new situations. They also want to have an optimistic and positive overview to understand better what is happening around them. Ageing successfully does not mean that people will not suffer from diseases. On the contrary, people should try to face them and selectively pay their attention only to those things or activities that provoke positive feelings and emotions.

Nowadays, successful ageing is perceived as a multidimensional concept, whose contents are formed by inner satisfaction and happiness (Havighurst, 1961), self-acceptance and autonomy, positive relationships with other people, meaning of life and personal growth (Ryff, 1989), adequate adaptation, satisfaction with life and subjective well-being (Depp et al, 2010), etc. We

have to mention also the Baltes' SOC Model of ageing (Baltes & Baltes & Pasupathi, 2019). According to this model, there are three strategies that lead to successful later life: *Selection* (refers to the choices that people make from all options available to them); *Optimization* (is the process of making use of all opportunities and even creating new ones to fulfil personal goals); *Compensation* (refers to the use of strategies that allow people to continue doing everything that is important for them).

According to Langmeier & Krejčířová (1998), adaptation of older people to changes is slower and every stress or disease make it worse. For this reason, the principles of spiritual hygiene should be aimed at maintaining and strengthening the process of adaptation. Švancara (1997, in: Langmeier & Krejčířová, 1998) mentions several assumptions for optimal adaptation to old age. They are also called as “5 P-principles”: *Perspective* (maintaining orientation to the future at personal and ultra-personal levels); *Promptness* (ability to accept new impulses, to change one's own attitudes and habits); *Prudence* (ability to organise one's own life according to the given possibilities, ability to compensate possible deficits, lack of energy, etc.); *Perception of other people* (acceptance of others, tolerance of different opinions and attitudes); *Pleasure* (ability to maintain the sources of pleasure and satisfaction).

Old people have to adapt themselves not only to changes in their own bodies (involutionary changes, increased susceptibility to diseases), but also to external changes (changes in social status, lifestyle, social environment) (Langmeier & Krejčířová, 1998). Bromley (1974) says that changes connected with ageing bring along significant, but relatively calm adaptations in all aspects of life. A critical period does not have to be the retirement itself, but the period shortly before leaving from work. At this time many people get nervous because they are afraid of all possible consequences and problems of leaving from active working life. However, people experience these consequences at different times and in different ways. For this reason, there is rather a problem of “ageing” than a problem of “being old”.

Leaving from active working life is the cause of serious problems with adaptation for both men and women. These problems include changes in daily working programmes, smaller financial security, changes in social roles and status, smaller responsibility, authority, changes in social and family relationships, weakened physical health condition, etc. These problems force people to accept new personal attitudes and develop new adaptation strategies (Bromley, 1974). The beginning of retirement is an important milestone, but at the same time, it is also a critical period in life. It is a difficult period because people lose their previously achieved social status and their self-confidence decreases. Some people have problems to adapt to this retirement period. Therefore, we can talk about the so called retirement crisis or disease from retirement. Older people try to do what they could not do before because of lack of time. Confusion they felt at the beginning is substituted with the feeling of satisfaction, but then insecurity comes back. In order to prevent the decay in social and economic status, it is necessary to focus on purposeful dealing with these risks. There is a relatively long period between the termination of career and the beginning of retirement. It is important to fill this time with a meaningful activity, a new programme and life perspective (Stojáková & Pavelková, 2019). For this reason, many people consider this time to be a difficult life situation which brings along problems with adaptation. The biggest difficulties can be observed in people who highly evaluate their own work. Outer conditions (amount of the pension and material level) as well as inner conditions (performance of the senior role), the exact idea about the life at retirement age, and positive attitudes represent the most decisive factors for seniors. Retirement is closely related to the attitude people have during their active working life because this can help them to create new life values. Adaptation has a direct impact on the general satisfaction of older people (Balogová, 2016).

In many cases, leaving from active working life can cause critical situation or shock. There is a certain limitation of the

scope of activities and social contacts, the loss of their habitual daily programmes. Seniors have more time to focus on their problems, they often exaggerate their meaning, and this approach can lead to their social isolation. They stop being members of small social groups they belonged to until now. Seniors often do not know what to do with their free time and this can lead to their personal dissatisfaction. A big part of their life was filled with their work, and now, when they are retired, they feel empty and they have a lot of free time. Seniors who created plans for future already during their working activity, are able to adapt to this new situation more quickly. For this reason, the ideal process of getting retired should lead to the preparation for gradual leaving from active working life and to the creation of a harmonogram of gradual shortening of time at work (Homola & Petřková, in: Balogová, 2016).

*Personal adaptation is low* if people are not able to overcome problems and obstacles, solve conflicts or they do not achieve satisfactory results in socially acceptable ways of behaviour. Bad adaptation is reflected in unfriendly attitudes, feelings of unhappiness, fear from people, dissatisfaction, panic, addictions, feeling of being guilty, low self-confidence, apathy, retreating or uselessness. These symptoms are almost identical throughout adulthood, but they get stronger with the growing age. This can be observed mainly in women. Badly adapted older people are physically and psychologically tired, they are afraid, disappointed or apathetic (Bromley, 1974). Ráczová & Marhevska (2013) examined the gender differences in attitudes to the process of ageing. Men have a more positive attitude to ageing when compared to women. One reason why women have more difficulties in accepting the irreversible changes of ageing can be the social preference of the youth. These stereotypes influence the generally valid opinions that women should always be attractive and good-looking.

*Good adaptation* is accompanied with the feelings of happiness, security, satisfaction, sociability, self-confidence, creative activity, and rejection of bad emotions. Well adapted older people are emotionally stable and they are able to accept new situations better. Successful adaptation is connected with an adequate lifestyle, financial and emotional security, good physical condition, regular and frequent social contacts, useful activity and personal hobbies. Successfully adapted people are able to get involved in manifold activities, they can follow their aims, they are active and they face unfavourable situations much more easily. They evaluate themselves positively and they usually feel satisfied and happy. Well adapted people are in good physical and mental condition. They have high moral principles, they rely on their social contacts, they feel relaxed and satisfied with their lives. These characteristic features are based on the feeling of inner satisfaction. This feeling is a more reliable indicator of adaptation than the ability of fulfilling social tasks. Some people feel happy being in their house with a garden, far from everyday noise and stress. They meet mainly with their relatives and friends. Other people feel happy in a house with many neighbours. For this reason, social relationships and inner satisfaction are more reliable indicators of personal adaptation to old age than the ability to work or material conditions. Despite their personal differences, people who get older in the same community, usually have similar ways of adaptation and they evaluate each other according to their generally accepted criteria (Bromley, 1974). According to Hamilton (1999, in: Stojáková & Pavelková, 2019), adaptation to old age could be better if older people had a possibility to participate in voluntary activities or in a working process. They would have a higher income, they would feel more stable, guided and useful. Bromley (1974) says that good adaptation of individuals depends also on the good personal adaptation of other people they meet with. For example, bad adaptation of one person can influence the adaptation of others. Vicious circles of obstructions, bad mood, anger, injustice can arise from matrimonial and family conflicts, misunderstandings at the workplace, etc.

It is evident that optimal adaptation requires many changes in behaviour and reactions to incessantly changing situations. Older people can get ill, but they are able to adapt themselves to their

surroundings in an adequate way. Basic personal features such as optimism can help older people to recover from diseases, whereas other people who tend to feel depressed or they are passive, can become hypochondriac (Bromley, 1974. Sabolová Fabianová & Žiaková 2019) examined how people behave in stressful situations full of changes in the period of ageing (physical changes, changes in health condition, psychological changes, etc.). They found out that the most frequent strategy in coping with changes during the process of ageing is the acceptance of these changes. This strategy is followed by a significant use of spirituality and religiosity. These results can be influenced by general perceiving of old age. If older people do not perceive changes in ageing as a stressful situation, they try to maintain their positive overview. According to Ráczová & Marhevska (2013), self-regulation as another psychological aspect plays an important role in the preparation for ageing and old age. They support the idea that seniors with a higher level of self-control and self-care have a more positive approach to ageing when compared to seniors with a lower level of these psychological features. The importance of self-regulation can be proved in the application of different mechanisms of self-control in the process of adaptation to changes connected with ageing, but also to changes in the ability to modify one's own "I" in order to achieve a higher concordance with their surroundings. Ráczová & Marhevska (2013) mention that proactive attitude, adequate self-care and self-control are also important in the effective preparation for ageing. This strategy has an impact on lifelong orientation and successful ageing. Such a preparation for ageing is crucial for the activation at old age.

#### 4 Instead of conclusion

As aforementioned, older people have a wide range of physical and psychological problems that can have a direct impact on their adaptation. They can be related to the general psychological and physical conditions of seniors, their health and their current life situation. Andragogues cooperating with other specialists (psychologists, doctors, etc.) should identify these obstacles in the optimal adaptation to ageing and they should try to eliminate them. According to Gracová (2014, in: Veteška 2017), professionals should help older people to maintain their physical and psychological conditions mainly by means of suitable educational activities and activation programmes. We think that education can be an effective tool at active old age. Educational programmes should meet all requirements and expectations of older adults and seniors. At the same time, their structure should correspond with the basic principles of education and respect the personalities of seniors and their specific educational needs. Andragogues should be facilitators who perceive and try to fulfil educational needs of older adults and seniors (Határ, 2014, Hupková & Zimermanová, 2013, Müller de Moraes & Jedličková, 2015, Müller de Moraes & Rapsová 2017). Despite the fact that more attention is paid to the education in order to achieve successful ageing, we think that there are still many opportunities for further knowledge from the point of view of geragogy and gerontopsychology. Within the project VEGA no. 1/0001/18 called *Preparation for ageing and old age - possibilities of andragogical intervention*, our aim is to propose an educational programme of successful ageing that would apply strategies of coping with one's own old age, as well as fulfil current needs of older adults and seniors.

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#### Primary Paper Section: A

#### Secondary Paper Section: AM

## SIBLINGS OF CHILDREN WITH ONCOLOGICAL ILLNESS

<sup>a</sup>KRISTÍNA NAGYOVÁ, <sup>b</sup>TERÉZIA HARČÁRIKOVÁ

*Comenius University in Bratislava, Faculty of Education,  
Department of Special Education, Račianska 59, Slovakia  
email: "nagyova.kristina25@gmail.com, "harcarikova@uniba.sk*

**Abstract:** However, the psyche of a person is very fragile and sensitive, especially when confronted with life difficulties. The most vulnerable is in children and even more so when a child feels they are unloved by their parents. In a family where cancer is present, all members are affected by pain and distress. The desire to heal a child leads parents to the limit of their possibilities. In an effort to do everything for the sick, they often forget about their other children, siblings of individuals with cancer. The paper deals with siblings of individuals with cancer. The empirical part of the papers records final results and information obtained from individual interviews and case reports with siblings of children with cancer and their mothers.

**Keywords:** sibling, cancer survival, family, school and education.

### 1 Family and closer social environment of individual with oncological illness

A family is defined as a close group whose members are in direct contact, their relationships are intimate, strong, and their inner experience is characterized by emotionality and cooperation. It is the cooperation that brings the child to social life in the social environment in which he / she is located and teaches him / her to know his / her surroundings and the world (Výrost, Slaměnik, 2008). It is widely acknowledged that families facing serious childhood diseases are basically ordinary families who are faced with an extraordinary stressor and are forced to cope with unique circumstances (Eiser, 2004). Oncological experience is a unique family and individual issue that results in changes in different areas.

Most families are not ready to diagnose their child's cancer and this diagnosis is a crisis for the child as well as for the whole family. As Meitar (2004 in Kreitler, Arush, 2004) states, the family as a unit is shaken, each member faces a new reality and has to reconsider their own survival and relationships with other family members - parents with their sick child, their other children, partnership and relationship with their own parents. Siblings review their relationship with a sick brother or sister and other siblings, their parents and grandparents; a child with cancer, their relationship to parents, siblings and grandparents. Grandparents, in turn, have to face their new mission with their own children, the sick grandchild and his healthy siblings.

In the next chapter we will focus on parents and grandparents, their survival of cancer, how they affect their children and what role they play in the family and in the education of siblings of individuals with cancer.

#### 1.1 Parents of an individual with oncological illness

One of the most difficult things in a parent's life is accepting the fact that his or her child's life is in serious or even critical danger. And since cancer treatment is largely a long-term issue that lasts several months to years, parents' psychological experience is replaced by feelings and states of anxiety, depression, and often the marital crisis itself.

When a diagnosis is first diagnosed, it may also be a denial, varying degrees of guilt, despair and anger. Parents often suffer from some kind of numbness and distrust of the imminent possibility of their child's death, which has so far been full of life, energy, joy, and now have a weak, defenceless and suffering being in front of their eyes. While for some, diagnosis is a daunting confirmation of internal concerns, for others, this knowledge may provide relief and some form of liberation (Lapwood, Goldman, 2012 in Goldman et al., 2012).

Parents' attention is focused on the child, the treatment of the disease and the difficulties associated with it. At this time, it is not easy for them to distract their thoughts and ideas about the common things they have been solving so far. Suddenly they

only perceive their own worries related to the disease and relatives or friends gradually get into seclusion. The surroundings mostly try to understand the whole situation and help the family as much as possible, but if the cancer has been going on for a long time, it happens that the contacts are broken and only a few people actually stay with the family. This situation affects the spouses very depressing; they begin to feel loneliness, isolation and misunderstanding from people so far close to them, which they are very difficult to bear emotionally and mentally. As a result, their intimate mutual bond, which they have built up over the years, can be seriously undermined (Aldridge, 2007).

The crisis also appears in the area of faith and religion. If parents and other family members feel that not only God can but that God will certainly heal the child, the individual's faith will be potentially compromised if the desired divine intervention does not take place. Therefore, the parent's risks losing not only the child but also the faith that could hold them after a child's death (Macauley, Rushton, 2012).

A typical coping strategy for parents of children with cancer is to rely on some kind of disease rejection. Hardy et al. (1994) found that parents of children with life-threatening illnesses were more likely to use the "wishful thinking" strategy than other parents in other difficult situations. Such a strategy can perform a very important function in situations where the treatment of the child is not available at the time. According to studies dealing with differences in responses between mothers, women's reactions were found to be more emotional (anxious, depressed, full of great concern) compared to men's. Mothers whose infants suffer from cancer often have psychological problems and mental health problems. The differentiation of stress also results from the responsibility for childcare. Mothers tend to spend more time in the hospital, talk to medical staff and be close to when medical treatments are taking place. On the contrary, working fathers are much more concerned with work-related stress, workplace-related deadlines and the pursuit of a "normal" life, knowing that their child is seriously ill (Eiser, 2004). Spinetta and Deasy-Spinetta (1981) confirm that fathers have a greater tendency to feel isolated from the child, especially when the mother is not working and spending more time in the hospital.

#### 1.2 Grandparents and their position in a family with an individual with cancer

Grandparents are those who experience double the pain. The first one encounters the pain of his own child, and the second concerns the child of his child - grandchild. They often feel tormented and confused (Aldridge, 2017) However, if a sick child has a sibling, suffering increases all the more because older parents are concerned and hurt when they see their other grandchildren suffer from sibling illnesses too (Castillo, Bousso, 2016). They also sometimes perceive some sort of seclusion and needlessness, especially when they are waiting for information about the course of the disease from their child, but their child, who is now also a parent, does not have the strength or energy to explain all the details of the disease. Another reason may be to protect grandparents from suffering and pain, and so grandparents feel the last to know about their grandchild's condition. Contributing to this is the fact that people are trying to protect themselves because they realize that in this stressful physically and mentally demanding situation they are in, they do not have the means to cope with their own emotions and not just support their parents (Aldridge, 2017).

However, according to the findings of Brazilian research (Castillo, Bousso, 2016); it is very important to inform grandparents about the course of the disease and the treatment of their grandchild. Ignorance leads to greater suffering and increases the feeling of isolation and loneliness. Some elderly parents are afraid that by talking about suffering with their child they will further exacerbate his pain, so they decide to save them from silence. Others, however, are convinced that a close family

should share the burden of their members with each other, seeking possible means to help their children and grandchildren, and thus find mutual support.

Many grandparents are found to be extremely guilty and desperate after they have been diagnosed with their grandchild's cancer because they are alive, while a grandchild who has a lifetime ahead of him is at risk of death. This situation puts them in a state of exhaustion, anxiety and helplessness (Lapwood, Goldman, 2012 in Goldman et al., 2012).

Scheinmann (2016) states that grandparents try to help their children by taking care of healthy siblings and giving them enough time, love and attention that parents cannot give them in a given situation. They can also spend time in hospital for sick grandchild or outpatient examinations, while one parent goes to work to secure treatment and the other parent takes care of the other children and the household. It is often the case that grandparents provide the family with financial assistance, which is in great need in this situation. Whether emotional or physical reinforcement, these both have a profound effect on coping with difficulties and the quality of family life.

However, physical changes are much more difficult for elderly parents in old age. Help often means moving either to the grandchild's house, another close relative, or even stay in hospital overnight. Older parents are expected to find a delicate balance between help and over-reorganization of the family, which in turn may be a burden on the family. Also, the family assumes that grandparents will support their children and not give them their own worries. Grandparents try to replace absent parents at home, but they are often confronted with the anger and despair of the child's siblings with the disease. In practice, they have often been compared and blamed by other grandchildren, siblings for not being as good as their parents in various activities, such as cooking, bedding, reading stories, and home management. Grandparents feel very lonely and are expected to be the strongest, wisest and always have a solution for every problem (Kreiter, Arush, 2004).

Research (Wakefield et al., 2016) has shown that grandmothers experience a worse quality of life than grandfathers because of the increased anxiety associated with the diagnosis of grandiose cancer. Grandmothers tend to be closer to their grandchildren than grandfathers and more often participate in leisure activities and practical aspects of caring not only for the sick, but also for their siblings.

Castillo and Bousso (2016) also found that when parents were too burnt out or physically and emotionally shaken to make decisions about their children, grandparents were challenged to take responsibility for treatment decisions, agree to invasive procedures and make the company their grandchildren. Grandparents saw no choice but to take on the task, but at the same time suppressing their own pain.

It should not be forgotten, too, that thanks to their wisdom acquired through life experience, grandparents can bring a different perspective and perspective to the whole situation. Their perception of death has changed over the years, they no longer feel so much fear, they are reconciled to the mortality of man, and so they no longer become death as an arch-enemy. Many of them can bring their children different and deeper feelings of the mysticism of life. Parents who are overwhelmed by the everyday worries and problems associated with the disease, grandparents can give relief and peace of mind to their inner life (Aldridge 2007).

They can also become a great source of understanding, support, practical advice, help and strength. But sometimes it can be the other way around. Excessive stress, a negative perception of the problem situation and the confusion they cause a significant impact on the whole family. However, much depends on the relationships with grandparents, their own children and their grandchildren, how they have established communication with each other, the cultural, personal values and traditions they live in (Lapwood, Goldman, 2012 in Goldman et al., 2012).

Research conducted in Canada has revealed a phenomenon of some rivalry and jealousy among adult siblings, parents of healthy children, and parents of a child with cancer. While one is paying too much attention to serious problems, other siblings with their healthy families feel unnoticed, perceive some separation and disinterest from their parents.

According to Australian research (Wakefield et al., 2014), elderly parents advise other elderly parents in a similar life situation to concentrate on providing support to the family, as well as trying not to take personally emotional outbursts from their daughter or son, the parent of a child with cancer. They emphasize the need to pay sufficient attention to healthy siblings who have been forgotten many times. They also recommend following the latest medical treatment methods. They consider it very important to have a balance in engaging in the household and not to cross certain borders, but also to be cautious in this physically and mentally demanding process.

Castillo and Bousso (2016) also point out that for a group of grandparents, expressing and sharing suffering in the family is an empathetic form and with the ability to perceive the pain of others, an act of self-care. It should not be forgotten.

According to research (Wakefield et al., 2016), elderly parents of children with cancer suffer from more sleeping difficulties and fall asleep overall. Although there have been no differences in the number of hospitalizations, elderly parents report more prescription drug use. It has also been shown that grandparents can neglect their own health while caring for their grandchildren, siblings of individuals with cancer. This important finding should encourage older people to care for themselves, which is a very important step in preventing serious health problems and possible premature death.

## 2 Siblings of individuals with oncological illness

There is no doubt about the importance of sibling relationships for their mutual and personal development of personality. The occurrence of a serious or life-threatening disease in one child has enormous consequences for every other child in the family. This implies that when one child is ill, there are fewer opportunities for learning through sibling, interaction and communication (Eiser, 2004). Sibling relationships are often emotionally complex; to varying degrees of intensity include love, devotion, belonging, but also rivalry and aggression. All of these circumstances affect attitudes, experience and adaptability to a sibling with cancer. Other factors that influence this process are gender, age of children, emotional and cognitive development, diagnosis and degree of disability of a sibling, family relationships, mutual communication and social support (Murray, 1999).

According to a study aimed at comparing family and sibling relationships where a child is suffering from cancer (Erker et al., 2018), sibling relationships have deteriorated due to the following child-related characteristics:

- diagnosed acute lymphoblastic leukaemia,
- female gender,
- younger age,
- more anxiety symptoms and less depressive symptoms.

A sibling relationship can also be disrupted under the influence of a child's brain cancer, where younger siblings can better manage their intellectual and physical activities than their sick brother or sister, leading to reduced self-esteem, fear and threat to the sick individual and thus to a relationship to a healthy sibling (Kreiter, Arush, 2004).

In conflicts between siblings, parents can favour a sick child, and often justify it in various situations (Eiser, 2004). By giving preference to the sick in their treatment of children, parents are milder and sometimes overly protective, health brothers and sisters often feel wrong (Hilden, Watterson and Chrastek, 2000). Siblings intensify rivalry and jealousy with their sick brother or

sister and try to stand up to this unfair act (Kramer and Moore, 1983). However, irritability and mood swings in siblings with cancer may be caused by the medicines they are taking. It may also be a problem to play too much when playing together, where parents are afraid of physical harm that could have very serious consequences for a sick child (Eiser, 2004).

According to Murray (1999), siblings of individuals with a serious or life-threatening disease are the most forgotten and emotionally overlooked group in the family. "A child's illness can make his siblings a problem child. Even after the possible death of a sick child, many parents have long process to cope with the situation and resume their duties" (Blumenthal-Barby, 1988, p. 151).

Healthy siblings may have their own ideas about the disease and its cause; these assumptions are often misrepresented and distorted, which greatly depend on age, information, and family relationships (Lapwood, Goldman, 2012). Especially in young children, they often feel guilty for their sibling's cancer. The reason for this is that in the past they have said in anger that they want their brother or sister to get sick or die, and now they are aware that they have caused their life-threatening illness to their sibling (Hodder, Keene, 2002). Some children are scared that they also suffer from a serious illness like their brother or sister. Feelings of guilt may also be added that they are healthy and are relatively well unlike their sibling who has a lot of pain. In some cases, there is a feeling of shame about the status of a family with cancer. There may also be negative feelings such as unhappiness to depend because of the lack of attention from parents and grandparents who are overwhelmed by the care of the sick and thus do not have enough time for a healthy sibling. These and many other aspects can significantly jeopardize the school and social behaviour and functioning of siblings, but especially their relationship with parents and sick siblings (Lapwood, Goldman, 2012).

Despite the fact that cancer and related treatments are not inherently related to a healthy sibling, the dramatic physical changes that witness such as hair loss, amputation or extreme weight loss affect their psyche and daily life. Because the family is stigmatized by some otherness, siblings often find themselves embarrassed by disappointment and fatigue over the constant answering of the ongoing questions about their sibling's health (Meitar 2004 in Kreitler and Arush et al., 2004).

Lapwood and Goldman (2012 in Goldman et al., 2012) further state that the closeness and few questions about a sick sibling are not a sign of disinterest or lack of concern. Often parents are so overwhelmed by taking care of a sick child that they are unable to satisfy the needs of their other children. Sometimes, in their desire to regain parental attention, the favour begins to draw attention to themselves by the various false symptoms of cancer. A very frequent dramatic change in the family occurs when the mother goes to the hospital with the baby and the healthy siblings are taken care of by the father or another family member. The difficulty of this situation often causes emotional and psychological isolation in healthy siblings. This may then have an impact on their problematic behaviour, be it aggression or asocial behaviour. In other cases, siblings try to be very responsible and behave according to the demands of their overloaded parents. It is not uncommon for older children to take on the parental role and responsibility for other siblings or even the care of a sick sibling. Most homework remains on them. The anxiety and inner survival of children growing up in a family where cancer is present often manifest themselves as psychosomatic problems such as intermittent sleep, wetting, abdominal and headaches, separation anxiety, constipation, back pain, decline or weight gain (Lapwood, Goldman, 2012) in Goldman et al., 2012).

Children and adolescents tend to worry about the worst, not only about their sick brother or sister, but also about their own health. Taiwanese researchers (Yang et al., 2013) found that when a child is hospitalized, siblings are threatening other patients in the hospital. They witness other suffering children, observe their changed appearance or even hear about the death of a patient

they might have known from their visits. Sometimes they believe that medical staff is trying to kill their sibling. When parents and health care team members make a good effort to protect siblings from knowledge and awareness of illness and treatment, such hiding of the truth often leads to even worse ideas in children, feelings of isolation, guilt and resistance. These fears will never be resolved unless healthy family members or doctors discuss why individual treatments fail. This is all the more important when siblings are to be tested for potential bone marrow donation. They should explain the reasons for transplantation, including the possibility of rejecting the graft regardless of its quality (Meitar 2004 in Kreitler and Arush et al., 2004).

Changes in routines and separation from individual family members experienced by siblings can lead to reduced social contact and impaired communication between parents and children.

One of the results of the study (Marques, Araujo, Sa, 2017) showed that the greater the impact of cancer on healthy siblings, the greater the impact of the disease on the whole family structure. Because the disease has negative effects on all aspects of family life, especially on healthy siblings, any change in the survival of this demanding situation affects all other members.

According to the findings of the study (Kárová et al., 2013) in the relationship between parents and healthy siblings, healthy siblings do not want their parents to spend less time with a sick sibling, but on the other hand they want to spend more time with them. There is a significant difference between the younger and older age groups, where only children, unlike adolescents, feel that they are being ignored and want their parents to spend more time with them.

## 2.1 School and schoolmates

Krajčová and Pasternáková (2009, p. 61) attribute to the school "a traditional function whose task is to provide education to pupils at a professional level, to contribute to the full personal development of a person, to provide qualifications and to create conditions for integration into social life." a school with an adequate climate and positive relationships develops abilities, motivation, emotional and character traits of personality. At first glance, it may appear that the school, which is considered to be part of every child's life, is not directly affected by the sibling's oncological disease. However, according to a study (Prchal, Landolt, 2011), pupils at school are confronted with many difficulties every day due to their sibling's illness, especially at the time of diagnosis. Almost all healthy siblings in this research have expressed attention problems due to worries about the life of their sick sibling. As a result, they had difficulty concentrating on teaching and homework, as well as nausea and frequent headaches. Half of them deteriorated, but this was only temporary. After a few months, the siblings improved their grades to the level they had before the disease was detected in their family. Most of them were uncomfortable or annoying frequently asked by their classmates and teachers about their sibling's health.

Karova et al. (2013) report that siblings of individuals with cancer are forced to take care of their own school roles and responsibilities. In the increased desire to be with her sick brother or sister, a sibling can, at the expense of his own needs, such as school work, focus his time on the family and sibling (Woodgate, 2006). However, this increased care can lead to conflict with sibling's school and extracurricular activities and also contributes to the loss of normal family routine and feelings of safety (Alderfer et al., 2010). Also, siblings may experience increased absenteeism as a result of changes in family functioning, such as increased care for siblings, unexpected disturbances due to childhood illness, problems with transport to school, and greater accountability at home (Long et al., 2015).

For some siblings, school can be a kind of refuge and the only place where they are recognized for themselves and not as a brother or sister of their sick sibling. At school, unlike the household situation, life tends to remain the same with

predictable routines (Lapwood, Goldman, 2012 in Goldman et al., 2012).

Parents tend to find it difficult to secure and sustain the continuation of healthy children in their extracurricular activities, thereby losing the ability to relax, social contacts and support from peers (Kárová et al. 2013). Relationships with peers provide children and adolescents at all levels of development critical components of successful adaptation, including acceptance, positive self-esteem, friendship and support. According to research findings (Alderfer, Hodges, 2010), friends are considered to be the most important and important source of social support for healthy siblings. In addition, the amount of social support received from classmates is considered equivalent to the amount of support received by a sibling from parents. This reinforcement from classmates and other school members is reflected in lower numbers of symptoms of depression, depression, and behavioural disorders. Also, siblings exhibit fewer attention problems, better motivation, improved interpersonal and social skills in the classroom, better reading, mathematical and critical thinking skills (Alderfer and Hodges, 2010).

Relationships with peers and school are an extremely important part of children's lives, which can provide some balance. Maintaining routine routines in school and extracurricular activities provides some security and predictability to siblings. The peers are often a source of consolation, but if they are not accepted, the sibling may feel isolated and excluded. It is therefore important to familiarize the environment with the situation of the child and to have ideas on how to help him (Lapwood, Goldman, 2012 in Goldman et al., 2012). Sometimes classmates can talk to their siblings about insensitive things. Fierce and tactile comments are usually caused by ignorance or fear, but these inappropriate notes need to be processed with the child. The siblings are well aware that their family is different and, like other children and adolescents, do not want to be different and stand out from the crowd. That is why adolescents are often slaves to fashion. They want to be the same as their peers, longing for "normality" (Aldridge, 2007). And it is precisely the lack of funding associated with the treatment that can cause problems in the child's security, his requirements for current trends in the creation of status based on clothing and equipment.

It is also important to recognize normal tensions in the life of a sibling that previously existed, such as tests, disagreements with classmates; from the stresses associated with family changes. Siblings can try to protect their parents by not giving them their feelings and experiencing them. Therefore, they often look for someone outside the family to listen to them and honestly answer questions. And it is school that can play a very key role in identifying a sibling person (Lapwood, Goldman, 2012 in Goldman et al., 2012).

The school also provides an opportunity for siblings to socialize with friends they will no longer be able to see after school due to their homework duties. They can trust their friends, experience the feelings of joy, and enjoy normal children's activities. During the lessons they may for a moment forget what is happening in their family. It is not only classmates and friends who play an important role in the life of siblings of children with cancer, but also their teachers. Often teachers will help them by listening to them and providing them with opportunities to express their feelings through writing, art, music, drama and physical education (Brown, 2012 in Goldman et al., 2012).

These findings point to the importance of contacting healthy siblings with friends, classmates, and teachers to give them strength and encouragement in experiencing a difficult life situation. The findings also suggest that school social support is related to the emotional, behavioural and academic settings of siblings of individuals with cancer.

### 3 Research

The aim of our qualitative research was to find out how a child's oncological disease affects his or her healthy sibling in the mental and physical field and what impact it has on his / her social life and study. It was also our goal to find out how a healthy sibling perceives his current position in the family, whether his role has changed under the influence of sibling cancer, in which areas and to what extent. Our next goal was to find out what relationships exist between healthy and sick siblings, whether they have changed in any way after diagnosis of the disease and in what area. And since grandparents are the ones who often take on the important role of parents in this difficult situation, the research also sought to find out their status in the family and the importance in raising healthy siblings.

Our research sample consists of three participants, siblings of individuals with cancer and their mothers with whom we have conducted case reports. All siblings are of adult age, college students, who remember their own experience of sister or brother illness.

Because the research is anonymous, P1, P2 and P3 are listed instead of participant names. Their siblings are X and Y. Our participants are currently university students. P1 (20) studies economics and was 11 at the time of Sister X's illness. P2 (23) is studying information technology and, when he was 9, his brother Y was diagnosed with acute lymphoblastic leukaemia. P3 (21), their sister is a psychology student and was 7 at the time of her brother's illness.

Tab. 1: Information about participants

| Participant | Gender | Actual age | Participant's age at the time of sibling illness | Age of sibling with cancer in the diagnosis of illness |
|-------------|--------|------------|--|--|
| P1          | Woman  | 20y.       | 11y.   | 8y.  |
| P2          | Man    | 23y.       | 9y.  | 13y.   |
| P3          | Man    | 21y.       | 7y.  | 13y.   |

To obtain qualitative data we used the method of individual interviews and auxiliary method – case report. We used the open coding method to analyze the data.

#### 3.1 Evaluation of research results

In this part of our work, we focused on evaluating the research results that we have accomplished through open coding of interviews and case reports. The results are organized in meaning categories.

##### *Sibling relations*

The relationships with their siblings were positively characterized by the participants, but the impaired health of the brother or sister had a negative impact on them. This was mainly due to the lack of time spent together. The sibling with the disease was often in the hospital and when he was at home he usually had to lie or relax. Participants lacked their brother or sister, but also the time they used to spend together. Therefore, their pain was twofold. One concerned their sibling's disease and their separation. The other one was related to sadness for joint activities.

*P1: "As I've always had a great relationship with X, we've been sisters and friends since I was. But then I knew it was so hard, I missed her when she was in the hospital and when I saw her at home and she was sick, I was so sorry. I was also sad for our fooling together, her doctors forbade it".*

During the illness of the nurse, P1 felt better the value of the relationship and the love she had for her. She was made aware of the possible threat of a nurse's death: *"But we were closer again, probably because I realized I could lose her and how much I love her"*.

P2: "We have always had a good relationship with Y, but I know that when he was ill he got a little bit broke. We weren't as much together as before, during his stay in hospital. And when he was home he often slept, breathing ... We used to model cars and airplanes together and when he was ill he couldn't".

P3: "Y Y, so he was always my big brother. He is six years older from me, so I was his pet".

#### *Perception and survival of the disease by sibling*

In the siblings there were various manifestations of survival of the disease of brother or sister. We realized that much depends on the age and nature of the sibling. For one sibling it was masking one's own emotions, another for nightmares. There was also fear of the future, but also of the possibility of acquiring cancer. The sibling whose brother was ill perceived some kind of benefit from his brother's side as much attention was paid to him.

P1: "Everything has changed. Mum was at the hospital most of the time. I was home with Babina (grandma). At home, there was rarely a laugh. We walked on tiptoes. There was such tension everywhere. Even fear that what will happen".

Mother P1: "... P1 doesn't show her emotions much, she looks like everything is fine, but in fact she kept everything in her. P1 still claimed that X would cure. She often asked for treatment what they were doing with X, what the doctor said ....".

Mother P2: "I would say that he was quite sensitive [to the disease]. ... And he often dreamed of bad dreams, so sometimes you went to bed with us".

P2: "Sometimes it seemed to him that [brother] was happy with it, that everyone was running around him. But that's just my opinion, it doesn't have to be true, I don't want to wrong him".

P3: "Maybe it sounds strange, but for me it was such a disappointment and fear that when he was so badly ill, that what would happen to me, or even I will not get sick. I was really scared. ... I love Y and I always did, just it was such a bad time".

#### *Changes in sibling behaviour*

Siblings of children with cancer have shown significant behavioural changes at the time of illness and treatment, such as tightness, serious mood, excessive attachment to parents and sick sibling, anxiety, jealousy, and excessive attention, resulting in a lack of attention to the sibling.

Mother P1: "... she was tighter and more serious than ever, especially when she saw X that she was sick or in pain".

Mother P2: "... I think he was more tied to me and Dad, he wanted to be with us, even with Y. He was pretty anxious about the boy".

P3: "... And in fact, I began to be jealous of him, because everyone was talking about Y, running around him, and our questions answered, "No, because Y ... ". As if I wanted to shout, "Hello, here I am!".

Mother P3: "She attracted enough attention. She used to do it before, but when Y was sick, she was running after us and doing everything possible to notice her. She kept jumping, talking, singing, dancing, banging things ... We didn't know how to calm her anymore. When we ignored her, she was sad. Perhaps it was a shock to her when she was suddenly not the centre of attention, but someone else was so hard to bear".

#### *Care of siblings for brother / sister at the time of illness*

Although the parents of one participant prevented her caring for her sick brother, probably because of her health concerns, all her siblings tried to help in some way in the care of her brother or sister with the disease. Their care was manifested in various ways. Most often it was paying attention to the sibling, spending leisure time with him, talking, mediating homework or carrying food and drink. During that time, the parents could recall and do other things for which they had no time in addition to dealing with the sick child.

P1: "Of course, at X, I tried to be still when she was home, I enjoyed taking care of her".

Mother P1: "P1 was very helpful, she still wanted to be at X. ... guarded X while I could make my stuff. It was enough that she was in her nursery with her and she called me when needed".

P2: "When he was at home, I used to sit with him and talk to him, being there when he felt bad. I brought him homework, greetings from his classmates".

P3: "Ours didn't allow me to worry about Y, they were afraid I might hurt him somehow, I don't know... But I brought him food from the kitchen to the room, or made him tea. And I used to go to sit down, tell him what I had at school".

#### *Parents' access to healthy siblings during childhood illness*

The parents of all siblings were so tired and exhausted from taking care of their sick child that they did not manage to devote enough time to their other children, siblings of individuals with cancer. They were also often nervous and irritated. The parents of one participant in many situations constantly reminded her sister's illness and compared her with her. Another sibling in the desire for parental attention wanted to get sick like his brother.

P1: "I spent little time with ours and they were still tired. And it bothered me that every time I did something, they reminded me of [sister's] disease. For example, when I was bored, they bothered me not to get bored what X would give if she could go out. Or let me put a cap on my head so I don't get sick, I don't care about health at all, and poor X is in the hospital. Because I was quite angry about this, and why they still remind me of it".

Mother P1: "Surely I didn't have as much time to do P1 as before. I was often nervous and tired, so I didn't always treat her kindly. But then I always felt sorry, so I apologized to P1 ...".

P2: "... But it bothered me, also because ours didn't pay attention to me, I mean P3. I have sometimes thought that I would also like to be ill like him. Luckily, that didn't happen. "

"... And when Mom was at home, she was often nervous, just to restrain us".

P3: "In fact, at that time, I thought we had ceased to exist for ours. Like me with P2. Now when I look at it, I understand their situation more, but anyway ... It was terrible. They didn't care at all, they were often nervous. When we reached them, they sent us to play together. I missed the old days when we were all happy together".

Mother P2 and P3: "I didn't have as much time on them as before, I was very tired and exhausted from the constant visits of doctors, hospital, treatment ... My husband was also tired of working and going to the hospital. I've been irritated to others sometimes".

#### *Family communication*

There was a communication problem in the families of all participating siblings. Parents and grandparents did not sufficiently inform their children or grandchildren about the health status and treatment of their sibling. Healthy siblings perceived this negatively and felt confused and uncertain as a result of poor awareness. They also had distorted ideas and lack of communication supported a fantasy that was not based on reality.

P1: "My parents didn't really talk to me about [sister's] disease, so they told me what she was, but no details... Babina didn't talk much either. ... surely it hindered me [lack of communication]. But then everything was running on my head, and I felt that I didn't know what was going on, so uncertain".

Mother P1: "I didn't want to tell her all the details, it was hard for me to absorb and not burden the 11-year-old." Although P1 understood their intention: "... I think they were afraid to tell me about the disease, maybe they didn't want to worry", he says, "... even if they told me something negative about X, I would at least know what was going on and wouldn't have to think of various catastrophic conclusions".

P2: "... [the parents] were completely silent about the disease. I didn't really know what the cancer was. And when I asked, my mother just cried. And daddy usually warmed me up, let me not ask such things and let me not even know. But I needed to know. I don't understand why they didn't explain it to us. Once I have my children, I will openly talk to them about life".

P3: "My parents didn't really [communicate], as they told me Y was sick and would be treated longer, but nothing closer. And grandpa and grandma also didn't talk much about [brother's] treatment; they were so lamenting what would happen to him. ...

*I was very curious and when ours didn't want to tell me, but I was confused. ... so I imagined that Y would be in the hospital forever, or that he would not walk, or even his funeral. I was also thinking what things and games I would get after him".*

*Grandparents in relation to siblings of individuals with cancer*  
Grandparents played an irreplaceable role in a family with a child with cancer. They were very necessary and helpful for families. In all cases, they took care of siblings and also of the household. We could say that they have to some extent replaced their parents' siblings. All participants mentioned that during their brother or sister's illness they spent most of their time with their old parents / parents.

P1: "... I met Babina and very often, as she lived near us so she was almost always at home."

"Everything [they spent time], I was a child then, so I enjoyed party games, especially „Don't be angry!" Or cards. But grandma also helped me with my homework, although I always tried to avoid it. And we used to cook and bake together, it was always fun. ... We went out to walk our Dusty [dog] together".

P2: "... we were seeing Grandpa and Grandma every day. They went to school for me and my sister, yet ours didn't want to let us go home. ... Then they did something to eat when Mom and Y were in the hospital. And when we ate our grandfather or grandmother helped us with homework, but mostly my sister, I was doing quite well with myself. And they went with us to the rings, with me to the piano and with my sister to the dance. Sometimes they took us to candy, or when it was pretty bike".

P3: "Every day [grandparents walked] every day. Rarely did Mom go to school for us. ... They used to take us out, or for a cake, or for ice cream. In fact, they took us on a bike, but only Grandpa was cycling with us, grandma's legs hurt".

Siblings P2 and P3 were well aware of the importance of their grandparents and the need for their care.

P2: "... they were very friendly and were fully devoted to us. We also had a lot of fun with them. I can't imagine having to take care of everything with my sister while daddy was at work and mum was in the hospital".

P3: "... not hitting them, I don't know, I would probably be worried. I missed my mother very much. Even daddy. But Grandpa and Grandma were able to entertain us. I think they've replaced our parents enough".

*Being empathetic and respecting her granddaughter, grandmother P1 was able to open her up better and share her experience with her: She always knew how I felt what was bothering me ... And she left me room, she didn't squeak in me like a mother. That's why I gave her more confidence in what I was experiencing".*

#### *Relationship of siblings to school*

The relationship with the school was mostly positive in the siblings, but in one participant there was a dislike of school, learning and preparation for lessons. There was also a problem with attention to teaching. All siblings mentioned as a positive classmates or the fun they had at school. This also made them sometimes forget the problems they had at home.

P1: "So my relationship to school, I have to say that nothing much, but who enjoys school?! Somehow I did not want to learn, I had quite a problem with attention in the classroom, so I missed a lot of information. Neither did I want to write or learn. So, I didn't even wear any good home signs, even though it didn't bother ours. But I have to say that we had a lot of fun at school, so far I remember many happy experiences from that period".

P2: "I always approached the school responsibly, I enjoyed learning new information. I can say that I liked going to school even though there were some things that I didn't like. And we had a good team in class, so I always looked forward to classmates".

P3: "I only went to school for a short time, so I was looking forward to it. I found a cool friend there, even the teachers were fine. ... at school I forgot our problems, the sadness I had, and the fact that I missed my mother. We just jumped there and then

*taught, so I was pretty cool at school. ... But I remember that I used to be sad at school for my mother. Some days".*

#### *Preparing for school*

Two siblings spent little time preparing for school. For one reason, the reason was rather uninterested in learning and the other was excessive skill. One participant spent quite a lot of time learning because of her brother's illness at the elementary school. All siblings tried to help grandparents write homework and learn. In the family of two siblings, when she was not just in the hospital, she was helping them, but only partially.

P1: "I would say that she spent the minimum amount of time [preparing for school]. I am not saying that I completely slapped the school, but I certainly did not spend hours a day over books. I quickly wrote homework and learned only the exams, they didn't test us verbally".

"I remember my grandmother was trying to get me to learn and to write homework, but she wasn't doing well, as I was preventing her. Sometimes she wrote me a role for me, mostly from Slovak, which I did not do much".

P2: "... I just needed to read the curriculum and I remembered it. I've always had my tasks written fast".

"Well, grandpa and grandma wanted to help me, but I didn't really need it. I don't want to brag about, but learning and tasks made me no problem".

P3: "Pretty much [she spent time preparing for school]. But probably because I was just a freshman. It didn't turn on me as fast as P2".

"When my mom was in the hospital, my grandpa and grandma helped me. And when Mom was home, so was she, but only a little. ... [father] not very. He went home later, and we were already slowly going to bed".

#### *Educational problems occurring in siblings during brother / sister disease*

All siblings experienced problems in their lessons or in school preparation. Most often there were problems with concentration on teaching, siblings could not keep their attention for a long time. It was also a problem of memorizing the curriculum that one participant associated with her absent-mindedness. On the same day, the same participant missed school because of her desire to care for her sick sister. Another sibling missed school attendance at the beginning of his brother's treatment at the hospital, as he was difficult to bear the situation and was unable to prepare for teaching. His younger sister, also a participant, sometimes forgot to do a job at school and had difficulty getting in front of classmates and teachers.

P1: "But certainly, I had enough problems with school. I couldn't concentrate for a long time when the teacher was talking something, so I didn't remember much of it and then it looked like it was written. I didn't even want to learn, somehow I couldn't remember the curriculum, I was probably so distracted".

Mother P1: "It also happened that she didn't want to go to school when X was home, she said she would take care of her. So we left her at home a few times, but not every time. The teachers told me that she was rather unconcentrated, but they knew about our situation, so they didn't solve it that much".

Mother P2: "I remember his class at the time reminding me that P2 was somehow unconcentrated, as if he were a body at school but a spirit somewhere else. But you see; now I think there was a period when Y came to the hospital and gave him chemo, so P2 lived through it a lot and we left him at home for a few days because he couldn't get ready for school and was afraid to go unplugged to school".

P3: "I know I've ever forgotten a task. But I also had a problem with answering ... I remember that I didn't like to answer before the whole class when the teacher asked something ... And it was hard to learn, I couldn't remember anything. Grandpa and grandma bothered me ...".

#### 4 Conclusion

A sibling in the desire for parental favour and manifestations of love often reaches for various methods of attracting attention. Sometimes he feigns the false symptoms of an oncological disease in the desire for parental interest; sometimes he is very helpful and caring just to gain praise and recognition from his parents. Siblings also have frequent psychosomatic disorders, anxiety to depression, nightmares and increased hypersensitivity. The sibling gets a sense of acceptance and the necessary daily routine, mostly at school, where lessons and breaks spent with peers distract his attention for at least a moment and the sibling may feel like a "normal" child again. However, many problems and complications are associated with school and preparation for teaching. The siblings show reduced concentration and attention on the clock, forgetting homework, missing the clock, worsening the benefit. Another of our findings was the importance of communication and its very frequent failure in families with individuals with cancer. In fact, the absence of communication leads to misconceptions and anxiety in the siblings. This is especially important when a sibling is undergoing a bone marrow donation process where poor awareness can cause minor or major psychological injuries.

We have come to realize that the frequent separation between brother and sister in the hospital causes sadness and sadness for the siblings to spend time together. On the other hand, it can be said that even greater pain is the loss of parental attention and expressions of love, which is the most common source of anxiety and psychological distress in siblings. Parents are usually so busy caring for an individual with cancer and financial security for the family, as one parent usually has to leave work that they do not have the strength and time to devote themselves to their other children. However, this can be greatly improved by parents' efforts to create other activities for their siblings or to spend time together in which they would feel important and loved. We also find it necessary to communicate openly but adequately with age with siblings. This avoids the misinformation and ideas that siblings can obtain, for example, via the Internet or from peers. It also considers it very important to have a sensitive, understanding and attentive attitude of teachers in schools, which can very positively influence the siblings of individuals with cancer.

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# CYBERBULLYING OF PRIMARY AND SECONDARY SCHOOL PUPILS FROM THE ASPECT OF CYBER-AGGRESSORS - SELECTED PROBLEMS AND POSSIBILITIES OF PREVENTION

<sup>a</sup>MIRIAM NIKLOVÁ, <sup>b</sup>JANA MAKÚCHOVÁ

<sup>a</sup>*Matej Bel University in Banská Bystrica, Faculty Of Education, Department Of Pedagogy, Ružová 13, 974 11 Banská Bystrica, Slovakia*

<sup>b</sup>*Matej Bel University in Banská Bystrica, Faculty Of Education, Department Of Pedagogy, Ružová 13, 974 11 Banská Bystrica, Slovakia*

*email <sup>a</sup>miriam.niklova@umb.sk, <sup>b</sup>makuchova.jana@gmail.com*

The paper is a continuous output of the KEGA project 018UMB-4/2018 under the title "Coaching Approach as a New Form of Development of Critical Thinking of Students in Higher Education".

**Abstract:** This study presents the results of an empirical research carried out in selected primary and high schools in Slovakia in 2017/2018. The aim of the study is to describe individual forms of cyber-bullying in terms of sex and age-specific aspects of cyber-aggressors. The research sample consisted of 1,004 respondents aged 10–20 years (AM 14.9). For the empirical data collection, the method of survey was used in form of a standardised written questionnaire according to S. Hinduja and J. W. Patchin (2010). The study focused on the most common forms of cyber-bullying and their identification from the pupil cyber-aggressor's point of view in terms of their sex and age. Statistically significant differences were observed in the forms of cyber-bullying in the following areas from the aggressor's perspective: identity theft, insulting/humiliating using a video, threatening and intimidating the victims in favour of the boys.

**Keywords:** cyber-bullying, cyber-aggressor, pupil, school.

## 1 Introduction

The Internet as a medium of the new era represents one of the most important communication tools of the third Millennium. According to the Statistica international statistical portal, the number of Internet users has been constantly rising. In 2016, the number of Internet users around the world reached 3.39 billion, but in 2017, the number rose to 3.58 billion. The electronic media with an access to the Internet are undoubtedly becoming a part of the children and youth's lives. In comparison to other mass communication means, the Internet environment is specific in terms of the speed at which information can be reached, its immediacy and high accessibility all around the world as well as the accessibility of contacts, etc. Children are being born into a digital world, creating generations growing up with the technology. In the life of the "digital kids", the real world overlaps with the virtual one. The Generation Z consists of individuals born after 2000, who have been surrounded by information and communication technology since their childhood. The current society is also referred to as the Google generation; it consists of "digital natives" who no longer remember the era before computers, Internet and the Google search engine. They are used to working with these technologies; instead of remaining passive recipients, they create and share information through the media, constantly communicating, actively learning and acquiring skills. The children of this generation perceive electronic media as a part of their lives (Spitzer, 2014).

Today, children are born into the digital world and they grow up with modern technologies from an early age. The life of these "digital children" comprises both actually lived and virtually "transferred" life within the cyberspace. Social networks are one of the most used and most attractive modern communication platforms among the current generation of children and young people all over the world. They share their experiences or feelings via social networks, communicate with other users, join various groups, or follow the lives of their friends or other public people. The characteristics of anonymity, availability and accessibility, which are typical of cyberspace, offer and enable children and young people to behave with almost no social supervision in the virtual environment. Unrestricted behaviour can result in cyberbullying.

The development of information and communication technologies brought many benefits, but also a number of risks,

including cyber-bullying. Cyber-bullying is a form of bullying using electronic media, such as the Internet and mobile phones, with the intention to inflict aggressive and deliberate harm on the media user. Both, bullying and cyber-bullying is characterised by repeated behaviour and power imbalance between the aggressor and the victim (M. Price – J. Dalgleish, 2010, p. 51). According to the World Health Organisation (2016, p. 14), cyber-bullying includes repeatedly inflicted physical, mental and social harm and occurs in a social environment, often in the school environment, where young people gather, as well as in the online environment. N. Hunter (2012, p. 6) considers cyber-bullying to be an activity which uses force or threat to persecute people with the intention to harm them. Cyber-bullies can hide their identity. Victims of cyber-bullying are ridiculed by a large group of people, and thanks to the virtual possibilities, the frequency of bullying with sexual undertones is increasing. Whereas the traditional bullying-related violence provides people with the opportunity to escape from the situation, in cyber-bullying it is difficult to escape, because the negative content about the victim can be seen by all Internet users (Taşkin, 2014).

Cyber-bullies can be divided into three groups: aggressors, victims and bystanders or onlookers. An online cyber-aggressor is referred to as e-aggressor. The e-aggressors are characterised by the following features: they spend a lot of time online, receive little attention from their parents and are quite good at using complex Internet applications. They are also bullies in the real life. K. Hollá (2010, p. 30–31) provides the following typology of e-bullies:

- The angel of vengeance – typical for children who were bullied themselves or are trying to protect a bullied friend.
- The power-hungry cyber-bully – typical for children who exert their authority and power and want to show it off. Bullies are often girls, but also the physically less fit children who are not very popular in the group.
- The mean girls – typical for bored children looking for entertainment.
- The inadvertent cyber-bullies – respond disproportionately to hateful and provocative messages without realising the consequences of their actions.

Cyber-bullies often desire to bully someone, yet they do not want to be involved in the traditional form of bullying. They are aware of the fact, that in traditional bullying, their position in the group could be harmed, they could be revealed, whereas cyber-bullying can be a good way to achieve their goals. Cyber-bullying is easier to accept for the aggressor, because they do not necessarily have to witness the actual impact of their actions (Černá, 2003, pp. 66–67).

## 1.1 Characteristics of the research objectives and methodology

The aim of the research was to map and analyse cyber-bullying among pupils of primary and high schools in the Slovak Republic. The objective was to determine the relationships among the forms of cyber-bullying in terms of sex and age of primary and high school pupils.

Empirical research was carried out in the academic year 2017/2018. The empirical data were collected using a questionnaire consisting of scale-based questions. The pupils were to evaluate each item on a 0–4 scale. The scale included the following possibilities: 0 = never 1 = once, 2 = sometimes, 3 = often, 4 = every day; the pupils were also required to express their dis/agreement with the statements provided using yes/no answers. The data collection method combined a standardised Cyberbullying and online aggression questionnaire inspired by S. Hinduja and J. W. Patchin (2010), tested on a pupil group with a similar age in the United States. Custom items were added to

the questionnaire since the standardized questionnaire did not include all social networking sites and mobile applications currently available for installation.

## 1.2 Characteristics of the research sample

The research sample consisted of 1,004 pupils of primary (394 pupils) and high schools (610) aged 10–20. Detailed figures on the type of school, age and sex are presented in Tables 1 and 2.

Table 1: Distribution of respondents according to the type of school

| Type of school |       |                |       |                   |       |       |     |
|----------------|-------|----------------|-------|-------------------|-------|-------|-----|
| primary school |       | grammar school |       | vocational school |       | TOTAL |     |
| n              | %     | n              | %     | n                 | %     | N     | %   |
| 394            | 32.24 | 210            | 20.92 | 400               | 39.84 | 1004  | 100 |

Table 2: The distribution of respondents in terms of age and sex

| Alternatives | Sex  |       |       |       | TOTAL |       |
|--------------|------|-------|-------|-------|-------|-------|
|              | boys |       | girls |       |       |       |
| Age          | n    | %     | n     | %     | N     | %     |
| 10           | 17   | 37.77 | 28    | 62.23 | 45    | 4.48  |
| 11           | 57   | 50.89 | 55    | 49.11 | 112   | 11.16 |
| 12           | 30   | 39.47 | 46    | 60.53 | 76    | 7.57  |
| 13           | 55   | 51.87 | 51    | 48.11 | 106   | 10.56 |
| 14           | 38   | 50.67 | 37    | 49.33 | 75    | 7.47  |
| 15           | 48   | 54.55 | 40    | 45.45 | 88    | 8.76  |
| 16           | 72   | 42.11 | 99    | 57.89 | 171   | 17.03 |
| 17           | 60   | 38.96 | 94    | 61.04 | 154   | 15.34 |
| 18           | 54   | 48.65 | 57    | 51.35 | 111   | 11.06 |
| 19           | 32   | 57.14 | 24    | 42.86 | 56    | 5.58  |
| 20           | 8    | 80    | 2     | 20    | 10    | 1     |
| TOTAL        | 471  | 46.92 | 533   | 53.08 | 1004  | 100   |

Most respondents attended vocational schools – 400 pupils (39.84%) and primary schools – 394 pupils (39.24%). 210 students attended grammar schools which represents 20.92% of the total number of respondents. In terms of the sex, the majority of respondents were girls – 533 (53.08%). There were 471 boys, which represents 46.92%. The most numerous groups included pupils aged 16 years (17.03 %), 17 years (15.34%), 11 years (11.16%) and 18 years (11.06%).

## 1.2 Research results

It can be stated that the most common manifestation of cyber-bullying from the cyber-aggressor's perspective included posting rude/insulting statements about someone on the Internet represented by 33.40%, in the favour of boys (21.00%). This is followed by posting rude/insulting photographs/pictures of another person (15.20%); hereby, the proportion of girls (7.80%) and boys (7.40%) was relatively similar. The third most common form of bullying was disseminating untrue information about someone on the Internet (11.30%), more often referred to by girls (6.40%).

The aim of the research was to identify whether the correlation between the sex and individual forms of cyberbullying is of statistical significance. The results are presented in Table 3. The table presents the arithmetic average, standard deviation as well as the minimum and maximum values pertaining to the forms of cyber-bullying in relation to the pupil's sex.

Table 3: Cyber-bullying forms distributed according to pupils' sex

| Alternatives |      | Rude/insulting speech on the Internet | Posting a rude/insulting video on the Internet | Disseminating untrue information on the Internet | Threats via SMS | Threats via the Internet |
|--------------|------|---------------------------------------|--|--|-----------------|--------------------------|
| Boys         | AM   | 0.36                                  | 0.04   | 0.07   | 0.04            | 0.10                     |
|              | SD   | 0.808                                 | 0.289  | 0.338  | 0.289           | 0.465                    |
|              | Min. | 0                                     | 0  | 0  | 0               | 0                        |
|              | Max. | 4                                     | 4  | 4  | 3               | 4                        |
|              | N    | 471                                   | 471  | 471  | 471             | 471                      |
| Girls        | AM   | 0.16                                  | 0.03   | 0.08   | 0.02            | 0.02                     |
|              | SD   | 0.472                                 | 0.196  | 0.366  | 0.211           | 0.207                    |
|              | Min. | 0                                     | 0  | 0  | 0               | 0                        |
|              | Max. | 4                                     | 2  | 4  | 4               | 4                        |
|              | N    | 533                                   | 533  | 533  | 533             | 533                      |
| Total        | AM   | 0.25                                  | 0.04   | 0.08   | 0.03            | 0.06                     |
|              | SD   | 0.659                                 | 0.244  | 0.353  | 0.251           | 0.354                    |
|              | Min. | 0                                     | 0  | 0  | 0               | 0                        |
|              | Max. | 4                                     | 3  | 4  | 4               | 4                        |
|              | N    | 1004                                  | 1004   | 1004   | 1004            | 1004                     |
| Test results | Z    | -4.020                                | -0.157   | -1.008   | -0.965          | -3.398                   |
|              | p    | 0.000                                 | 0.413  | 0.335  | 0.038           | 0.001                    |

Based on the Mann-Whitney test results, regarding the sex, a statistically significant difference can be observed between these two forms of cyber-bullying: rude/insulting speech on the Internet and threats via the Internet. In both cases, it was found that boys prefer these forms of cyber-bullying.

Table 4: The inference indicator of the statistically significant difference among the forms of cyber-bullying from the cyber-aggressor's point of view

| Alternatives                                     | Chi-square | P     |
|--|------------|-------|
| Rude/insulting speech on the Internet            | 39.525     | 0.000 |
| Posting a rude/insulting photograph/picture      | 40.340     | 0.000 |
| Posting a rude/insulting video on the Internet   | 26.035     | 0.004 |
| Creating a rude/insulting website                | 8.165      | 0.613 |
| Disseminating untrue information on the Internet | 28.660     | 0.001 |
| Threats via SMS                                  | 8.194      | 0.610 |
| Threats via the Internet                         | 22.471     | 0.013 |
| Abuse/creation of a fake profile                 | 25.742     | 0.004 |

In terms of age, a statistically significant difference was confirmed in five forms of cyber-bullying: rude/insulting speech, posting rude or insulting photograph/picture, posting rude/insulting video, disseminating false information and creation of a fake profile. In terms of the forms of cyber-bullying, a statistically significant difference was observed mainly in pupils aged 18-20 years. In the Table 5, the average order of the selected forms of cyber-bullying is presented in which the statistically significant differences were observed in terms of pupils' age.

Table 5: Average ranking of selected forms of cyber-bullying in terms of the age of the cyber-aggressors

| age | rude/insulting speech |      | posting a rude/insulting photograph/picture |      | disseminating untrue information |      | creation of a fake profile |      |
|-----|-----------------------|------|---|------|----------------------------------|------|----------------------------|------|
|     | Mean rank             | AM   | Mean rank                                   | AM   | Mean rank                        | AM   | Mean rank                  | AM   |
| 10  | 432.07                | 0.04 | 488.00                                      | 0.00 | 474.00                           | 0.00 | 485.00                     | 0.00 |
| 11  | 445.18                | 0.05 | 492.46                                      | 0.01 | 474.00                           | 0.00 | 489.44                     | 0.01 |
| 12  | 453.34                | 0.12 | 494.57                                      | 0.01 | 487.47                           | 0.07 | 498.36                     | 0.07 |
| 13  | 495.61                | 0.23 | 492.71                                      | 0.01 | 478.92                           | 0.02 | 489.69                     | 0.01 |
| 14  | 487.32                | 0.21 | 488.00                                      | 0.00 | 501.09                           | 0.08 | 505.54                     | 0.08 |
| 15  | 505.52                | 0.26 | 493.68                                      | 0.01 | 502.71                           | 0.08 | 501.94                     | 0.03 |
| 16  | 528.28                | 0.33 | 508.45                                      | 0.04 | 529.61                           | 0.14 | 511.35                     | 0.06 |
| 17  | 516.87                | 0.30 | 504.22                                      | 0.03 | 506.64                           | 0.05 | 504.47                     | 0.05 |
| 18  | 543.64                | 0.39 | 515.24                                      | 0.07 | 523.25                           | 0.11 | 493.95                     | 0.02 |
| 19  | 549.12                | 0.45 | 542.33                                      | 0.21 | 509.95                           | 0.13 | 538.93                     | 0.18 |
| 20  | 615.30                | 0.50 | 537.95                                      | 0.10 | 523.45                           | 0.10 | 586.05                     | 0.30 |

### 3 Discussion and Conclusions

The study examines the mutual relationships between the sex and age of cyber-aggressors and the cyber-bullying forms. It has been shown that the most common form of cyber-bullying is rude/insulting speech on the Internet – denigration, provocation and online attacks. It was statistically proved that mostly boys and pupils aged 18–20 incline to aggressive behaviour in the cyberspace.

Boys and girls seem to take different roles in cyber-bullying. In general, research results concerning cyber-bullying are inconsistent; the differences are not clear-cut. In some studies boys were identified as cyber-bullying aggressors more frequently (e.g. Q. Li, 2006; R. Slonje and P. K. Smith, 2013; K. Kopecký et al., 2015; K. Hollá, 2016, 2017; M. Dulovics, 2017; S. Hinduja and J. W. Patchin, 2016); however, in other studies, girls prevailed (e.g. Kowalski et al., 2008; Schneider et al., 2012). Research shows that boys are more prone to physical aggression in comparison to girls; in the online environment, boys use threats of physical aggression and happy slapping more often than girls. On the other hand, girls use verbal skills to express their aggression more often than boys (S. Hinduja and J. W. Patchin, 2016). In general, it can be stated, that the boys are more often in the position of cyber-aggressors.

In 2013–2015, K. Hollá (2016, 2017) studied sexting and cyber-bullying; she found out that in boys the probability of becoming a cyber-aggressor is 7.37 times higher than in girls. In most cases, cyber-bullying occurs among boys aged 17. The most common forms of attack they used included sending rude/insulting messages (28.90%), false information (24.30%) and sharing compromising photographs on the Internet (19.60%). The research of the Centre for the Prevention of Risky Virtual Communication also identified boys as the more frequent cyber-aggressors (K. Kopecký, R. Szotkowski, V. Krejčí, 2015). According to the research results, boys acted as the cyber-aggressor more often (e.g. identity theft – 63.67% boys, 36.33% girls; insulting/humiliating someone using video – 61.97% boys, 38.03% girls; threatening and intimidating – 57.68% boys, 42.32% girls). The verbal attacks were an exception, in this case girls acted as the cyber-aggressors more often (52.29% girls, 47.71% boys).

In M. Dulovics's research (2017) carried out among pupils of primary and high schools, the statistically significant differences in sex were found in the following forms of cyberbullying – posting insulting photographs, threatening and insulting someone via chat, vulgar or offensive speech in the on-line environment – more frequently among boys in all three cases. Cyber-bullying via chat was noticed in 27 (46.6%) boys and 8 (21.1%) girls, 23 (39.7%) boys and 3 (7.9%) used offensive

language in the communication on the Internet. 3 (5.2%) cyber-aggressors have created a fake profile on the behalf of another person. All of them were high school students. Outing was carried out by 8 (7.3%) cyber-aggressors; 5 (8.6%) were boys and 3 (7.9%) girls. Happy slapping was performed by 2 (3.5%) boys in the research sample. These were high school students in their 2nd and 3rd year of studies.

S. Buelga, M. J. Cava, G. Musitu a E. Torralba (2015) stated in their study that 69 (5%) of students committed a serious and recurring form of cyber-bullying. The authors revealed significant differences between the cyber-bullying forms preferred by either sex: cyber-stalking, posting insulting videos and photographs that can harass or harm the victim. The boys scored higher in all of them. Social exclusion represented an exception, girls preferred it statistically more often than boys.

K. Hollá and H. Hanuliaková (2017) researched the relationship between the student's social status in the class and their role as the cyber-victim or cyber-aggressor. The research sample consisted of 1,118 pupils of Slovak primary and high schools (45.50% boys and 55.50% girls). It was found out that both groups of respondents (boys and girls) pertain to the same statistically significant category: I am making fun of the others. Among boys, the behaviour making fun of others and rude behaviour shows that they may become cyber-aggressors or victims of cyber-crime. The self-assessment of girls indicates they may become cyber-aggressors and cyber-victims at the same time due to lies and gossip spreading in the class.

The UK Safer Internet Centre (2017), which studied a sample of 1,500 children and young people aged 8–17 in the UK, found out that more respondents aged 13–17 years (45%) have experienced cyber-bullying as victims or aggressors than respondents aged 8–12 years (32%).

R. Slonje, P. K. Smith, and A. Frisen (2012) found out that girls were more likely to become cyber-aggressors at a younger age, whereas there was no difference in the probability of becoming cyber-aggressors between girls and boys as they got older.

C. Barlett and S. M. Coyne (2014) observed statistically significant differences in terms of the sex and age. Among younger respondents, it was confirmed that girls were more involved in cyber-bullying than boys. As they got older, the probability of boys being involved in cyber-bullying increased – in late adolescence and at the university.

Cyber-bullying, as a socio-pathological phenomenon in the contemporary society, and its various forms in the on-line environment made up of different technologies daily influence pupils in primary and high schools. It is widespread not only in the school environment, but also everywhere the pupils can live their “virtual” lives. The cyber-space (often) provides an anonymous opportunity for the pupils to behave aggressively on the Internet.

Cyber-bullying represents a serious socio-pathological phenomenon. It requires special attention, mainly in terms of prevention. The cyber-bullying prevention must occur across the country and involve a number parties including parents, teachers and the whole community with the aim to stop cyber-bullying at the very beginning. These efforts should focus especially on children and young people with the biggest predisposition to become bullied. In this respect, it is very effective to build a community where young people learn strategies to deal with anger, strengthen positive behaviour and sense of social cohesion within the community (Bullying, a prevention toolkit, 2011, p. 7).

The children and youth belong among the largest and most active electronic media user groups, but they also represent the group at the greatest risk, since they are not always able to critically select the information offered by the media. The virtual environment is favourable for the development of risk behaviour, endangering not only the individuals, but also their surroundings.

Cyberbullying is a serious educational and social problem, accompanying the development of information-communication technologies. It is important to pay attention to its prevention and ways of dealing with this issue at schools. It is the school that should provide a safe space for the prevention of social-pathological phenomena and therefore of cyberbullying. Prevention at schools should be realized as a planned, purposeful, systematic and continual process. K. Hollá (2016, p. 138) offers an updated model of cyberbullying prevention at schools by modifying a three-level model presented by Ch.F. Brown and M. K. Demaray. This model constitutes of the following levels and steps:

1. the elaboration of the cyberbullying prevention plan:
  - a) to become acquainted with cyberbullying;
  - b) to map the cyberbullying occurrence at schools;
  - c) to create a prevention and intervention programme;
2. the implementation of prevention and intervention techniques - the implementation comprises:
  - a) the education in the issue of cyberbullying;
  - b) the creation of different procedures and interventions;
  - c) the determination of sanctions;
3. reporting of cyberbullying cases in the school environment that includes the following steps:
  - a) anonymous system of reporting;
  - b) counselling and victim support;
  - c) formal procedures for dealing with cyberbullying.

K. Hollá (2016, p. 134-170) emphasizes that "the introduced model must fulfil the school's possibilities and reflect students' and teachers' needs." It will bring optimal results only if the prevention and intervention methods are carried out continuously, not only immediately after the incident. The three-level model focused on the prevention and intervention includes the school's attitude towards the cyberbullying prevention and educates the school employees, pupils, and their parents. This model can help predict, plan, prepare and educate pupils and teaching staff in cyberbullying prevention.

Cyberbullying prevention must have a wide focus and include many professionals, parents, teachers and also the wider community, with the aim to prevent cyberbullying before it has a chance to appear. Preventive efforts should be concentrated mostly on children and the young because they are more likely to be bullied. In this respect, it is very useful to create a community where the young people could learn various strategies of anger management, enforcement of positive behaviour and a sense of belonging to the community (Bullying: A Prevention Toolkit, 2011, p. 7).

The school may create a campaign to raise the awareness of teachers, parents, pupils, and to inform the school's employees about the forms of cyberbullying and the ways of dealing with it. The involvement of pupils in conceiving and keeping the rules for an adequate and responsible use of school information technologies creates a great advantage. The main aim should be the explanation of what cyberbullying is; to keep in mind that "it is forbidden to use the Internet for cyberbullying, to sum up the prevention strategies and cyberbullying solutions; and to determine sanctions for their non-compliance (Preventing Cyberbullying in Schools and the Community). In this respect, it is important to teach pupils to identify the threats arising from the use of modern technologies and to show them other forms of effective defence. School represents the institution in which pupils spend most of their day and thus also a key factor in revealing of risk behaviour. The primary mission of school education is to educate the pupils efficiently, provide them with information and also teach them how to select and critically recognize it. It is essential that pupils learn to evaluate things and phenomena, to evaluate themselves and others, which is a very important area of human cognitive abilities, in the process of education. These competences are necessary not only for their successful application in practice, but it is also important for those working in different educational institutions to be able to clearly explain to the public what they teach, how they teach and why the ability to think critically for society is important. The

development of critical thinking promotes discussion. Learners learn to evaluate information, express their own opinion and attitude, and last but not least take responsibility for their decisions. Based on the Learning Slovakia national programme of development in education and upbringing submitted for public discussion by the Ministry of Education, Science, Research and Sport of the SR, the sections 1–10.07 emphasize the creation of opportunities to address the current affairs in the educational programmes. The curriculum is supposed to provide certain space for the teachers to address the current affairs in Slovakia and abroad, comment on important events and use it as an opportunity to interconnect the subject matter with the actual world. In the section addressing forms, methods and organisation of the educational process (1–11.06), the programme emphasizes that more opportunities for the pupils to ask questions, discuss and present their own opinions and arguments needs to be provided. All these activities develop critical thinking.

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**Primary Paper Section: A**

**Secondary Paper Section: AM**

## DEVELOPMENT OF INNOVATIONS MONITORING SYSTEM AND ITS IMPLEMENTATION IN PRACTICE OF COMMERCIAL COMPANIES

<sup>a</sup>ALLA V. NIKONOROVA, <sup>b</sup>PAVEL V. STROEV, <sup>b</sup>DMITRY E. MORKOVKIN, <sup>c</sup>OLGA N. BYKOVA, <sup>d</sup>NATALIA I. ISAICHKOVA, <sup>e</sup>ALEXANDER A. KVAK, <sup>f</sup>OLEG O. SKRYABIN

<sup>a</sup>Moscow Witte University, Moscow, Russia

<sup>b</sup>Financial University under Government of the Russian Federation, Moscow, Russia

<sup>c</sup>Plekhanov Russian University of Economics, Moscow, Russia

<sup>d</sup>Gomel State Technical University named after P.O. Sukhoi, Gomel, Belarus

<sup>e</sup>Orel State University of the Economics and Trade, Orel, Russia

<sup>f</sup>National University of Science and Technology "MISIS", Moscow, Russia

email: <sup>c</sup>lgaa3@rambler.ru

**Abstract:** The article submits the development of an innovations monitoring system. The aim of its creation is in increase of competitiveness of commercial organizations. The proposed innovations monitoring system consists of eleven main units, each of the units performs its own role, starting from searching information and ending with correction of production processes. Implementation of the innovations monitoring system in practice of a commercial organization can become a new instrument in generation unique ideas, finding out new key factors and advantages for development in competitive environment, taking decisions and actions regarding how to allocate or develop resources. Implementation of such system can facilitate the process of generating competitive new products and services; it can help in automation and formalization of processes, reducing time for introduction of innovations, finding modern trends on the market, managing the impact upon the environment.

**Keywords:** innovative development, monitoring of innovations, innovative infrastructure, decision making management, innovative process, commercial companies.

### 1 Introduction

Identification of innovations suitable for implementation in a particular organization is a complex task. Competitiveness of commercial companies depends on prompt introduction of innovations. Presently vast amount of useful but not used information is available, new competitive products and technologies keep appearing on the market every day. The digital economy breaks the usual patterns of industry markets [1]. The emergence of innovation in one area can also be used effectively in other areas. Prompt analysis, comprehending and implementation of innovations can become significant competitive advantages for commercial companies. As people, business, and equipment are becoming more closely linked in a single digital space, digitalization offers broad opportunities for new decision-making models [2].

Systematic work on development of innovations monitoring system for innovations search can significantly increase effectiveness of a commercial company.

Active development of information technologies and their application in various fields of activity create prerequisites for further growth of the companies. But the fact is that innovations derived from new knowledge are accompanied with high costs and risks, which may significantly hamper the production of knowledge and reduce level of satisfaction with innovation of economic agents [3]. Since the process of introduction of new knowledge in practice is a risky arrangement, each decision about introduction of an innovation should be based on detailed analysis of a particular environment and situation. Besides, search for information about new developments, decisions connected with their expediency for introduction, and their introduction in practice take a long period of time. The rate of diffusion is also dependent on the cost-effectiveness of the new technology [4]. The model presented in this article is aimed at solving these problems. Its usage allows planning work within the predetermined framework of projects, managing a variety of tasks at the same time. Prompt choice and introduction of innovations is a difficult task even for huge companies with

numerous employees. Introduction of automated systems can significantly facilitate the decision-making process. Automation is not limited to automating obviously repetitive processes, like in the case of manufacturing companies. It also covers the areas of marketing, recording, reporting, and even product testing and evaluation [5]. Algorithmic processes can be applied to mine a large volume of digital data to find patterns and correlations within that data, distilling the patterns into predictive analytics, and applying the analytics to new data [6].

The present article describes the model for search and elaboration of efficient innovations.

The introduction of such a model in practice creates conditions for the development of new ideas, the active spread of innovations in the market and, as a result, improvement the efficiency of the economy. It is expediently for innovations monitoring system to perform on a regular basis. It can strengthen positions of a company on the market, maintain its sustainability, and facilitate adaption to market changes. It allows tracing immediate and long-term impacts of the company's activity on the environment. Development and implementation of continuously functioning system for search of innovations can be of help for many companies both in development of new products and services and in finding innovative ways for environmental protection.

### 2 Methods

The active development of a modern commercial company depends on the velocity of innovation process. As organizations move towards the global and more dynamic environment, they face specific challenges that inevitably need to cope with for their survival and progress [7]. Systematic work on development of a system of innovation search can significantly improve efficiency of enterprises, influence positively on their competitiveness.

Competitiveness of an enterprise can be considered as an integral system, which includes the following elements: structural construction of the enterprise; specific forms of management, which includes all the functional subsystems of the enterprise; legal norms; applied management methods; features of the management system based on economic methods of management [8]. Development and introduction of the innovations monitoring system has a practical orientation, it can be changed under the influence of factors in the external environment.

Innovative activity is a constantly renewed innovation process [9]. Business structures, in comparison with state institutions, have great mobility, efficiency in decision-making, they are characterized by a large initiative in the generation of innovations [10].

In the field of creation of effective searching systems huge amount works are fulfilled, but nevertheless the elaboration of new techniques is still required.

The introduction of innovations is the result of a long preliminary analysis and its implementation requires considerable resources.

In order to save them, it is possible to develop and implement a system that facilitates the search for potentially useful information for the company. To obtain such information it is necessary to define the criteria on the basis of which the search can be carried out.

The definition of these criteria depends on the specifics of the production processes of the organization. The criteria can be determined on the basis of cyclical operations features in the

production process, specific production methods, specific conditions in which the processes are carried out, methods for creating these conditions and so on.

The required information may be related to the field of activity of the company both directly and indirectly. The area of the interest in this field is quite extensive. It can include innovations that use similar technical elements, technologies, materials, etc.

The theme of development of formalized systems for their usage in management of commercial companies attracted attention of many scientists. Significant contribution in development of search technologies was made by such researchers as Gerard Salton, Vannevar Bush, Marc Lowell Andreessen, Larry Page, Sergey Brin, and Tim Berners-Lee.

The problems of development of control systems and search systems were studied by Ansoff I., Fedorova G. N., V. M. Glushkov.

The specifics in creating of monitoring systems was researched by Sharco E. E., Ivanova I. A., Eroshina S. E., Trushkin E. V.

A target problem of the present period of our country development is supply of high growth rates of the gross domestic product, the further accumulation of production efficiency and achievement on the basis of this high level and quality of life of the population [11]. Development of innovation monitoring system improves competitive positions of companies on the market; it contributes into acceleration of business activity, and creates conditions for increase in income of the population.

The introduction of innovations is impossible without extensive tentative analysis. The directions of improvement can be made in different directions, for example, they can be connected with simplification of procedures in implementation of new knowledge, innovations introduction, decrease in volume of performed work, increase the quality of product or process.

Development and introduction of formalized system of information search is able to facilitate fulfillment of decision making processes, it can be used as the tool for tracking environmental data for a company.

### 3 Results

The process of innovation introduction is influenced with a number of factors. They are connected with diffusion of innovations, improvement of technological processes, the development and implementation of new information technologies.

The result of the operation of the proposed innovations monitoring system is in simplification of the procedure of finding and implementing new knowledge, accelerating the procedure of innovation, reducing the amount of the performed work, improvement the accuracy of modeling by improving the used methods.

Implementation of innovations monitoring system can be used for intelligent resource management, pollution control, and waste minimization.

Generating and finding ideas is a complex task. In order to simplify the process of search and implementation of innovations in practice, the model of a system for monitoring innovations has been developed.

In the process of fulfilling the present research the materials of a number of patents on related topics and the data of statistics have been studied. It helped to make conclusions regarding the improvement of the methods of finding the information which is necessary for the development of commercial companies.

The functioning of such system is assumed on a permanent basis. Most of society's innovation systems are "open" in the

sense that they are designed to facilitate knowledge disclosure among innovators [12]. The search for new knowledge is carried out continuously in open sources.

The system consists of eleven main blocks. The process of functioning of the innovations monitoring system is schematically shown on the Figure 1.

The first one is an input unit which includes unit of search for information in open sources, a data processing unit, an information storage unit, and an analytical unit. The setting unit includes the unit for setup of the system and the unit for correction of information search processes.

This function can be fulfilled with the special processing software that adjusts the information retrieval processes. The production process unit consists of the unit for identifying cycles and the unit for determining requiring improvement areas.

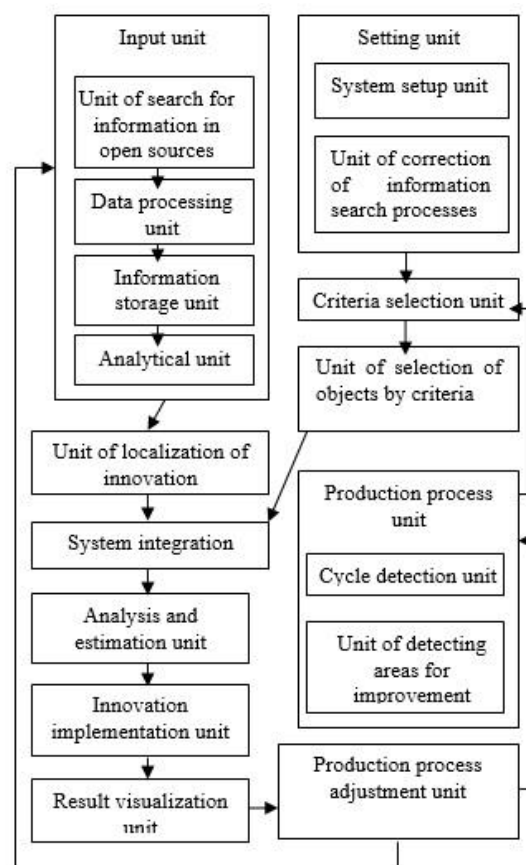


Figure 1 – The model of innovations monitoring system.

The setting unit and the production process unit transfer the information to the criteria selection unit, which in turn sends it to the unit of selection of objects by criteria. The system integration unit combines the results received from the unit of localization of innovation and the unit of selection of objects by criteria. Then the data are analyzed, estimated and sent to the innovation implementation unit. The proposed changes are drawn and visualized in the model of a new or improved product or a business process. If the results of proposed changes are positive the necessary adjustments of the production process are provided. The innovations monitoring system is to perform permanently, the described cycle is to be repeated in similar way within the production process. Management should continuously monitor and test the system [13].

Thus, the whole system is a closed cycle and can operate continuously.

#### 4 Discussion

Nowadays the implementation of information technology is opening up vast vistas for business development and helping boost the efficiency of activities [14]. The active use of various communication tools can significantly improve the management processes in a company.

Implementation of innovations monitoring system in practice of commercial companies creates basis for active development, rapid adaptation to dynamically changing environment, helps in finding new methods of intelligent resource management.

To obtain the information that can be useful for strengthening the competitive position of a commercial company in the market it is necessary to pay more attention to the processes of search, analysis, processing, and implementation of existing innovations in the market.

Continual search of potentially useful information creates conditions for sustainable development of a commercial company. The use of innovative technologies allows reducing consumption of resources and improving the quality of the implemented processes [15, 16].

Introduction of innovations monitoring system does not completely exclude the analytical work of experts, but the process can be significantly simplified with usage of formalized systems.

Generation of new ideas is a creative process with limited potential for automation and formalization. The proposed system helps in finding information which can become the basis for development of unique ideas. It consists of combination of hardware, software, and human recourses.

#### 5. Conclusion

In modern conditions it is crucial for commercial companies to find new ways to increase their competitive advantages. The development of innovations monitoring system and its implementation in practice can help in finding new opportunities.

Innovations monitoring system is a long-term or constantly functioning system. Its usage in practice of a commercial organization can be of help in generating new ideas, finding out new key factors and advantages for development in conditions of competitive environment, searching new methods of waste reduction, tracking environmental data.

Implementation of innovations monitoring system can facilitate the process of creating competitive new products and services, finding new prosperous techniques, reducing time for introduction of innovations.

The described innovations monitoring system consists of eleven main units. Each unit performs its own role.

In the input unit the information is searched from open sources, processed, stored, and tentatively analyzed. The results of the analysis are adapted to the interests and specifics of the enterprise in the unit of localization of innovation. Setting unit is responsible for the system setup and correction of information search processes. This function is fulfilled with the special processing software. The function of production process unit consists in detection of cycles and detecting areas for improvement. The results received on the level of production process unit and setting unit are processed in the criteria selection unit, and then in the unit of selection of objects by criteria. The system integration unit combines the results received from the unit of localization of innovation and the unit of selection of objects by criteria. Then the data are analyzed, estimated and sent to the innovation implementation unit. The possible changes are formed and visualized in the model of future product or a business process. If the results of proposed

changes are expedient the necessary adjustments of the production process are provided. The innovations monitoring system is to perform constantly, and the described cycle is to repeat in similar steps within the production process.

Implementation of new technologies for prompt information search and revision influences positively on competitiveness of commercial organizations.

Usage by companies of data processing techniques such as implementation of innovations monitoring system can help in finding modern trends on the market and reducing negative influence on the environment.

#### Literature:

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## THE IMPORTANCE OF GLOBAL ISSUES IN PREGRADUAL PREPARATION FROM THE POINT OF VIEW OF UNIVERSITY STUDENTS

<sup>a</sup>LUCIA GALKOVÁ, <sup>b</sup>MICHAL NOVOCKÝ, <sup>c</sup>GABRIELA CITTERBERGOVÁ, <sup>d</sup>KATARINA KURČÍKOVÁ

*Matej Bel University, Faculty of Education, Ružová 13, 974 11 Banská Bystrica, Slovakia*

*email: <sup>a</sup>lucia.galkova@umb.sk, <sup>b</sup>michal.novocky@umb.sk, <sup>c</sup>gabriela.citterbergova@umb.sk, <sup>d</sup>katarina.kurcikova@umb.sk*

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**Abstract:** The aim of the study was to analyse the relevance of global issues among university students for their field of study. The research sample consisted of 581 students of Matej Bel University (Faculty of Economics, Faculty of Arts, Faculty of Education, Faculty of Natural Sciences and Faculty of Political Sciences and International Relations) in Banská Bystrica. For the data collection we used a scale questionnaire mapping the degree of importance of global issues among students in relation to their fields of study (Andreotti et al., 2013). Exploratory factor analysis was used to analyse its internal structure. The value of Cronbach's alpha per dimension ranged from 0.74 to 0.85. We identified a statistically significant difference in the relevance of global issues among students for their field in favour of human rights and economic-social development issues. We noticed a statistically significant difference in the relevance of the global issues in terms of student gender for their field of study in the human rights dimension for the benefit of the female students. The statistically significant difference in the relevance of global issues in terms of student discipline for their field was confirmed in the dimensions of economic-political and economic-social development in favour of non-pedagogical students and in the human rights dimension in favour of students with pedagogical disciplines. There was no statistically significant difference in the relevance of global issues in terms of students' degree courses for their field of study.

**Keywords:** global issues, students, global dimension of education, exploratory factor analysis

### 1 Introduction

Developments around the world still pose new challenges and problems to society. The 21st century is characterised by the phenomenon of globalisation, which speaks of the interconnectedness of countries, cultures, history, economies, policies and, last but not least, education. We share the opinion of Lysý et al. (2007) that we are more intensively aware of the global context today than in the past.

According to Kosová (2013), globalisation is a complicated and multidimensional process, with many contradictory consequences. On the one hand, it has contributed to creating conditions for improving the quality of life, as relations between states have expanded, leading to economic transformation, abolishing state interference in the free movement of goods and services, spreading people's experiences across borders, reducing distance and time among them, contributing to a broad identification of social relationships (Scholte, 2005), but on the other hand, environmental problems, increased poverty, unemployment, loss of social security, emigration, armed conflicts, abuse of technology or empowerment have appeared (Beck, 2000; Harris, 2017). The fact remains that it is not easy to assess the benefits of globalisation because the same phenomenon as Petrusek (2003) claims can have both positive and negative consequences for the planet and human life.

We agree with Pike and Selby (1994) that everything that takes place on a global scale is a product of man, and it retroactively affects it at the local level, which suggests the postulate of each individual's responsibility for the future of the world. This is confirmed by the fact that the solution of global problems characterised by systemic nature depends on the constant involvement of experts in their detailed analysis, as the linear vision of global problems is directed to a vicious circle where the action causes the reaction which is the cause of other consequences. The multilateral interconnectedness of continents, where global affairs become part of our daily lives, has the consequence of a need to think about a global citizen.

One means of achieving this is to change education to prepare people for a constantly changing world (Porubský et al., 2013; Poláková et al., 2018). In agreement with experts (Danek, 2011; Kosová, 2015; Fridrichová, 2018), we believe that the priority in education should be to develop critical thinking, which contributes to functional literacy, balancing socialisation and personalisation, where the aim is to learn to live with others, but at the same time remaining with oneself, using cognition with the aim of deepening the flexibility and ability to work effectively and linking the development of the cognitive and affective aspects of the personality of a human being guided by human values.

The effectiveness of change in the world depends to a lesser extent on the prevailing philosophy of education, which is developed mainly in universities, where space is offered to reflect on the image of man as being conscious of its history and the ability to create values which affect several areas such as ethics, politics, economics, technology and the functioning of education and its development.

The global dimension in education is significant (Petrucijová, 2009; Ogrodzka-Mazur, 2009; Pashby & Andreotti, 2016). As Tichá (2018) argues, globalisation and education are mutually determined through goals in preparing young people for the future, and therefore the school should be at the forefront of defining the essence of the global dimension in all spheres of society.

The thesis that education is a tool for the reconstruction of society and its better organisation was proclaimed already in the 19th and 20th centuries. Human culture was not able to adapt to technological change, and thus civilisation began to find itself in a deep crisis. The accent was put on the subject matter of socio-economic problems of society. The inclusion of global issues in the content of education should contribute to changing students' approach to solving these problems (Bajtoš, 2013).

Průcha (2015), who emphasizes the presence of the European dimension in education for change, recommends introducing topics into the curriculum of subjects covering the issues of European culture, international understanding, tolerance and cooperation. By contracting the ideas of Dewey (1934), the curriculum should lead to the development of students' social competences. It is intended to be a means by which they can be directed to be able to visualise activities within a particular social reality.

We add Castells' assertion (2010) that global education should be represented not only in primary school subjects but also in universities that play an important role in the transfer of knowledge about globalisation and the phenomena associated with it. It offers a way to make changes at local and global level in terms of citizenship building. In this way, people learn responsibility that cannot be left to governments and other decision-makers (Cabezudo et al., 2010; Andreotti, 2014).

The result of this process is education, as defined by Kaiser and Kaiser (1993, p. 69), based on a dialectical synthesis of maturity and emancipation. It is a state of personality that makes us act on the basis of understanding and competence with the participation of the principle of self-determination. A person characterised by such an education is expected, based on the goals of global education (Hoffmanová, 2003; Suchožová, 2013), to:

- develop their ability to perceive things in a historical context,
- can enter into the nature of conflicts and approach them constructively,
- look at global issues from the perspective of several humanities,

- understand their value and honours the value of others around them,
- control and respect human rights,
- can identify and, at the same time, eliminate prejudices,
- be aware that the planet's problems directly or indirectly affect them.

This issues is further specified in Agenda 2030 adopted by the Member States of the United Nations in 2015, calling on states to work together in a coordinated way to address global challenges. The 2030 Agenda for Sustainable Development offers a better future not only for billions of people around the world, but also for the planet itself. The 17 Sustainable Development Goals (SDGs), unanimously adopted by 193 countries, represent a new universal standard for development that thinks of all the planet's inhabitants (The Sustainable Development Agenda, 2015).

The Minister of Foreign Affairs of the Slovak Republic, Mr. Lajčák, commented as follows. "In my understanding, Agenda 2030 is a guide to a fair life in peace by eliminating inequalities, hunger and poverty. In the end, it also represents a concrete contribution to national or world security" (Ministry of Foreign and European Affairs of the Slovak Republic, 2017).

It is noticeable that it is necessary to emphasise, following the statements of Khun (1994), on the axiological and ethical background of the educational process so that the adolescent does not fall to the level of routine, insufficiently revising the social applicability of knowledge. The aim of education is to remain social, cultural and responsible for its actions.

Global education is education that "emphasises the global context in teaching and learning. Global education topics provide scope for changing the individual's attitudes and strengthening awareness of one's own role in the world" (National Strategy for Global Education 2012-2016, p. 1).

At the same time, this strategy defines basic global topics such as globalisation and interdependence (aspects of globalisation; economic globalisation - world trade; sustainable development and migration), global problems and development cooperation (development cooperation and humanitarian aid of the SR and EU; volunteering in development cooperation and humanitarian aid; fair trade and ethical entrepreneurship; development, concept development, principles; millennium development goals; poverty and inequality; health: HIV / AIDS, malnutrition; conflicts in the world: forms and methods of conflict resolution), multiculturalism (stereotypes and prejudices; racism, intolerance; cultural identity, cultural differences, religious differences), environment with respect to global aspects (climate change; waste; environmental migration; air, water, land; use of natural resources; alternative energy sources) and human rights (human and civil rights; children's rights, gender equality; democracy and good governance).

Our intention was to map the perception of the relevance of global issues to Matej Bel University students from the aspect of fields of study, which may contribute to identifying what global issues they would be interested in studying, but at the same time, these findings may provide material for analysis of whether they perceive the appropriateness of the issues mainly through the prism of their fields of study or reflect the need for a broader competence profile.

## 2 Research methodology

To determine the relevance of global issues among students we used a scale questionnaire by Andreotti et al. (2013). It was created as part of the Ethical Internationalism in Higher Education Research Project to discover which global topics are relevant to university students in terms of their field of study. It consisted of 24 items to which respondents should respond on the 5-degree Likert scale (1 – strongly disagree, 2 – disagree, 3 – neither disagree, nor agree, 4 – agree, 5 – strongly agree). The questionnaire was provided to us by CEEV Živica as part of the

University Global Education Network project, which was approved by the Slovak Agency for Development Cooperation SAMRS / 2017 / RV1.

The workability of this questionnaire was conditioned by the fact that the given area is not given much attention in Slovakia and the questionnaire items representing key global topics were based on an analysis of renowned foreign experts focusing on global education and related issues. It has also been shown, based on the content analysis of the items, that global themes can be categorised as being named according to the typology of global problems (e.g. environmental, social, cultural, economic problems, or their combination) (Kudláčková, 2007; Seitz & Hite, 2012).

Empirical research was carried out with students of 5 faculties of Matej Bel University in Banská Bystrica in 2016 – 2017. We evaluate the research file as available, taking into account the possibilities of researchers and the willingness of respondents to participate in the research.

We administered the questionnaire to the respondents online. It was not piloted since it had already been used in research at other universities in Slovakia (e.g. at the Faculty of Ecology and Environmental Sciences at the Technical University in Zvolen, at the Faculty of Management at Comenius University, at the Slovak University of Agriculture in Nitra) and proved to be undemanding in terms of the importance of each item. In the course of our research we were not confronted by any problems from the respondents in completing it. Respondents were made aware when repeating the questionnaire that if they had already filled in the questionnaire, they should not respond to avoid duplication of answers, which seems to be a neuralgic place in the questionnaire research.

The research sample consisted of 581 respondents (see Table 1). The non-pedagogical fields (72.98%) included study programmes focusing on economics, management, tourism, political sciences and international relations and social work. The pedagogical fields (27.02%) included study programmes focusing on teaching academic subjects (various combinations), primary education, education and andragogy.

Table 1: Structure of the research sample

| Category       |                 | N   | %     |
|----------------|-----------------|-----|-------|
| Gender         | female          | 505 | 86.92 |
|                | male            | 76  | 13.08 |
| Field of study | non-pedagogical | 424 | 72.98 |
|                | pedagogical     | 157 | 27.02 |
| Degree course  | bachelor        | 397 | 68.33 |
|                | master          | 184 | 31.67 |

The 2014 Summary Report on the State of Gender Equality in Slovakia points to the fact that in 2013 of the total number of female students at universities, up to 62.8% studied humanities. The situation has not changed significantly in recent years. In our research group, women (N = 367; 63.17%; N = 138; 23.75%) were more prominent in the non-pedagogical and educational fields. According to Tokárová (2006), a profession where women start to dominate gradually changes its characteristics. Such professions (e.g. accountant, clerk, teacher, social worker) lose social prestige, reducing the amount of money the state invests in employee development and wages, leading to worsening of their working conditions.

As Ližbetinová's research (2017), conducted at the Faculty of Economics and Agriculture, indicated, it is important for male students as well as female students to obtain a university degree, but the motivation of female students to study at university has been reinforced by their desire for knowledge. They favoured the given field more for personal interest than students who were mostly motivated by external motivation (family tradition, trying to obtain any university degree, failure at an entrance interview at another university).

For female students, the motive for helping others prevails, while for male students, motives such as prestige or getting a well-paid position come to the fore. Male students participate in activities in academic bodies in a larger number. These conclusions are presented by Bianchi et al. (In Bianchi et al., 2008), based on research conducted among medical and nursing students. The opinion of Skelton (2002) is that women in any relevant profession cause a change in how work is approached and what quality of workers should be at the forefront. Taking these facts into account, gender can be an important variable that affects the preference of global issues among students in the relevant field of study at universities.

Another variable that was well-founded in the research was the field of study. Sciences, dealing with human upbringing, is an axiological dimension. The problem of pedagogical sciences will remain a problem of values, therefore axiology bears the status of their ideological basis. A serious problem of today's education is the effort to overcome individualism and group interests by the morality of general humanity (Kučerová, 2011). We are of the opinion that education sciences are very close to human rights and social justice issues (in the rights themselves, it is about maintaining and applying standards that are progressive values and ensure the survival and functioning of society), but the aim of education should be a well-developed personality. Functional literacy, which must not be unidirectional, is a precondition for this development. The need for political (Tam, 2016) and economic literacy (Korimová, 2018) of young people comes to the forefront, because a holistic view needs to be applied to address global problems in the world.

When selecting a global issues for a given field, we consider it important to take into account the students' degree course. Students studying for a master degree who are already familiar with the subjects and teaching strategies in their field of study, carrying out practice, may be more reflective of the needs of the

field and their competence profile, assessing what they lacked in their training and what they should pay more attention to. Global issues play the role of an innovative tool, allowing the broader context of science to be seen.

Slavkovský (2005), developing Gödel's idea of the incompleteness of human knowledge, says that questions arise before us that we cannot simply answer at each of its levels. A wider system of beliefs usually brings more acceptable answers, but at the same time it poses new challenges, which is a way to further develop knowledge. In deciding what global issues to favour in the field of study, students studying for a bachelor degree may be confronted with the initial notion of higher education functions, given the expectations and primary experience. Aguerrondová (2010) draws attention to the fact that there is a change in the mission of university education, which is not merely to explain the reality, cumulating new theories, but its main purpose is to create opportunities for its effect, which fundamentally changes the relationship between man and the world. The contrast between academic and applied cognition is lost.

We defined the following research questions:

VO1: Is there a statistically significant difference in the relevance of global issues among students for their field?

VO2: Is there a statistically significant difference in the relevance of global issues in terms of student gender for their field?

VO3: Is there a statistically significant difference in the relevance of global issues in terms of the students' field of study for their field?

VO4: Is there a statistically significant difference in the relevance of global issues in terms of the students' degree course for their field?

Table 2: Global issues (rotated matrix of factor loads)

| Items saturating the factors                | Factors  |        |        |        |        |
|---|----------|--------|--------|--------|--------|
|   | $\alpha$ | I.     | II.    | III.   | IV.    |
| (I) Economic and political issues           | 0.854    |        |        |        |        |
| distribution of wealth                      |          | 0.743  | 0.066  | -0.042 | 0.233  |
| excessive government expenditure            |          | 0.723  | -0.086 | 0.111  | 0.278  |
| corporate greed                             |          | 0.707  | 0.287  | -0.007 | 0.214  |
| excessive consumption                       |          | 0.664  | 0.180  | -0.023 | 0.266  |
| loss of employment                          |          | 0.654  | 0.047  | 0.346  | 0.037  |
| unequal power relationships                 |          | 0.622  | 0.150  | 0.368  | 0.137  |
| wasting resources                           |          | 0.585  | 0.295  | 0.018  | 0.299  |
| (II) Potential threat issues                | 0.808    |        |        |        |        |
| disease outbreaks                           |          | 0.057  | 0.837  | 0.178  | 0.051  |
| terrorism                                   |          | 0.043  | 0.791  | 0.220  | 0.158  |
| excessive surveillance of persons           |          | 0.219  | 0.703  | 0.118  | -0.096 |
| climate changes                             |          | 0.002  | 0.648  | 0.125  | 0.377  |
| migration                                   |          | 0.182  | 0.486  | 0.359  | 0.080  |
| (III) Human rights issues                   | 0.770    |        |        |        |        |
| human rights                                |          | 0.057  | 0.229  | 0.744  | 0.029  |
| discrimination                              |          | 0.171  | 0.339  | 0.717  | -0.155 |
| access to education                         |          | -0.101 | -0.007 | 0.676  | -0.001 |
| international solidarity                    |          | 0.030  | 0.181  | 0.649  | 0.259  |
| poverty                                     |          | 0.287  | 0.246  | 0.573  | 0.118  |
| (IV) Economic and social development issues | 0.739    |        |        |        |        |
| barriers to trade                           |          | 0.338  | -0.062 | -0.186 | 0.751  |
| economic growth                             |          | 0.374  | -0.094 | -0.081 | 0.746  |
| technological advances                      |          | 0.064  | 0.173  | 0.203  | 0.641  |
| global mobility                             |          | 0.132  | 0.240  | 0.195  | 0.614  |
| <i>eigenvalue</i>                           |          | 3.66   | 3.08   | 2.90   | 2.56   |
| <i>% variance</i>                           |          | 17.44  | 14.64  | 13.83  | 12.18  |

We used exploratory factor analysis to analyse the internal structure of the research tool. The most satisfactory method was the principal component method using orthogonal equamax rotation, which represents a combination of varimax and

quartimax rotation, minimising the number of variables highly correlating with one factor and the number of factors needed to explain the variable (Szeliga, 2010; Hanák, 2016). Standard exhausted data variability was shown (58.09%). The Bartlett

sphericity test refutes the hypothesis that the correlation matrix is a unit matrix ( $0.000 < 0.001$ ). The KMO test of the rate of adequacy of selection (0.886) shows the very good suitability of using factor analysis for the data obtained. We identified 4 latent variables (see Table 2).

The minimum factor load for an item to be included in one of the factors was 0.40. The item could not have a factor load higher than 0.40 simultaneously in two or more factors. On the basis of this criterion, we excluded three items (international cooperation, the difference between rich and poor, racism). For the whole

research instrument, Cronbach's alpha was 0.878. Its value per dimension ranged from 0.74 to 0.85. We performed statistical data analysis in SPSS 19.0. From descriptive statistics, we used the arithmetic mean (AM), standard deviation (SD), median (Me), minimum (Min) and maximum (Max) of the measurement. Non-parametric Mann-Whitney U test and Spearman correlation coefficient were applied from inductive statistics (since the variables did not show distribution normality for each set and subsets  $p < 0.05$ , which we verified by Kolmogorov-Smirnov test). We verified the statistical significance of differences and relationships between variables at a significance level of 0.05.

Table 3: Interrelations between dimensions of a range of global issues

| Relationships between issues           |                     | Economic and political issues | Potential threat issues | Human rights issues | Economic and social development issues |
|--|---------------------|-------------------------------|-------------------------|---------------------|--|
| Economic and political issues          | <i>Spearman rho</i> | 1.000                         | 0.314                   | 0.301               | 0.530                                  |
|  | <i>p-value</i>      | .                             | 0.000*                  | 0.000*              | 0.000*                                 |
|  | <i>N</i>            | 581                           | 581                     | 581                 | 581                                    |
| Potential threat issues                | <i>Spearman rho</i> | 0.314                         | 1.000                   | 0.499               | 0.225                                  |
|  | <i>p-value</i>      | 0.000*                        | .                       | 0.000*              | 0.000*                                 |
|  | <i>N</i>            | 581                           | 581                     | 581                 | 581                                    |
| Human rights issues                    | <i>Spearman rho</i> | 0.301                         | 0.499                   | 1.000               | 0.104                                  |
|  | <i>p-value</i>      | 0.000*                        | 0.000*                  | .                   | 0.012*                                 |
|  | <i>N</i>            | 581                           | 581                     | 581                 | 581                                    |
| Economic and social development issues | <i>Spearman rho</i> | 0.530                         | 0.225                   | 0.104               | 1.000                                  |
|  | <i>p-value</i>      | 0.000*                        | 0.000*                  | 0.012*              | .                                      |
|  | <i>N</i>            | 581                           | 581                     | 581                 | 581                                    |

The correlations between the dimensions of the research instrument demonstrate a logical context (see Table 3). The dimension of economic-political issues shows the closest relationship with the dimension of economic-social development. Both dimensions are weaker in correlation with the dimension of potential threat and human rights issues, and this is evident in the latter dimension. A stronger correlation has been identified between the dimension of human rights issues and potential threats.

### 3 Results of the research

We can state that there was a statistically significant difference ( $0.000 < 0.05$ ) in the relevance of global issues among students for their field of study (see Table 4). Respondents achieved the highest scores for the dimensions of human rights (AM = 3.88; Me = 4.00) and economic and social development (AM = 3.68; Me = 3.75). They achieved lower scores for the dimension of economic-political development (AM = 3.60; Me = 3.71). They scored the lowest for the dimension of the issue of potential threats (AM = 3.33; Me = 3.40).

Table 4: Differences in the relevance of global issues for their field of study among students

| Economic and political issues          |      |      |      |      |      | Friedman test<br>(chi-square) | p-value |
|--|------|------|------|------|------|-------------------------------|---------|
| N                                      | AM   | SD   | Me   | Min  | Max  |                               |         |
| 581                                    | 3.60 | 0.77 | 3.71 | 1.00 | 5.00 | 181.750                       | 0.000*  |
| Potential threat issues                |      |      |      |      |      |                               |         |
| N                                      | AM   | SD   | Me   | Min  | Max  |                               |         |
| 581                                    | 3.33 | 0.85 | 3.40 | 1.00 | 5.00 |                               |         |
| Human rights issues                    |      |      |      |      |      |                               |         |
| N                                      | AM   | SD   | Me   | Min  | Max  |                               |         |
| 581                                    | 3.88 | 0.69 | 4.00 | 1.00 | 5.00 |                               |         |
| Economic and social development issues |      |      |      |      |      |                               |         |
| N                                      | AM   | SD   | Me   | Min  | Max  |                               |         |
| 581                                    | 3.68 | 0.79 | 3.75 | 1.00 | 5.00 |                               |         |

It is clear from Table 5 that there is a statistically significant difference in the relevance of human rights issues in terms of student gender for their field ( $0.000 < 0.05$ ). Female respondents scored higher for this dimension (AM = 3.93; Me = 4.00) than the male respondents (AM = 3.57; Me = 3.60). In other dimensions the statistically significant difference was not confirmed.

It is evident from Table 6 that there is a statistically significant difference in the relevance of economic-political ( $0.000 < 0.05$ ), human rights ( $0.000 < 0.05$ ) and economic-social development ( $0.000 < 0.05$ ) in terms of the students' field of study for their field.

Respondents studying the non-pedagogical field scored higher for the dimensions of economic policy and economic and social development (AM = 3.75; 3.92) compared to respondents studying the field of education (AM = 3.18; 3.05). The median value is the same (Me = 3.86; 4.00). Respondents studying the pedagogical field scored higher for the dimension of human rights (AM = 4.07) than respondents studying the non-pedagogical field (AM = 3.81).

Based on the results of the research presented in Table 7, there is no statistically significant difference in the relevance of global issues in terms of the students' degree course for their field of study. Respondents achieved similar scores for all four dimensions, depending on their degree course.

Table 5: Differences in the relevance of global issues for their field of study in terms of student gender

| Gender | Economic and political issues          |      |      |      |      |      | Mann-Whitney U test | p-value |
|--------|--|------|------|------|------|------|---------------------|---------|
|        | N                                      | AM   | SD   | Me   | Min  | Max  |                     |         |
| female | 505                                    | 3.60 | 0.77 | 3.71 | 1.00 | 5.00 | 18,803.500          | 0.776   |
| male   | 76                                     | 3.60 | 0.78 | 3.86 | 1.00 | 5.00 |                     |         |
| Gender | Potential threat issues                |      |      |      |      |      | Mann-Whitney U test | p-value |
|        | N                                      | AM   | SD   | Me   | Min  | Max  |                     |         |
| female | 505                                    | 3.34 | 0.85 | 3.40 | 1.00 | 5.00 | 18,346.500          | 0.535   |
| male   | 76                                     | 3.26 | 0.80 | 3.40 | 1.20 | 4.80 |                     |         |
| Gender | Human rights issues                    |      |      |      |      |      | Mann-Whitney U test | p-value |
|        | N                                      | AM   | SD   | Me   | Min  | Max  |                     |         |
| female | 505                                    | 3.93 | 0.67 | 4.00 | 1.00 | 5.00 | 13,973.500          | 0.000*  |
| male   | 76                                     | 3.57 | 0.74 | 3.60 | 1.60 | 5.00 |                     |         |
| Gender | Economic and social development issues |      |      |      |      |      | Mann-Whitney U test | p-value |
|        | N                                      | AM   | SD   | Me   | Min  | Max  |                     |         |
| female | 505                                    | 3.69 | 0.79 | 3.75 | 1.00 | 5.00 | 18,545.000          | 0.634   |
| male   | 76                                     | 3.65 | 0.77 | 3.75 | 1.50 | 5.00 |                     |         |

Table 6: Differences in the relevance of global issues for the field of study in terms of students' field of study

| Field of study  | Economic and political issues          |      |      |      |      |      | Mann-Whitney U test | p-value |
|-----------------|--|------|------|------|------|------|---------------------|---------|
|                 | N                                      | AM   | SD   | Me   | Min  | Max  |                     |         |
| non-pedagogical | 424                                    | 3.75 | 0.68 | 3.86 | 1.00 | 5.00 | 19,704.000          | 0.000*  |
| pedagogical     | 157                                    | 3.18 | 0.85 | 3.29 | 1.00 | 5.00 |                     |         |
| Field of study  | Potential threat issues                |      |      |      |      |      | Mann-Whitney U test | p-value |
|                 | N                                      | AM   | SD   | Me   | Min  | Max  |                     |         |
| non-pedagogical | 424                                    | 3.33 | 0.83 | 3.40 | 1.20 | 5.00 | 32,668.500          | 0.731   |
| pedagogical     | 157                                    | 3.34 | 0.88 | 3.40 | 1.00 | 5.00 |                     |         |
| Field of study  | Human rights issues                    |      |      |      |      |      | Mann-Whitney U test | p-value |
|                 | N                                      | AM   | SD   | Me   | Min  | Max  |                     |         |
| non-pedagogical | 424                                    | 3.81 | 0.68 | 4.00 | 1.00 | 5.00 | 25,291.500          | 0.000*  |
| pedagogical     | 157                                    | 4.07 | 0.70 | 4.00 | 1.00 | 5.00 |                     |         |
| Field of study  | Economic and social development issues |      |      |      |      |      | Mann-Whitney U test | p-value |
|                 | N                                      | AM   | SD   | Me   | Min  | Max  |                     |         |
| non-pedagogical | 424                                    | 3.92 | 0.64 | 4.00 | 1.75 | 5.00 | 13,081.500          | 0.000*  |
| pedagogical     | 157                                    | 3.05 | 0.80 | 3.00 | 1.00 | 5.00 |                     |         |

Table 7: Differences in the relevance of global issues for their field of study in terms of the students' degree course

| Degree course | Economic and political issues          |      |      |      |      |      | Mann-Whitney U test | p-value |
|---------------|--|------|------|------|------|------|---------------------|---------|
|               | N                                      | AM   | SD   | Me   | Min  | Max  |                     |         |
| bachelor      | 397                                    | 3.58 | 0.78 | 3.71 | 1.00 | 5.00 | 34,634.500          | 0.314   |
| master        | 184                                    | 3.65 | 0.76 | 3.71 | 1.00 | 5.00 |                     |         |
| Degree course | Potential threat issues                |      |      |      |      |      | Mann-Whitney U test | p-value |
|               | N                                      | AM   | SD   | Me   | Min  | Max  |                     |         |
| bachelor      | 397                                    | 3.34 | 0.84 | 3.40 | 1.00 | 5.00 | 35,532.000          | 0.597   |
| master        | 184                                    | 3.31 | 0.87 | 3.40 | 1.00 | 5.00 |                     |         |
| Degree course | Human rights issues                    |      |      |      |      |      | Mann-Whitney U test | p-value |
|               | N                                      | AM   | SD   | Me   | Min  | Max  |                     |         |
| bachelor      | 397                                    | 3.85 | 0.68 | 4.00 | 1.00 | 5.00 | 33,146.000          | 0.071   |
| master        | 184                                    | 3.95 | 0.72 | 4.00 | 1.00 | 5.00 |                     |         |
| Degree course | Economic and social development issues |      |      |      |      |      | Mann-Whitney U test | p-value |
|               | N                                      | AM   | SD   | Me   | Min  | Max  |                     |         |
| bachelor      | 397                                    | 3.64 | 0.78 | 3.75 | 1.00 | 5.00 | 33,259.000          | 0.081   |
| master        | 184                                    | 3.76 | 0.79 | 4.00 | 1.00 | 5.00 |                     |         |

#### 4 Discussion

Based on the opinions of experts in the philosophy of education (Skalková, 2004; Gálíková-Tolnaiová, 2007) and the sociology of education (Hroncová & Emmerová et al., 2010; Vančíková, 2011), the postmodern society is characterised by relativism that affects people's ideas about the future of the world, expressing a sceptical view, proclaiming the loss of claim to universal truth and values. Gálik (2003) even takes a more critical stance, emphasising that individualist tendencies dominate Western culture.

We share the opinion of Kudláčová (2006) that under the influence of internationalisation, we also allow to claim globalisation, education is forced to change the attitude to education, where it will understand it as a worthwhile value. Adhering to Keller and Tvrdý (2008), universities should strive

to include important cultural content in education which can contribute to changes in society. This can be done, for example, by integrating global issues in the subject curriculum, taking into account the students' inclination to issues so that their integration into higher education subjects is not an end in itself.

Our research has shown that students would prefer human rights and economic-social development issues in their field of study. We explain this by the fact that female respondents clearly dominated the research sample. Taking into account the bases for the variables presented in the methodological part, as well as the prevailing stereotype in society, which have an impact on female and male polarity, women are destined to develop social competences in particular (Stiegler, 2009). But economics is not only about resources and services, but by translating this framework into it, we are confronted with the regulation of

social relations and relationships with ourselves (Michalitsch, 2009).

Examining the differences in the relevance of the global issues in terms of student gender for their field of study showed that female respondents scored statistically significantly higher in the dimension of human rights issues compared to the male respondents.

As justification it can be mentioned there is an increasingly frequent point for women to participate in the political, economic and cultural life of society (Kiczková, 2011). The growing interest of women in human rights issues is undeniable, especially among younger women with higher education (Bitušíková, 2005), who do not limit human rights issues exclusively to women's rights but are open to topics such as politics and decision-making, entrepreneurship, education, charity, or health and the environment.

Students' interest in human rights issues should be strengthened. This is a topic that touches on the needs of man in the most general sense of the word and the possibility of making society so-called better. At present, social and civic engagement is at the forefront, but along with it is the demand for a personality to be characterised by the capacity to cooperate in emerging problems. Although human rights issues evoke mainly norms and rules, it actually aims to understand other people's situation and their needs.

Čerešník (2011), in analysing the psychological concept of androgyny from the perspective of several domestic and foreign researches, concluded that men and women are different, whether we talk about physiology, psychological attributes or social behaviour. However, the fact remains that androgyny enters the well-being process as an indirect factor. Rather, women are characterised by expressiveness that is associated with features such as sensitivity or cooperation, while for men, the instrumentality manifested in the pursuit of independence and self-promotion is essential. Taking into account that modern personality models do not separate emotionality and cognitive abilities, recognising their complementarity, when their optimal course is determined by concurrent functioning, then one can develop the hypothesis that individuals equipped with the synthesis of these qualities more easily adapt to changed conditions (e.g. profession) and are more flexible in situ.

We found a statistically significant difference in the relevance of global issues in terms of the students' field of study for their field of study. Even with regard to descriptive indicators, it is evident that respondents showed an interest in a global issue closely related to their field (students of non-pedagogical fields of economic-political and economic-social development and students of pedagogical fields of human rights). In line with Rodrik (2012) and Steger (2017), we are of the opinion that globalisation was originally understood primarily from an economic point of view due to the interdependence of countries and the flow of international capital.

Research by Pelegrinová and Lačný (2013), focused on the analysis of the impact of globalisation processes on the economies of developed countries, pointed to the fact, following the trend analysis of the Slovak Republic's globalisation index for the period 2010-2015 that economic globalisation was the most concerning the dissemination of ideas and information was at a lower level. In terms of globalisation in the Slovak Republic for 1999 to 2005, economic globalisation also recorded the highest shift.

The fact that human rights issues are closer to students in pedagogical fields is quite understandable, since, as Švec (2003) notes, the ideal of service to society is expected in this profession. It allows for the defence and protection of man, influenced by his social practice (Helus, 2009; Zelina, 2010).

Research by Gallayová et al. (2018), who used the same tool in their research, indicated a similar problem. In their case,

however, the research sample included students of economics and ecology.

On the one hand, these findings appear trivial, but on the other hand they testify that students can perceive their field narrowly. The opinion of Svitačová et al. (2015) is that the faculties of economics have a strategic role to play in preparing their graduates for the challenges of globalisation. Future economists' attention must not be focused solely on the economic growth of the state, but must understand the complexity of today's world, recognising the interdependence between technology, nature, culture and economics. Global development education is a potential means of achieving this goal. We think that this also applies to other faculties, such as political sciences and international relations, legal and technical faculties.

Hanakovičová and Lopusánová (2010) recommend students of management and managerial education, in view of strong globalisation tendencies, to develop the skills of a cosmopolitan system of thinking, which includes a sensitivity to permanent learning, manifested primarily in the management of oneself, relationships and business.

In a similar situation, pedagogical disciplines find themselves also required to prepare their students to solve global problems by acquiring wider knowledge and plastic skills. The pedagogical-psychological basis should be extended to include the basis of economic, technical and social sciences. A globally shaped personality can respond to global challenges. The IT revolution has always been accompanied by socio-economic restructuring (Kučírek, 2017, p. 29).

Although there was no statistically significant difference in the relevance of global issues in terms of students' degree course for their field of study, it is observable that respondents in the master degree courses achieved slightly higher scores for the dimensions of human rights and economic-social development. It is a positive finding for us, which apparently tells us that they are considering their preparation at university, respectively, where it should change in order to be applicable to the labour market. Truneček (2004) or Heller (2005) put it meaningfully, saying that the knowledge-based society needs specialists, but it will not do without systemisers that describe the thinking in context.

The limitation of the research is mainly the way we got the respondents into the research sample, which limits the valid generalisation of its results to students of Matej Bel University. Similar research is required, but on a stratified sample, which would likely increase the proportion of the male population. Although we have encountered disproportion of the male population in relation to female in our research sample, based on the number of students studying at the faculties of Matej Bel University, we would like to say that this inequality is in principle common, as the majority of students at these faculties are women (e.g. in 2018/2019, 3,351 out of a total of 4,755 students). It would be appropriate to include other control variables in the questionnaire, e.g. what the respondents most often associate with the concept of global world, how they understand global education, whether they have confronted global issues in their study subjects, where they would like to work after graduation and what professional qualities a university student after graduation should excel in with regard to the field of study.

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#### Primary Paper Section: A

#### Secondary Paper Section: AM

## EFFECTS OF ENTERPRISE RISK MANAGEMENT (ERM) IMPLEMENTATION. A COMPARATIVE CASE STUDY IN THE CONDITIONS OF THE POLISH ECONOMY

\*OLIWIJA KHALIL-OLIWA

*Silesian University of Technology, Faculty of Organization and Management, Roosevelt Street 26<sup>th</sup>, 41-800 Zabrze, Poland  
Email: oliwia.khalil-oliwa@polsl.pl.*

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**Abstract:** The main purpose of this paper is to assess the effects of the implementation of a holistic Enterprise Risk Management system in the context of financial stability and performance (in the short term) and the company's value (in the long term). The paper uses a case study covering two large Polish enterprises operating in high risk international environment in the mining and chemical industry. The results of the conducted research have shown that, in enterprises with a very high risk exposure and a low level of flexibility (high dependence on the State Treasury – the owner), the effectiveness of ERM implementation is limited and does not always translate directly into the financial result and company value.

**Keywords:** risk management, effectiveness and efficiency of risk management, Enterprise Risk Management.

### 1 Introduction

Risk is an indispensable element accompanying every business decision. Most often, it is associated with the possibility of an unforeseen threat which will cause the result of the decision taken to be worse than expected. Therefore, risk has a negative impact on the effects of activities undertaken in the enterprise. The aggregated effects of risk resulting from multiple materialized threats cause, in the short term, a decrease in the financial result of the company and, in the long run, may contribute to the slowdown of development and decrease in value for all stakeholders.

Bearing in mind the above circumstances and negative connotations of risk, enterprises are still looking for effective and efficient methods of risk management. The purpose of these methods is to reduce the likelihood of occurrence of threats or reduce losses related to their materialization, which enables the company to maintain the planned level of financial performance and prevent the loss of company value in a strategic perspective. Regardless of the methods used, risk management must be a planned process organized in a thoughtful way. It must also be constantly improved and modernized due to the intensification of threats and the appearance of new, previously unknown dangers (e.g. cybercrime). In effective management, it is also important to include all employees in the implementation of this process and to make them aware of its significance for the company's operations (Acosta, 2018; Arena et al., 2017).

The most advanced form of risk management at present are holistic systems referred to as Enterprise Risk Management. Their purpose is to organize the entire risk management process and reduce the impact of risk on the performance of the entire organization (Wróblewski, 2011).

A. Lienbenberg and R. Hoyt defined the ERM system as an integrated approach to risk management, allowing management of a wide range of threats faced by an organization. According to A. Moulbroek, integrated risk management is associated with the identification and assessment of risk, and then building the strategy of the entire organization in terms of managing this risk (Bromiley et al., 2015).

An ERM system is implemented in a sustainable manner at all levels of the organization. Thanks to this, an enterprise can improve the decision-making process, collect information in a more effective way and, consequently, improve the entire management process (Bromiley et al., 2015). In order for the ERM system to function in the best possible way, it is necessary to identify and divide roles between its stakeholders (Jones-Kowalska, 2019; Callahan and Soileau, 2017). Units responsible for improving and supervising the risk management process in

a given enterprise are created in its structure. The correct functioning of the system is supervised by the so-called Chief Risk Officer, to which individual units of the enterprise submit regular reports (Towers, 2014).

The ERM system consists of three dimensions: structure, management and process, and the ERM process itself is divided into 5 stages (Shad and Lai, 2015):

1. risk identification,
2. risk analysis,
3. risk assessment,
4. risk mitigation,
5. risk monitoring.

To identify risk, lists of possible internal and external threats are created. They are the basis for risk analysis and assessment, as a result of which the risk is selected in terms of probability of occurrence and possible losses caused by this occurrence. The threats considered to be the most serious are those that are the most likely to cause the most serious losses. The risk management activities of an enterprise focus on their mitigation. Typical methods used to mitigate the effects of risk materialization include risk transfer in the form of insurance or establishing economic cooperation (Jones-Kowalska, 2019), as well as prevention in the form of tangible security measures, such as fire-fighting equipment or anti-burglary protection. The last element of risk management is continuous monitoring of the effects of this management (Meidell and Kaarbøe, 2017), which allows to obtain information on the effectiveness and efficiency of actions taken to protect the enterprise against threats. The results of this monitoring are the basis for improvement activities of ERM systems. Thanks to the use of these systems, the planned financial result and systematic growth of company value should proceed as planned and without interruptions (Florino and Leoni, 2017).

The research conducted by A. Lienbenberg and R. Hoyt indicated that the implementation of the ERM system in an enterprise affects its performance and value (Hoyt and Liebenberg, 2011). Analysis of data from 275 insurance companies has shown that enterprises that implemented a holistic risk management system increased their value.

These enterprises also less frequently used financial leverage and operated in a more transparent manner.

Bearing in mind the above conclusions and observations, the main purpose of this paper is to evaluate the implementation of ERM in two Polish companies listed on Warsaw Stock Exchange. Initial analysis of the number and scope of ERM implementations conducted among all listed companies showed that the number of implementations was the highest in industries highly exposed to risk, such as: energy, fuel, mining and chemical industries, which is why we decided to choose our cases for study from this group. The first studied company operates in the chemical industry and is the second largest producer of nitrogen and multi-component fertilizers in Europe. The other of the analyzed enterprises is the largest European coal company extracting coking coal supplied to coking and metallurgical plants. They are, therefore, very large companies, operating on the international market, and thus exposed to numerous and intense sources of risk. In the further part of the paper, the research methodology and results are presented, and then conclusions on the effects of using ERM systems and the directions of their further improvement are formulated. The analysis carried out in this paper contributes to conclusions concerning new industries and economic regions to research into the investigated field of study.

## 2 Materials and methods

As it has already been mentioned above, the main purpose of risk management is to prevent threats that may expose an enterprise to a deteriorated financial performance and/or loss of value. Therefore, in the course of the conducted research, these parameters were used to assess the effectiveness of ERM system implementation in the examined enterprises, whose level and variability over time before and after changes in management systems was studied. The key research problem in this case was to determine whether the implementation of ERM system contributed to stabilizing or improving the company's financial performance and value. The case study was used in the analyses, which enabled detailed presentation of the scope of ERM in both companies and the risks covered by it. Additionally, the following statistical measures of differentiation were used to assess the level of risk: dynamics indexes, standard deviation and coefficient of variation. In the short-term research perspective, the risk was assessed in the context of changes in the net financial result. In the long-term perspective, the market value of the examined enterprises expressed in the form of the exchange rate was used.

The next research stages included:

- defining the characteristics of the activity of the industries and enterprises studied,
- describing the ERM systems implemented, taking into account the identified risks and actions aimed at limiting them,
- assessment of changes in financial performance before and after ERM implementation,
- assessment of changes in company value before and after ERM implementation,
- formulation of final conclusions regarding the effectiveness of ERM implementation and directions of further research.

## 3 Results

### 3.1 Characteristics of the examined enterprises and implemented ERM systems

Jastrzębska Spółka Węglowa S.A. is the largest producer of hard coking coal and a major coke producer in Europe. What is more, the company is engaged in the extraction of coal for energy purposes in the Upper Silesian Coal Basin. It also has its own coking plants, which allows it to partially implement further stages of coke production, thereby reducing production and market risk.

Jastrzębska Spółka Węglowa (JSW SA) implemented a holistic risk management concept in January 2013. The purpose of the adopted ERM system was, first of all, to identify potential risk factors and all incidents that may have a negative impact on the functioning of the entire capital group. The comprehensive corporate risk management system at JSW SA consists of two basic documents, valid throughout the entire group: *Capital Risk Management Policy and Procedure*, which are updated on an ongoing basis, when necessary, and contain information on all risks significant for the functioning of the enterprise. The last ERM system update took place in 2017.

The description of the system's operation emphasizes the fact that risk management is a continuous process, shaped by the influence not only of the changing economic reality, but also changes in individual risks affecting the business objectives of the enterprise. Therefore, risk management covers all organizational structures and areas of activity, i.e. operational, strategic, financial, commercial, legal and regulatory issues. In JSW SA, the ERM system is supported by a dedicated IT tool.

Both potential and actual operational threats are systematically identified and subsequently reported to management board members, the audit committee, the supervisory board and stakeholders. In accordance with the subsequent stages of the ERM process, the control and assessment of the effects of the

undertaken activities is carried out, and then potential corrections are introduced to the risk management process in order to increase the efficiency of its operation.

In the organizational structure of Jastrzębska Spółka Węglowa SA, a risk management representative was appointed, who – together with risk owners – collects information about risk, analyzes it and then develops risk response plans. On a quarterly basis, the representative draws up a report on risk monitoring, which is then presented to the management board, the supervisory board and the audit committee.

Grupa Azoty S.A. conducts production, service and commercial activities in the field of engineering plastics, semi-finished products for their production and nitrogen fertilizers. It is one of the most important companies in the chemical industry in Central Europe, operating in the sector of mineral fertilizers, engineering plastics and other chemicals.

At Grupa Azoty SA, the corporate risk management system was implemented also in 2013. Its operation was developed in accordance with the ISO 31000 standard "Risk management – Principles and guidelines" and the COSO II standard "Corporate risk management – Integrated framework". Thanks to the implementation of the system, the "Corporate Risk Management Policy of Grupa Azoty" and procedures defining the stages of the risk management process were adopted. And so, the ERM system implemented in the company consists of the following stages:

1. identification and assessment of risk;
2. establishment and implementation of risk responses and incident response plans;
3. monitoring and reporting of risk levels;
4. including information on risk in decision-making processes;
5. reporting and communication;
6. monitoring and evaluation of the risk management system.

The corporate risk management process takes place at the level of the so-called Grupa Azoty Corporate Center. To improve this process, a steering committee and a team of risk experts were appointed. The steering committee consists of representatives of subsidiaries in which the risk management system has been implemented. The team of risk experts is an advisory body composed of owners of specific corporate risks.

Periodically, risk owners carry out risk identification and assessment in the enterprise. Risk verification is the basis for determining key risks for the enterprise. Moreover, risk owners adopt risk management strategies and analyze risk factors and risk levels on an ongoing basis.

An annual report on corporate risk management is prepared in the company, which contains both a description of key risks and information on risk management methods. In addition, in order to assess the effectiveness of activities aimed at mitigating risks, internal audits of management systems are carried out in subsidiaries.

The above characteristics show that both companies carry out systematic risk assessment and analysis. Risk management results are also monitored, and the conclusions drawn are aimed at improving the implemented ERM. Risk owners and representatives of management and supervisory boards participate in risk management. A difference between these two systems is the appointment of a team of risk management experts at Azoty SA, which certainly helps to look at risk and assess it from a different perspective. The analytical conclusions of this group can therefore be an important source of information in risk management.

The scope of identified risk sources in both enterprises, together with a description of risk reduction activities in both examined enterprises is shown in Table 1.

Table 1: Identified risks and methods for their reduction in Grupa JSW SA and in Grupa Azoty SA

| Grupa JSW SA  | Grupa Azoty SA   |
|---|--|
| Identified key risks  |  |
| market risk, including: price risk, FX risk, risk of changes in cash flow due to changes in interest rates, credit risk, liquidity risk, capital risk, risks related to the social, economic and market environment, risks related to the conducted business activity, environmental risks, legal risks | currency risks<br>interest rate risk<br>price risk<br>risks regarding the price and availability of natural gas<br>risk related to the process of planning and implementation of strategic projects<br>risks related to the need to adapt production processes to new legal requirements, including environmental requirements<br>the risk of a deterioration in the demand-supply balance<br>the risk related to the availability and efficiency of capital and other sources of financing<br>the risk of negative impact of prices used in CO <sub>2</sub> emissions trading on the financial result<br>the risk of major industrial failures or technical failures causing interruptions in the continuity of operations and the operation of key production installations<br>the risk of maintaining the continuity of production and the availability of ammonia at prices<br>guaranteeing profitability of production<br>the risk of implementing tightening EU / local regulations restricting the use of the company's products<br>the risk of non-compliance with the deadlines for the reduction of NO <sub>2</sub> , SO <sub>x</sub> and dust emissions |
| Actions aimed at reducing risk  |  |
| <b>CURRENCY</b>   | <b>CURRENCY</b>  |
| Fx Forward transactions<br>intra-group hedging transactions<br>purchase of materials, services and investment goods in foreign currencies<br>cash flow hedge accounting   | natural hedging<br>currency forward transactions<br>currency swap<br>concluding symmetrical FX option structures, such as "currency corridor", or other symmetrical put-call options and the sale of call currency options   |
| <b>INTEREST RATES</b>   | <b>INTEREST RATES</b>  |
| ISR transactions  | natural hedging<br>Forward Rate Agreement (FRA) transactions<br>Interest Rate Swap (IRS) transactions<br>Currency Interest Rate Swap (CIRS) transactions   |
| <b>CREDIT</b>   | <b>TRADE CREDIT</b>  |
| financial collateral from recipients in the form of blank promissory notes, letters of credit and insurance limits  | trade credit limit insurance   |
| <b>PRICE</b>  | <b>DETERIORATION IN THE DEMAND-SUPPLY BALANCE</b>  |

|  |  |
|--|--|
| increase in production and sales volume<br>change in the production structure to increase sales efficiency<br>optimization of product sales directions<br>market monitoring  | production cost optimization<br>expanding the range of products and services offered to customers  |
| <b>LOSS OF LIQUIDITY</b>   | <b>ADAPTING PRODUCTION PROCESSES TO NEW LEGAL REQUIREMENTS, INCLUDING ENVIRONMENTAL REQUIREMENTS</b>   |
| additional bond issue<br>optimization of liability management<br>savings initiatives and cost reduction,<br>effective liquidity monitoring and reporting, enabling taking preventive actions in the situation of liquidity risk and maintaining an appropriate (minimum) level of available funds for servicing current payments | monitoring of all planned and implemented changes in the legal environment<br>reduction of energy consumption of processes (reduction of greenhouse gas emissions) |
| <b>CAPITAL</b>   |  |
| monitoring of financial debt indicators  |  |

Source: Own work on the basis of reports of the examined enterprises

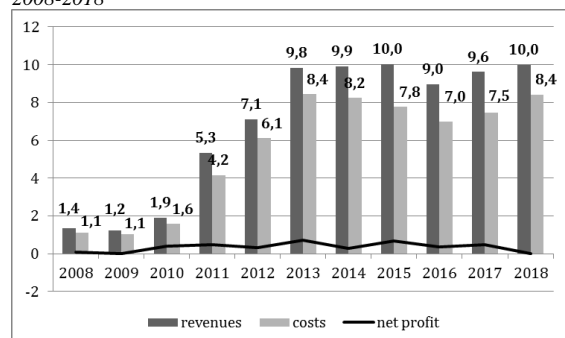
According to the data presented in Table 1, the list of identified risks is more extensive and more detailed in Azoty SA than in JSW SA. The risk catalog in a mining company covers very general categories of risks occurring in practically every enterprise. In Azoty SA, the list includes industry risks, directly related to the company's market situation, such as: the prices of CO<sub>2</sub> emissions, the availability of natural gas or EU regulations stopping or restricting trade in chemical products. It can therefore be concluded that the identification of risks at Azoty SA is more accurate and more adapted to the specificity of the industry.

Despite this difference, the catalog of hedging activities in both companies is rich and adapted to the most serious threats, i.e. currency and market (including price, demand and supply) risk. In addition, JSW SA distinguishes a wide range of instruments for financial risk reduction, which, for many years, has threatened the functioning of mining enterprises in Poland (liquidity risk and the risk related to restricted access to financing sources). It means that JSW SA uses the so-called experience history in risk management and does not underestimate such threats.

### 3.2 Assessment of changes in the financial performance before and after the implementation of the ERM system

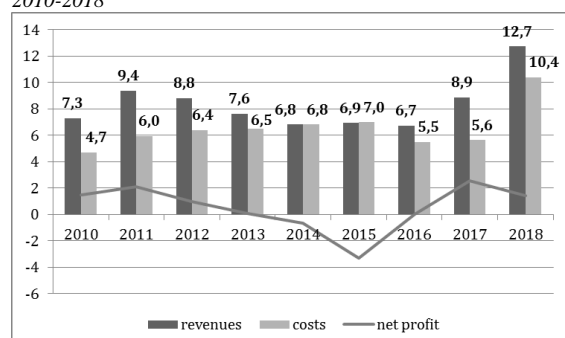
The financial results of both the examined enterprises are shown in Chart 1 and 2.

Chart 1: Revenues, costs and net profit of Azoty SA in the years 2008-2018



Source: own work on the basis of data from both examined enterprises.

Chart 2: Revenues, costs and net profit of JSW SA in the years 2010-2018



Source: own work on the basis of data from both examined enterprises.

The data presented in Chart 1 and 2 shows that JSW SA is characterized by a higher volatility of the financial result over time than Azoty SA, which generally means higher exposure to risk (Jonek-Kowalska, 2014). The coefficient of variation of this company's result in the entire covered period is over 318%, while in Azoty SA it approximates to 68%. The high variability of the results is also confirmed by the dynamics presented in Table 2.

Table 2: Changes in the financial results of Azoty SA and JSW SA

| Azoty SA | Years    |            |          |            |         |
|----------|----------|------------|----------|------------|---------|
|          | 2009     | 2010       | 2011     | 2012       | 2013    |
|          | -105.01% | 10.815.45% | 24.50%   | -36.81%    | 126.30% |
|          | Years    |            |          |            |         |
|          | 2014     | 2015       | 2016     | 2017       | 2018    |
|          | -62.85%  | 161.02%    | -45.78%  | 30.30%     | -98.44% |
| JSW SA   | Years    |            |          |            |         |
|          | 2009     | 2010       | 2011     | 2012       | 2013    |
|          | n/a      | n/a        | 40.19%   | -53.07%    | -91.68% |
|          | Years    |            |          |            |         |
|          | 2014     | 2015       | 2016     | 2017       | 2018    |
|          | -899.37% | -399.98%   | -100.13% | 57,299.07% | -44.22% |

n/a – no data, company listed on the Warsaw Stock Exchange since 2011

Source: own work on the basis of data from both examined enterprises.

It should also be noted, that in Azoty SA the net profit was only negative in 2009. In other periods, the company generated profits. On the other hand, in JSW SA financial losses were recorded in two years: 2014 and 2015. While analyzing the variability of the financial result in the context of ERM implementation in 2013, it can also be stated that in Azoty SA, after the implementation of the risk management system, the amplitude of fluctuations in financial results has clearly decreased. In JSW SA, financial results were still largely unstable.

The financial results of the examined companies described above are influenced by two key components: sales revenue and production costs of the products and materials sold. The first one is a reflection of external risk, because it is shaped by market conditions. The other is connected with internal risk because it concerns the production resources used by the company. The parameters characterizing the variability of these components are presented in Table 3.

Table 3: Arithmetic mean, standard deviation and coefficient of variation for revenues and costs of Azoty SA and JSW SA

| Azoty SA         |                                    |                                       |                                 |
|------------------|------------------------------------|---------------------------------------|---------------------------------|
| Parameter for:   | Arithmetic mean [in PLN thousands] | Standard deviation [in PLN thousands] | Coefficient of variation [in %] |
| sales revenue    | 6,838,309                          | 3,555,033                             | 51.99%                          |
| production costs | 5,570,712                          | 2,897,185                             | 52.01%                          |
| JSW SA           |                                    |                                       |                                 |
| Parameter for:   | Arithmetic mean [in PLN thousands] | Standard deviation [in PLN thousands] | Coefficient of variation [in %] |
| sales revenue    | 8,356,737                          | 1,807,080                             | 21.62%                          |
| production costs | 6,542,178                          | 1,512,367                             | 23.12%                          |

Source: own work on the basis of data from both examined enterprises.

The data presented in Table 3 shows that revenue and costs were characterized by higher variability in Azoty SA than in JSW SA (Jonek-Kowalska and Turek, 2017). This means that both external and internal risks were higher in the chemical company, despite the final lower variability of the financial results presented above. The high variability of financial results at JSW SA was therefore not directly related to the variability of revenue and costs, but resulted from a small difference between the revenue and costs observed in particular in the years 2013-2016. It should be noted that, in the covered period, revenue decreased systematically in JSW SA, due to the increase in market risk (downturn) and costs increased due to pressure on the increase in wages related to the good situation on the coking coal market in 2010-2012. The simultaneous increase in external and internal risk caused risk accumulation at JSW SA, which translated into significant fluctuations in financial results, which was a direct result of simultaneous materialization of both risks. In Azoty SA, changes in revenue and costs were synchronized over time and proportional, which ultimately enabled stabilization of financial results over time and caused losses only in one period.

### 3.3 Assessment of changes in market value before and after the implementation of the ERM system

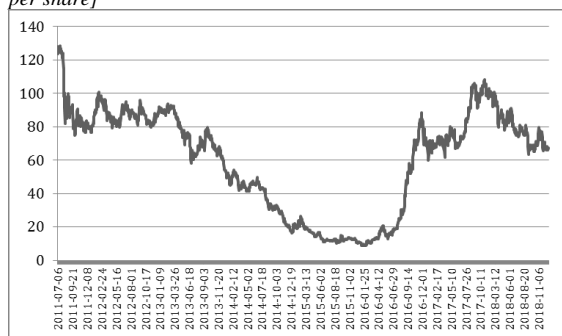
As it has been mentioned before, in the next stage of research, the market value of both enterprises was used to assess the implementation of the ERM system. And so, in Chart 3 and 4 its changes in time for Azoty SA and JSW SA are shown.

Chart 3: Share price of Azoty SA in the years 2008-2018 [in PLN per share]



Source: own work based on the data from the portal money.pl

Chart 4: Share price of JSW SA in the years 2008-2018 [in PLN per share]



Source: own work based on the data from the portal money.pl

The share price of Azoty SA fluctuated in the covered period between PLN 10 and PLN 110 per share. JSW SA's share prices ranged from PLN 10 to PLN 130 per share. The price difference for both companies reflected significant risk related to the operation of these enterprises in traditional industries, strongly dependent on the decision of the owner (State Treasury). Nevertheless, after the implementation of ERM system, the value of Azoty SA shares has been growing, and the value of JSW SA shares has been falling, which may mean that the system implemented in the chemical company is effective and the solution used in the mining company is ineffective. The development (downward) trend of the share price for both companies has been synchronized since the beginning of 2017, which is largely related to the political situation in Poland and the change of government.

Higher effectiveness of ERM implementation at Azoty SA is also confirmed by an analysis of market value of both companies, the results of which are presented in Table 4.

Table 4: Average market value, its standard deviation and coefficient of variation before and after ERM implementation at Azoty SA and JSW SA

| Azoty SA                        |                           |                          |
|---------------------------------|---------------------------|--------------------------|
| Parameter                       | Before ERM implementation | After ERM implementation |
| Arithmetic mean [in PLN]        | 21.98                     | 66.60                    |
| Standard deviation [in PLN]     | 11.65                     | 15.82                    |
| Coefficient of variation [in %] | 53.00%                    | 23.76%                   |
| JSW SA                          |                           |                          |
| Parameter                       | Before ERM implementation | After ERM implementation |
| Arithmetic mean [in PLN]        | 88.97                     | 52.87                    |
| Standard                        | 10.16                     | 29.49                    |

| deviation [in PLN]              |        |        |
|---------------------------------|--------|--------|
| Coefficient of variation [in %] | 11.42% | 55.78% |

Source: own work based on the data from the portal money.pl

The average share price of Azoty SA went up after the implementation of ERM, which indicates an increase in company value, and in the case of JSW SA it decreased, which means a loss of company value. In the first company, the coefficient of variation of the share price also decreased visibly, which confirms its stabilization in time and lower risk. In JSW SA, the coefficient of variation increased almost five times, which, in turn, confirms the increase in risk, despite the implementation of the ERM system.

#### 4 Discussion

The implementation of comprehensive risk management systems is a multi-stage and complex task, which is why it usually takes place in large enterprises, which, due to the multiplicity of risks, require increased protection, and which can afford to implement the ERM system. In the analyzed cases, the implementation concerned two listed companies owned mostly by the State Treasury and took place in 2013. In Azoty SA, in the short term it contributed to the stabilization of financial performance and in the long term it contributed to the increase in the market value of the company. Nevertheless, the observed risk reduction was accompanied by rational adaptation of costs to revenue, changing under the influence of market conditions (reasonable response to risk).

Such an approach was not observed in the second of the examined companies – JSW SA, where social and political priorities contributed to unsynchronized changes in revenue and costs, as well as the accumulation of internal and external risks during a market downturn. As a result, financial results deteriorated and the value of the company decreased over time. The observed changes indicate the ineffectiveness of the ERM system in JSW SA.

#### 5 Conclusions

It may be concluded from the obtained research results that the effectiveness of ERM implementation and operation depends on many factors, including, to a large extent, the rationality of decisions taken by company executives. All methods and systems provide data and information necessary to make a decision, but the final response to the risk, its scale and direction depend on the human factor, which significantly affects the level of protection against risk.

Therefore, the effectiveness and efficiency of ERM systems must also be considered in the human dimension, including the wider context of this dimension, such as political and social factors.

The present research includes only case studies, hence its scientific value is limited. Nevertheless, it should be emphasized that a well thought-out ERM system adapted to the specificity of the company (Azoty SA) combined with the rationalization of executive decisions may positively affect the level of risk, although, as it is generally known, it is shaped by a variety of external and internal factors. Therefore, it is difficult to confirm the unambiguity of the research results received in this regard. Nevertheless, they enable better understanding of the mechanisms of risk materialization and protection against risk.

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**Primary Paper Section: A**

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## THE RELATIONSHIP BETWEEN PROFESSIONAL REFLECTION AND BURNOUT SYNDROME IN SECONDARY SCHOOL TEACHERS

<sup>a</sup>MICHAL NOVOCKÝ, <sup>b</sup>RENÁTA OROSOVÁ

<sup>a</sup>*Department of Pedagogy, Faculty of Education, Matej Bel University in Banská Bystrica, Ružová 13, 974 11 Banská Bystrica, Slovakia*

<sup>b</sup>*Department of Education, Faculty of Arts, Pavol Jozef Šafárik University in Košice, Moyzesova 8, 040 59 Košice, Slovakia*  
email: <sup>a</sup>michal.novocky@umb.sk, <sup>b</sup>renata.orosova@upjs.sk

**Abstract:** The presented study analyses the relationship between the frequency with which teachers reflect on their work and their burnout syndrome risk levels. The research sample consisted of 390 teachers working at secondary schools in Slovakia. Two types of scales were used to collect data. The first scale related to the frequency of professional reflection and its types which was created by the author. The second scale, authored by Maslach and Jackson (1986), aims to identify the burnout syndrome risk level in teachers. The Slovak translation was used (Petlák & Baranovská, 2016). To identify the construct validity of the scale mapping the frequency of professional reflection in teachers, exploratory factor analysis was used. To determine the construct validity of the burnout syndrome risk scale, confirmatory factor analysis was chosen. In dimensions pertaining to both instruments, Cronbach's alpha indicated a satisfying level of reliability (0.59 – 0.89 and 0.72 – 0.89 respectively). The assumed statistically significant relationship between teachers' professional reflection and the burnout syndrome risk level was disproved. However, a statistically significant positive correlation was proved between the frequency of meta-cognitive reflection and the dimension of emotional exhaustion and personal accomplishment, and between the frequency of critical, cognitive and practical reflection and the dimension of personal accomplishment. An indirect dependence was identified between the frequency of consulting reflection and the dimension of depersonalisation. In all cases, the dependences were weak.

**Keywords:** professional reflection, burnout syndrome, factor analysis, secondary school, teachers.

### 1 Professional reflection and the burnout syndrome

Teaching belongs among the helping professions affected by constant changes. Teachers' profession results are constantly compared against demanding standards, teachers have to actively develop their professional competencies, and face rapidly changing professional requirements expected by pupils as well as society. All this can result in significant emotional exhaustion, loss of interest in education-related events, and weak profession performance, which may ultimately lead to development of burnout syndrome (Maslach, 2015; Fontana, 2016).

Burnout syndrome represents the terminal stage of the process in which people performing an activity they love lose their enthusiasm and motivation over time (Freudenberger, 1974). And other experts, for example Preiss (2015) and Honzák (2018), describe the burnout syndrome similarly.

It may manifest in three areas: a) psychical – mental exhaustion and attenuation of overall activity; b) physical – overall exhaustion, digestion problems, headache, trouble sleeping, and increased risk of addiction; c) social – the teacher no longer cares about the way they are seen by other people, grows impassive and develops social apathy towards pupils, colleagues, and parents (Kebza & Šolcová, 2003; Salvagioni et al., 2017).

In the first stage of burnout syndrome, significant emotional exhaustion occurs followed by depersonalisation; the person loses attachments to other people, and eventually loses their professional identity. These factors cause the affected teacher's performance to decrease (Bianchi, Schonfeld & Laurent, 2015; Maslach & Leiter, 2016).

Chronic stress is a frequent cause of the burnout syndrome (Barutçu & Serinkan, 2013; Huget, 2015; Morovicová, 2016). It is caused mainly by work overload that significantly affects teachers' mental functioning. It is a result of a conflict between the interactional, cognitive and emotional aspects, possibilities, and requirements (Paulík, 2017).

Teachers face constant stress due to being forced to tackle problems that exceed their actual skills, and require an unreasonable volume of effort. The resulting frustration renders teachers unable to satisfy their own needs. By ignoring this

frustration, its effects are prolonged, possibly resulting in apathy and latent aggression – symptoms of depersonalisation. Conflicts also deserve attention. In their profession, teachers often face contradictory tendencies in which individual participants focus on different goals. The school practice may also bring negative emotions, fear, and anxiety, which is also very exhausting (Hagemann, 2012; Holeček, 2015).

The causes of burnout syndrome further include working conditions, i.e. high number of pupils in classrooms; dealing with difficult pupils, workplace relationships, and last but not least, the social prestige of teaching as a profession (Korczyński, 2014; Hrečiński, 2016).

On a daily basis, teachers need to expect communication difficulties, while being required to be empathetic towards pupils. They are the ones who carry great responsibility, while their own errors are pointed out immediately (Vercambre et al., 2009). If the stressful situations are not subsequently analysed by reflecting teacher's actual capacity within the reality of education, values are not reviewed, and the overload is ignored, the teacher may ultimately reach the stage of internal emptiness (Kalwass, 2008; Krivohlavý, 2012).

One of the tools for prevention of burnout syndrome is professional reflection (Javadi & Khatib, 2014; Ghazalbash & Afghari, 2015). Hrabal and Pavelková (2010) define professional reflection as a controlled evaluation-based activity, during which the teacher reflects on their pedagogic and didactic communication with pupils – it comprises multiple aspects of teaching with dynamic elements. This type of reflection is based on interpreting the records made during the lessons as well as the feedback obtained from the pupils, and the aim of this activity is to develop one's professional competencies.

However, it is necessary to add that professional reflection as a process requires an understanding of the context in which learning takes place as well as the related educational issues. It is absolutely necessary to realise that this activity is beneficial to the teacher's professional growth: they need to confront their past experience, teaching philosophy, and knowledge. The key component of professional reflection is to examine the causes of certain experience using relevant theory; i.e. to find out why certain things happened the way they did and not differently (Ryan & Ryan, 2015).

Korthagen (2011) studied the learning process and teachers' behaviour more explicitly in the context of professional reflection. He states that using a detailed analysis of the problematic educational situations and subconscious processes, the so called practical personal theories are generated. They have the nature of cognitive structures that adapt to changes through self-correction, thus developing further knowledge. Such cognitive structures protect us – teachers – by letting us respond in an automated way to things that are happening to us or to our pupils. This makes us sure that we responded appropriately in a situation and manage it successfully.

Professional reflection represents a platform for developing specialised skills in teachers, i.e. a tool that influences the school practice. It removes monotony as one of the main sources of mental load, which manifests as decreased activation and overall worsening of adaptability. Teachers falling into routine are at risk, as they stop paying proper attention to their own motivation, monitoring and review of their didactic procedures and educational influence (Petlák & Baranovská, 2016). If a teacher wants to perform quality teaching, they must reflect on it (Afshar & Farahani, 2015; Faghihi & Sarab, 2016; Tomengová et al., 2017) – reflection satisfies them and provides consolation. We agree with Kopřiva (2016) who states that burnout syndrome is always related to the question as to whether one's job is meaningful in any way. The experience of meaningfulness improves if the person is successful at least in some aspects.

Another source of mental overload is the state in which teachers realise the conflict between the demands and performance expected (Kačmárová & Kravcová, 2011; Clipa & Boghean, 2015). The protective function of professional reflection is important (Urdang, 2010; Cimermanová, 2013). It helps us find our limits. Knowing our own professional competencies and their extent allows us to determine what we can do in the given situation and prevents us from setting impossible goals for ourselves. It is necessary to develop a system in one's work and in critical situations, to accept compromise and adjust ideas to the reality.

Korthagen (2014) distinguishes between reflection focused on teachers' behaviour and deeper professional reflection (core reflection). In terms of the latter approach, professional reflection is a tool that helps build internal potential and personal strength in teachers, which can be further actualised and used to overcome obstacles (Korthagen, 2013; Evelein & Korthagen, 2015). It aims to determine the internal obstacles limiting the regulation of one's mental capital. These can be found on all levels of the respective onion model. These levels include the *environment* – school culture, pupils, classroom climate, teachers' actions, overcoming barriers; *competencies* – actions that teachers can in reality take; *self-confidence* – based on what can be actually achieved; *identity* – self-perception and professional tasks; *mission* – answering the question what inspires teachers and makes their work meaningful.

In psychotherapy, Bobek & Peniška (2008) compare reflection to a therapist presenting a mirror to their client.

Using conscious reflection, we develop our social maturity and learn to consider what is going on around us before taking actions. We learn to focus on understanding other people and resolving actual problems (Křivohlavý, 2009). Teachers therefore should have a developed skill of objective self-assessment, efficient methods of self-control, and be able to tolerate a range of approaches to problem-solving.

Akbari (2007) claims that professional reflection helps increase job satisfaction in teachers, improves interpersonal relationships, and supports the perceived image of their professionalism.

As pointed out by experts in reflective education (Kemmis, 2011; Rushton & Suter, 2012; Muchacka, Kaleta-Witusiak & Walasek-Jarosz, 2013; Pollard et al., 2014; Kouteková & Furinová, 2015), the following benefits of professional reflection – as one of the situation-control strategies in teaching and teachers' responses – can be formulated. Using professional reflection, teachers:

- learn about themselves, the motives for their decisions, and educational actions – post hoc,
- can identify the problems in their teaching and didactic activities and determine whether they can solve them efficiently,
- become more perceptive towards the needs and interests of their pupils,
- employ discourse analysis to examine individual proposals and possibilities for self-improvement,
- can anticipate pupils' reactions in difficult educational situations. It can clarify what measures need to be taken to manage or prevent certain situations,
- are able to constantly re-adapt to changing performance requirements, which allows them to adjust their educational tools accordingly,
- creatively interpret educational situations by drawing from relevant pedagogic and psychological theories,
- adjust their professional and personality development goals, regulate requirements and compare them to the criteria of educational process quality,
- enhance satisfaction from their work by summarising in which areas they have already improved and which ones need improving, thus getting courage to tackle difficult situations.

Based on the theoretical starting points, 4 research questions were formulated:

*Is there a statistically significant negative relationship between the frequency of professional reflection among the respondents and their burnout syndrome risk level?*

*Is there a statistically significant negative relationship between the frequency of the individual types of professional reflection among the respondents and their emotional exhaustion rate?*

*Is there a statistically significant positive relationship between the frequency of the individual types of professional reflection among the respondents and their personal accomplishment rate?*

*Is there a statistically significant negative relationship between the frequency of the individual types of professional reflection among the respondents and their depersonalisation rate?*

## 2 Characteristics of the research sample

Available selection was used to form the research sample. This type of selection was determined by the researchers' actual possibilities. The research was performed at secondary schools in all regions of Slovakia. The survey was administered to the respondents online. The e-mail addresses pertaining to schools in the individual regions were collected from the *Institute of Information and Prognoses of Education* website. The rest of the e-mail addresses were collected independently as they had not yet been published (newly established or smaller schools in towns and villages), or had changed.

As for the online survey, Poliach and Fridrichová (2018) reviewed recent studies and identified qualitative differences between traditional and online surveys. Another significant problem is that the survey return rate is usually about 1%.

Data were collected from January to May 2018. The research sample consisted of 390 respondents. More details on the research sample can be found in Table 1, and Charts 1 and 2. The average length of the respondents' practice was 19.94 years (SD=10.28) and varied from 1.5 to 31+ years. The majority of respondents were female (n=331; 84.87%). In the research sample, 85.90% (n=335) respondents achieved qualification by completing teaching study programmes at universities. It was also tested as to whether the respondents in the sample were educated on reflective teaching in the last 8 years within continuous education; most respondents were not (n=287; 73.59%).

Table 1: The structure of the research sample in terms of respondents' sex and length of practice

| Length of practice | Sex     |       |       |       | Total |        |
|--------------------|---------|-------|-------|-------|-------|--------|
|                    | females |       | males |       |       |        |
|                    | n       | %     | n     | %     | N     | %      |
| 1.5–5 years        | 33      | 8.46  | 11    | 2.82  | 44    | 11.28  |
| 6–10 years         | 37      | 9.49  | 6     | 1.54  | 43    | 11.03  |
| 11–15 years        | 40      | 10.26 | 6     | 1.54  | 46    | 11.80  |
| 16–20 years        | 54      | 13.85 | 15    | 3.84  | 69    | 17.69  |
| 21–25 years        | 58      | 14.87 | 7     | 1.80  | 65    | 16.67  |
| 26–30 years        | 51      | 13.08 | 8     | 2.05  | 59    | 15.13  |
| >31 years          | 58      | 14.87 | 6     | 1.54  | 64    | 16.41  |
| Total              | 331     | 84.87 | 59    | 15.13 | 390   | 100.00 |

Chart 1: The structure of the research sample in terms of respondents' teaching qualifications

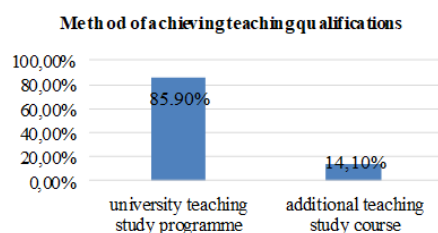
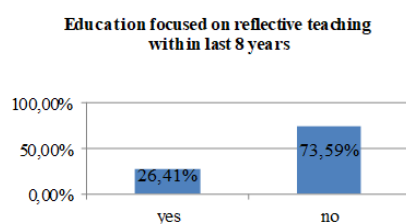


Chart 2: The structure of the research sample in terms of respondents' participation in a reflective teaching course over the last 8 years (continuous education)



### 3 Research methodology

To identify the frequency of professional reflection in secondary school teachers, the authors developed a new scale. The research instrument developed by Akbari, Behzadpoor, and Dadvand (2010) was used to create a framework of items. Their research summarises the elements pertaining to professional reflection among teachers as demonstrated in dimensions. In terms of clarity, the instrument was easily comprehensible, which was verified also in translation. In the Slovak environment, the *Reflexive Thinking Scale* by Nezvalová (2000) is often used, however, the statements are formulated too “academically”, which can be considered a weakness. There were also other reasons why the authors decided to develop a new scale.

Firstly, the scale developed by the authors focused on the frequency of professional reflection among teachers of English as a second language to pupils with other native languages. Our intention was to develop a scale that would map the frequency of the process among teachers regardless of the subjects they teach.

Another problem was represented by the social and cultural contexts of the reality in education. Iranian and Slovak teachers work in different social and educational environments, which determine the respective curricula. This aspect should not be underestimated (Majerčíková & Gavora, 2011). To reflect these facts in the creation of the scale, the *English language teaching reflection inventory* research instrument was approached critically with the aim to prevent forceful inclusion of items related to global problems (poverty, discrimination). Items related to the impact of the political developments on education and social justice were also deemed unnecessary. The items relevant for the Slovak teachers in the respective context were opted for (e.g. I think about the ways I can change the pupils' attitude to different types of substance and non-substance addiction).

Items in which the authors asked about multiple aspects at the same time represented the main difficulty. This deficiency was eliminated by taking appropriate methodological steps (e.g. *I think about the ways of promoting tolerance and democracy in my classroom and in the world in general.* – *I think about the ways of promoting tolerance among the pupils.*; *I talk to the pupils about their family background, interests, hobbies, and skills.* – *I talk to the pupils about their interests.*).

The question regarding whether items related to observing other teachers' lessons, workshop attendance, classroom research, and writing articles reflecting one's teaching experience was reconsidered. Ultimately, these items were left out of the instrument, as these activities do not represent a common part of teachers' work in Slovakia (e.g. observing lessons with the aim to learn efficient ways of teaching from colleagues, requesting the opportunity to observe such lessons by the interested teacher). Using similar items would not be compatible with the frequency scale – an adjustment was necessary to enhance the validity of the instrument. Degrees such as *never* – *rarely* – *sometimes* – *often* – *always* were specified in greater detail: *never* – *at least once per term* – *at least once every three/four months* – *at least once every two months* – *at least once a month* – *at least once every two weeks* – *always (2 and more times per week)*. Experts (in didactics and methodology) were consulted before this step was taken. Recommendations provided by teachers and their experience with survey-based research also proved very important. The frequency scales in their most common forms (*never* – *sometimes* – *often* – *always*) can be unclear (Švec, 1998). Before the research began, a pilot study was performed on a sample of 15 teachers (both instruments were examined).

The final scale consists of 23 items. To perform construct validation, exploratory factor analysis was selected. The Equamax rotation method proved the most suitable; it showed standard data variability in all factors (63.13%). Bartlett's sphericity test refutes the hypothesis that the correlation matrix represents a unit matrix ( $0.000 < 0.001$ ). The Kaiser-Meyer-Olkin (KMO) Test for Sampling Adequacy (0.916) shows that factor analysis is a highly suitable method for analysing the collected data (see Table 2.) 5 factors were identified: meta-cognitive, critical, cognitive, consulting, and practical reflection. The minimum factor value per item to be included was 0.40. Cronbach's alpha value in the individual dimensions ranged from 0.59 to 0.89. Cronbach's alpha of the research instrument as a whole was 0.927.

The *meta-cognitive reflection* factor consisted of items related to the frequency with which teachers think about their own personalities, teaching concepts, and profession. Meta-cognition represents active monitoring and management of cognitive processes. It is necessary to take into account also the professional background in which teachers develop their teaching strategies. Meta-cognitive reflection includes not only the identification of motives for actions, but also experiencing – teachers are supposed to answer the questions related to the meaning of their work as well as the sources of their satisfaction. The components of this type of reflection are self-perception, self-assessment, and behaviour.

The *critical reflection* factor consisted of items related to the frequency with which teachers address social, value-related, and teaching aspects of their classroom work. Teachers try to improve aspects that determine the pupils' school life and help them develop their personalities in multiple ways by analysing the ethical principles and social context of teaching.

The *cognitive reflection* factor consisted of items related to the frequency with which teachers address their own professional development. Professional progress requires self-education that allows teachers to evaluate which of their professional competencies need to be developed primarily; in turn, this requires identification of teaching problems that should potentially be examined.

Table 2: Types of professional reflection (rotated factor loading matrix)

| Items pertaining to individual factors  | Factors  |        |       |       |        |       |
|---|----------|--------|-------|-------|--------|-------|
|   | $\alpha$ | I      | II    | III   | IV     | V     |
| (I) Meta-cognitive reflection   | 0.890    |        |       |       |        |       |
| I think about the meaning of my job.  |          | 0.762  | 0.093 | 0.107 | 0.274  | 0.106 |
| I try to identify what exactly makes me feel satisfied about teaching.  |          | 0.742  | 0.240 | 0.086 | 0.311  | 0.119 |
| I think about my strengths and weaknesses as a teacher.   |          | 0.732  | 0.304 | 0.131 | 0.234  | 0.172 |
| I think about how to resolve conflicts that occur when I teach.   |          | 0.635  | 0.350 | 0.190 | 0.242  | 0.058 |
| I think about the way my teaching studies (training) influences the way I perceive myself in my job.                  |          | 0.583  | 0.138 | 0.380 | 0.053  | 0.337 |
| I think about the way the teaching models I studied when I was a student influence me positively or negatively.       |          | 0.533  | 0.273 | 0.246 | 0.043  | 0.268 |
| I think about my own teaching philosophy (ideas I draw from).   |          | 0.532  | 0.253 | 0.291 | -0.008 | 0.311 |
| I think about whether I can consider myself an example for my pupils.   |          | 0.531  | 0.330 | 0.230 | 0.164  | 0.128 |
| (II) Critical reflection  | 0.872    |        |       |       |        |       |
| I think about how I can understand my pupils' values.   |          | 0.338  | 0.708 | 0.204 | 0.262  | 0.134 |
| I think about how I can promote tolerance among the pupils.   |          | 0.350  | 0.690 | 0.125 | 0.259  | 0.134 |
| I think about the ways I can change the pupils' attitude to different types of substance and non-substance addiction. |          | 0.307  | 0.612 | 0.256 | 0.108  | 0.116 |
| I talk to my pupils about their interests.  |          | 0.003  | 0.606 | 0.285 | 0.340  | 0.182 |
| I think about the ways sex or social status influences the pupils' rate of success.                                   |          | 0.306  | 0.561 | 0.066 | 0.004  | 0.365 |
| I ask my students whether they like the tasks/activities during lessons.  |          | 0.103  | 0.524 | 0.258 | 0.305  | 0.240 |
| I talk to my pupils about their learning styles.  |          | -0.007 | 0.504 | 0.384 | 0.258  | 0.341 |
| I think about the social events that may affect my teaching.  |          | 0.366  | 0.492 | 0.268 | 0.004  | 0.266 |
| (III) Cognitive reflection  | 0.763    |        |       |       |        |       |
| I read articles in magazines or on the Internet to be up to date with the current trends in my profession.            |          | 0.026  | 0.175 | 0.871 | 0.164  | 0.121 |
| I read books/articles on increasing teaching efficiency.  |          | 0.091  | 0.097 | 0.847 | 0.202  | 0.117 |
| I think about the events that occurred during my teaching as potential research topics.                               |          | 0.226  | 0.070 | 0.554 | 0.003  | 0.378 |
| (IV) Consulting reflection  | 0.716    |        |       |       |        |       |
| I talk about my teaching experience with my colleagues.   |          | 0.094  | 0.091 | 0.061 | 0.840  | 0.072 |
| I consult my colleagues about how to manage different practical problems in teaching.                                 |          | 0.093  | 0.030 | 0.116 | 0.835  | 0.103 |
| (V) Practical reflection  | 0.590    |        |       |       |        |       |
| I analyse the weak and strong points of my classes in writing.  |          | 0.036  | 0.043 | 0.145 | 0.104  | 0.797 |
| I record various findings and inspiration from teaching in my portfolio.  |          | 0.026  | 0.097 | 0.104 | 0.149  | 0.759 |
| variance %  |          | 16.99  | 14.86 | 11.91 | 9.75   | 9.63  |
| accumulated variance %  |          | 16.99  | 31.84 | 43.75 | 53.50  | 63.13 |

The *consulting reflection* factor consisted of items related to the frequency with which teachers talk to their colleagues about their work to obtain advice and instructions, which can help them manage educational dilemmas. Information on good practice obtained from colleagues can help revise the deficiencies of one's own teaching concept.

The *practical reflection* factor consisted of items related to the frequency with which teachers examine their teaching in retrospection. It is a type of reflection that comes post-hoc and its goal is to understand particular teaching situations. Written evaluation of the events represents a tool to do so (e.g. teaching preparation) as well as the teacher's portfolio.

To identify the burnout syndrome risk level in secondary school teachers, the *Maslach Burnout Inventory Educators Survey* was used; its Slovak translation can be found in Petlák and Baranovská (2016). It is the most frequently used research instrument (Mareš, 2013), however the main reason for its use in this case was the fact that it examines the burnout syndrome risk level through three components: emotional exhaustion, depersonalisation, and personal accomplishment. Its internal structure is not random. The Maslach model (Maslach & Leiter, 2008; Maslach & Leiter, 2016) describes the burnout process in its three dimensions, which do not develop simultaneously. At first, emotional exhaustion occurs as a response to the excessive demands of the teacher's surroundings.

Exhaustion leads to depersonalisation manifested as a defence strategy with the aim to decrease the perceived load. However, a higher depersonalisation rate does not remove the symptoms of emotional exhaustion – quite on the contrary, it decreases the perceived personal accomplishment. Our second goal was to find out whether there was a relationship between the types of professional reflection and burnout syndrome components indicating that professional self-recognition and improvement can fulfil a protective function.

This represents one of the multitude of ways (others include combining high and low scores in individual dimensions or focusing only on the top scores in a selected dimension) (Doulougeri, Georganta & Montgomery, 2016) to evaluate the burnout syndrome risk level in the helping professions.

The scale consisted of 22 items. The respondents expressed how much they agree with the provided statements on the scale from 1 – disagree completely to 7 – agree completely. The frequency scale was adjusted to a Likert-type scale since its aim was to identify how the respondents generally felt about their job. This type of scale was also used in the Oldenburg Burnout Inventory which measures working and academic burnout (Demerouti et al., 2003). The scale adjustment did not disrupt the construct validity of the tool. Confirmatory factor analysis was used to verify the existence of the three aforementioned factors. The Varimax rotation method proved the most suitable; it showed

standard data variability in all factors (51.76%). Bartlett's sphericity test refutes the hypothesis that the correlation matrix represents a unit matrix ( $0.000 < 0.001$ ). The KMO Test for Sampling Adequacy (0.867) shows that factor analysis is a highly suitable method for analysing the collected data (see Table 3.) The minimum factor value per item to be included was 0.40. The factor analysis was performed twice. After the first analysis, items with factor value  $> 0.40$  in more than two factors simultaneously were excluded (My job makes me feel remote

and dissatisfied. I always have lots of energy. I feel fresh and encouraged when working with my pupils.).

The Cronbach alpha value in the individual dimensions ranged from 0.72 to 0.89. The Cronbach alpha of the research instrument as a whole was 0.845. Reverse coding was used on respondents' answers in the personal accomplishment dimension to calculate the Cronbach alpha value pertaining to the research instrument as a whole.

Table 3: Burnout syndrome components (rotated factor loading matrix)

| Items pertaining to individual factors                                      | Factors  |        |        |        |
|---|----------|--------|--------|--------|
|   | $\alpha$ | I      | II     | III    |
| (I) Emotional exhaustion  | 0.888    |        |        |        |
| At the end of the working day, I feel completely exhausted.                 |          | 0.844  | 0.016  | 0.041  |
| I feel burned out and exhausted from my work.                               |          | 0.806  | -0.106 | 0.223  |
| All-day work with pupils is truly exhausting me.                            |          | 0.758  | 0.023  | 0.093  |
| When I wake up and think of my work problems, I feel tired.                 |          | 0.753  | -0.023 | 0.131  |
| My job is draining me emotionally.  |          | 0.746  | -0.092 | 0.009  |
| I feel as if working so hard on my tasks exhausted me.                      |          | 0.709  | 0.106  | 0.015  |
| I feel as if I was running out of energy capacity.                          |          | 0.633  | -0.103 | 0.316  |
| Working with pupils is very stressful for me.                               |          | 0.622  | -0.121 | 0.240  |
| (II) Personal accomplishment  | 0.750    |        |        |        |
| I feel that I influence my pupils positively and make them feel positive.   |          | -0.103 | 0.727  | -0.083 |
| During the years of my work I have been successful and did a lot of good.   |          | 0.012  | 0.713  | -0.028 |
| I am able to solve my pupils' problems very efficiently.                    |          | -0.002 | 0.694  | -0.209 |
| I can establish a relaxed atmosphere for my pupils.                         |          | -0.086 | 0.615  | -0.134 |
| I understand my pupils' feelings very well.                                 |          | 0.122  | 0.613  | -0.077 |
| I solve emotional problems at work peacefully and stoically.                |          | -0.102 | 0.589  | -0.066 |
| (III) Depersonalisation   | 0.717    |        |        |        |
| Since I have started teaching, I have become less sensitive towards people. |          | 0.085  | -0.023 | 0.824  |
| I am afraid my job makes me emotionally cold.                               |          | 0.189  | -0.016 | 0.798  |
| Today, I no longer care that much about what is going on with my pupils.    |          | 0.130  | -0.219 | 0.633  |
| I feel that my pupils ascribe some of their problems to me.                 |          | 0.087  | -0.092 | 0.521  |
| I feel that sometimes I handle pupils impersonally.                         |          | 0.120  | -0.241 | 0.514  |
| variance %  |          | 23.55  | 14.70  | 13.52  |
| accumulated variance %  |          | 23.55  | 38.25  | 51.76  |

Table 4: Inter-correlation between the dimensions of the professional reflection scale

| Relationship between the types of professional reflection |                | meta-cognitive reflection | critical reflection | cognitive reflection | consulting reflection | practical reflection |
|---|----------------|---------------------------|---------------------|----------------------|-----------------------|----------------------|
| meta-cognitive reflection                                 | Spearman's Rho | 1.000                     | 0.736               | 0.494                | 0.339                 | 0.353                |
|   | p-value        | .                         | 0.000*              | 0.000*               | 0.000*                | 0.000*               |
|   | N              | 390                       | 390                 | 390                  | 390                   | 390                  |
| critical reflection                                       | Spearman's Rho | 0.736                     | 1.000               | 0.563                | 0.377                 | 0.432                |
|   | p-value        | 0.000*                    | .                   | 0.000*               | 0.000*                | 0.000*               |
|   | N              | 390                       | 390                 | 390                  | 390                   | 390                  |
| cognitive reflection                                      | Spearman's Rho | 0.494                     | 0.563               | 1.000                | 0.267                 | 0.380                |
|   | p-value        | 0.000*                    | 0.000*              | .                    | 0.000*                | 0.000*               |
|   | N              | 390                       | 390                 | 390                  | 390                   | 390                  |
| consulting reflection                                     | Spearman's Rho | 0.339                     | 0.377               | 0.267                | 1.000*                | 0.176                |
|   | p-value        | 0.000*                    | 0.000*              | 0.000*               | .                     | 0.000*               |
|   | N              | 390                       | 390                 | 390                  | 390                   | 390                  |
| practical reflection                                      | Spearman's Rho | 0.353                     | 0.432               | 0.380                | 0.176                 | 1.000                |
|   | p-value        | 0.000*                    | 0.000*              | 0.000*               | 0.000*                | .                    |
|   | N              | 390                       | 390                 | 390                  | 390                   | 390                  |

Table 5: Inter-correlation between the dimensions of the burnout syndrome scale

| Relationship between the burnout syndrome components |                | emotional exhaustion | personal accomplishment | depersonalisation |
|--|----------------|----------------------|-------------------------|-------------------|
| emotional exhaustion                                 | Spearman's Rho | 1.000                | -0.167                  | 0.278             |
|  | p-value        | .                    | 0.001*                  | 0.000*            |
|  | N              | 390                  | 390                     | 390               |
| personal accomplishment                              | Spearman's Rho | -0.167               | 1.000                   | -0.374            |
|  | p-value        | 0.001*               | .                       | 0.000*            |
|  | N              | 390                  | 390                     | 390               |
| depersonalisation                                    | Spearman's Rho | 0.278                | -0.374                  | 1.000             |
|  | p-value        | 0.000*               | 0.000*                  | .                 |
|  | N              | 390                  | 390                     | 390               |

Table 6: The relationship between the frequency of professional reflection among respondents and their burnout syndrome risk level

| Relationship between professional reflection and burnout syndrome |                | burnout syndrome |
|---|----------------|------------------|
| professional reflection   | Spearman's Rho | -0.077           |
|   | p-value        | 0.131            |
|   | N              | 390              |

Table 7: The relationship between the frequency of the individual types of professional reflection among respondents and their burnout syndrome risk level (burnout syndrome components)

| Relationship between the types of professional reflection and burnout syndrome components |                | emotional exhaustion | personal accomplishment | depersonalisation |
|---|----------------|----------------------|-------------------------|-------------------|
| meta-cognitive reflection   | Spearman's Rho | 0.104                | 0.157                   | -0.010            |
|   | p-value        | 0.040*               | 0.002*                  | 0.838             |
|   | N              | 390                  | 390                     | 390               |
| critical reflection   | Spearman's Rho | 0.020                | 0.268                   | -0.033            |
|   | p-value        | 0.698                | 0.000*                  | 0.512             |
|   | N              | 390                  | 390                     | 390               |
| cognitive reflection  | Spearman's Rho | -0.065               | 0.251                   | -0.008            |
|   | p-value        | 0.202                | 0.000*                  | 0.872             |
|   | N              | 390                  | 390                     | 390               |
| consulting reflection   | Spearman's Rho | 0.023                | 0.073                   | -0.139            |
|   | p-value        | 0.654                | 0.151                   | 0.006*            |
|   | N              | 390                  | 390                     | 390               |
| practical reflection  | Spearman's Rho | -0.088               | 0.181                   | -0.071            |
|   | p-value        | 0.081                | 0.000*                  | 0.161             |
|   | N              | 390                  | 390                     | 390               |

The statistical significance of correlations was verified at the significance level of 0.05. In terms of inductive statistics, the Spearman's correlation coefficient was used since the variables did not show a normal distribution ( $p \leq 0.05$ ) – as verified by the Kolmogorov–Smirnov test.

As shown in Table 4, most correlations between the dimensions exceed the value of 0.35. The closest relationship was identified among the dimensions of meta-cognitive reflection, critical reflection, and cognitive reflection. The more frequently the respondents try to understand themselves, evaluate their teaching, and respect their actual potential, the more frequently they take into account their pupils' needs and society's requirements in the teaching content.

A close relationship was also identified between the dimensions of critical reflection and cognitive reflection, and practical reflection. The more frequently the respondents evaluate their teaching in order to remove the stereotype and justify their teaching strategies, the more frequently they adjust their mental networks toward the creation of a more complex teaching theory.

A strong direct dependency was identified between the dimensions of cognitive and practical reflection, between consulting and critical reflection, and between practical and meta-cognitive reflection. The weakest relationship was identified between the dimensions of consulting and practical reflection. It indicates that analysing one's teaching experience with colleagues does not result in more frequent post-hoc reflection.

Table 5 shows that in terms of the individual components of the burnout syndrome, the closest negative correlation can be found between the dimensions of depersonalisation and personal accomplishment. The more alienated and cynical the respondents feel, the more their job performance decreases. A weaker positive correlation was identified between the dimensions of emotional exhaustion and depersonalisation. The more emotionally aloof the respondents are, the more they distance themselves from the educational phenomena.

#### 4 Research results

The results presented in Table 6 show that there is no statistically significant relationship between the frequency of professional reflection among teachers and their burnout syndrome risk level. Regardless of the professional reflection

frequency score, respondents did not show different burnout syndrome risk level scores.

Table 7 shows the indication of a statistically significant positive relationship between the frequency of meta-cognitive reflection, the dimensions of emotional exhaustion ( $0.040 \leq 0.05$ ;  $r_s=0.104$ ) and personal accomplishment ( $0.002 \leq 0.05$ ;  $r_s=0.157$ ). The higher the respondents' score in the dimension of meta-cognitive reflection, the higher their score in the dimensions of emotional exhaustion and personal accomplishment. It means that the more often they think about their teaching concept – e.g. what influences it, their weaknesses and strengths – the more the teachers may feel emotionally exhausted, and their joy of work decreases; on the other hand, the more they self-reflect and think about their profession, the more satisfied they may feel and tackle the related problems.

Table 7 also shows the indication of a statistically significant positive correlation between the frequency of critical reflection and the dimension of personal accomplishment ( $0.000 \leq 0.05$ ;  $r_s=0.268$ ). The higher the respondents' score in the dimension of critical reflection, the higher their score in the dimension of personal accomplishment. It means that the more teachers think about the social, value-related, and teaching aspects of their job, the more accomplished they can feel. This also applies to 1) the frequency of cognitive reflection (addressing one's professional development) and the dimension of personal accomplishment ( $0.000 \leq 0.05$ ;  $r_s=0.251$ ), and 2) the frequency of practical reflection (retrospection on teaching) and the dimension of personal accomplishment ( $0.000 \leq 0.05$ ;  $r_s=0.181$ ).

Moreover, Table 7 shows the indication of a statistically significant negative correlation between the frequency of consulting reflection and the dimension of depersonalisation ( $0.006 \leq 0.05$ ;  $r_s=-0.139$ ). The higher the respondents' score in the dimension of consulting reflection, the lower their score in the dimension of depersonalisation. It means that the more often they talk about teaching with their colleagues and analyse it together, the smaller the possibility that they will lose interest in their work and the related aspects.

#### 5 Discussion

Systematic reflection of teaching situations is a precondition for teachers' professional development (Ghaye, 2011; Mathew et al., 2017). In relation to their job, teachers should perform multiple types of reflection based on which their pedagogic and didactic

activities can be evaluated in detail (Marzano et al., 2012; Zeichner & Liston, 2014).

The importance of professional reflection lies in the fact that it allows teachers to look at their teaching realistically, thus preventing burnout syndrome.

On one hand, teachers create problem-solving strategies focused on pupils, thus making their own job easier – they arrange their experience within a theoretical framework; on the other hand, it can help them realise how good they really are at their job, which influences pupils' performance as well as their own professional development (Qing, 2009; Noormohammadi, 2014).

The research questions were formulated based on the provided theoretical background. A statistically significant negative correlation between the frequency of professional reflection in teachers and their burnout syndrome risk level was not supported.

The construct validity of the tools measured using exploratory and confirmatory factor analyses showed that the respective theory was correct.

The reliability of both scales was very high, as verified by Cronbach's alpha. The values calculated for the individual scale dimensions confirmed that our measuring was reliable enough. A research instrument cannot be considered relatively valid if its reliability is low (Marko, 2016).

The Cronbach alpha pertaining to the adjusted Maslach Burnout Inventory – Educators Survey proved to be within the expected range of 0.71 – 0.90 (Mareš, 2013). The only critical point seems to be located in the dimension of practical reflection within the scale of professional reflection frequency; hereby, the Cronbach alpha equals to 0.59. It is acceptable, however below the minimum limit (0.70) at which it can be said that a dimension measures the given construct reliably. It would be desirable to increase the number of similar items related in terms of meaning within the given dimension to increase its reliability.

Another question is how teachers perceive professional reflection in terms of its performance: from the description of their teaching experience to their reconstruction. Based on experts' claims (Theodoulides & Jahn, 2013; Soják, 2017), the quality of professional reflection depends upon our experience with its performance and what inclination we possess in terms of self-evaluation. The respondents achieved the lowest scores in practical professional reflection although it should be an inseparable part of their job ( $Me=2.50$ ) and in turn, initiate discourse reflection.

The question is whether we can speak of efficient professional reflection if teachers perform it without supervision or support from the school management. Most teachers (who at least partially care about their job) perform professional reflection intuitively. However, it is not clear whether it really helps them in professional and personal development (Kyriacou, 2012). Brestovanský (2019) also points out the discrepancy – although he agrees with the need to establish teacher communities with the aim to perform professional reflection based on mutual help and partner learning. Only consulting reflection indicates the potential to prevent depersonalisation in teachers – here a statistically significant negative correlation was identified among the respective dimensions.

The effort to develop teachers' expertise relates to their professional role-models and the influence of the professional community (Pišová et al., 2013; Janík et al., 2013). Teaching cannot be analysed without the interaction-based evaluation circle in which a person interprets and compares their own behaviour instead of being evaluated by others. Professional reflection brings desirable results if teachers systematically work with well-designed evaluation standards that determine the professional development goals and are shared by the whole collective.

This statement is supported by the fact that a statistically significant difference in the frequency of professional reflection was identified ( $0.000 \leq 0.05$ , Mann-Whitney U test=11256.500;  $Me=5.17$ ;  $Me=4.61$ ) and the frequency of meta-cognitive, critical, cognitive, and practical professional reflection ( $0.024 \leq 0.05$ , Mann-Whitney U test=12564.000,  $Me=5.25$ ;  $Me=4.88$ ;  $0.001 \leq 0.05$ , Mann-Whitney U test=11385.500;  $Me=5.50$ ,  $Me=4.88$ ;  $0.000 \leq 0.05$ , Mann-Whitney U test=9798.000;  $Me=5.00$ ,  $Me=3.67$ ;  $0.000 \leq 0.05$ , Mann-Whitney U test=11115.500;  $Me=3.00$ ;  $Me=2.00$ ). The research showed that having undergone reflection training over the last 8 years was of use. The respondents who attended a basic training focused on reflective teaching achieved higher scores in the dimension of personal accomplishment in comparison to those who did not attend it. In the burnout syndrome scale, these respondents achieved lower scores, which means that their burnout syndrome risk level is lower. The differences were statistically significant ( $0.013 \leq 0.05$ , Mann-Whitney U test=12352.500;  $Me=5.33$ ;  $Me=5.08$ ;  $0.031 \leq 0.05$ , Mann-Whitney U test=12666.500;  $Me=2.68$ ;  $Me=2.89$ ).

Most respondents in the research sample had long-term teaching experience. The Spearman's correlation coefficient showed that the longer the practice, the higher the score in the dimension of personal accomplishment ( $0.000 \leq 0.05$ ;  $r_s=0.211$ ) and lower score in the dimension of depersonalisation ( $0.009 \leq 0.05$ ;  $r_s=-0.133$ ). It can be stated that the length of practice did not represent a factor that would distort the research results. Weak dependencies were observed. The statistically significant correlation between the length of practice and realization of frequency of professional reflection types was not identified. The statistically significant correlation between the length of practice and total score in both scales was not identified. Statistically significant differences in the scores within the dimensions and scales were not identified between different sexes or teaching qualifications.

The low correlation between the two research instruments in the aforementioned aspects may be due to the fact that the burnout syndrome risk level scale was not homogeneous enough. The dimension of emotional exhaustion showed a positive correlation with the dimension of depersonalisation, however, the Spearman's correlation coefficient values provide only an indication of the fact. Similar findings related to the correlation between the dimensions of personal accomplishment and emotional exhaustion. Based on this, we decided to examine the correlation between the individual types of professional reflection and the dimensions describing the burnout syndrome.

The research shows that a weak direct dependency exists between the frequency of meta-cognitive reflection and the dimensions of emotional exhaustion and personal accomplishment. It is assumed that teachers who reflect on their professional background, i.e. studies, teaching models and philosophy can be unhappier as their original ideas on working with pupils may not match reality, and they had to adjust their expectations over time. Cantor (In Korthagen, 2011) state that after having adapted, we no longer tend to change our environment. We assimilate our experience according to the previous findings. However, adaptive metacognition helps teachers re-construct their teaching concepts (Lin et al., 2005), which may result in a change of their approach to pupils and the introduction of innovations. It can also enhance one's personal accomplishment.

A weak direct dependency was identified between the frequency of critical reflection and the dimension of personal accomplishment. Teachers who perform critical reflection are characterised by active interest in the teaching conditions, goals, consequences, teaching socialisation, and pupils' needs (Farrell, 2009; Shandomo, 2010). This type of reflection, usually accompanied by cognitive reflection can penetrate under the surface of the teaching processes, thus turning professional reflection into an integrative element (Timková, 2010; Farrell, 2018). Teachers' personal accomplishment is also enhanced by

independent self-development through updating their knowledge and performing strategic thinking (Petty, 2013).

A weak indirect dependency was identified between the frequency of consulting reflection and the dimension of depersonalisation. Only in this case, the research showed an indication that consulting reflection actually can help prevent depersonalisation as the highest-risk stage of the burnout syndrome. Simoncini et al. (2014) and Pollard et al. (2014) emphasize that a reflective teacher maintains a dialogue with their colleagues. Being able to ask suitable reflective questions and verbalise one's thinking and actions related to their teaching practice depends upon the stimuli within their teacher collective. Obst (2009) claims that the teacher's joy of teaching increases if they obtain feedback, as it drives them towards further teaching activities.

Javadi and Khatib's (2014) research confirmed an indirect linear dependency between the frequency of professional reflection in teachers and their burnout syndrome risk level. The demonstrated dependency strength was significantly higher ( $r=0.80$ ) than in our case in the individual types of reflection that were examined in relation to the burnout syndrome components. Their research also showed that all three burnout syndrome components show statistically significant negative correlation with the frequency of professional reflection. It can be interpreted by the fact that their research sample consisted of teachers working at private language institutes in Iran, and as pointed out by research of Rezaeyan & Nikoopour (2013) and Ashraf, Aynaz & Yazdi (2016), reflective teaching in Iran takes place in a different context as it is supported by the Iranian culture itself, which probably prefers participative teacher learning.

It should be emphasized that if teachers face increasing problems that require their long-term attention and activity, their ability to perform professional reflection – as a suitable operative and feedback tool to increase the quality of their teaching activities – tends to decrease. Lorenzová (2016) describes the teachers' situation in the postmodern era as follows: they are required to be constantly re-adapting to the constantly changing indicators of their performance quality, which affect their professional competencies in both intensity and extension. The teacher is not only an expert in a specific academic subject, they are also required to help bring up pupils and take care of them (Tomková et al., 2012; Rovňanová, 2015).

It is necessary to explain how the respondents were included in the research sample. The available selection was chosen despite its limitations. Since there was no other form of motivation available to persuade the respondents to participate in the research other than writing to them (the point of the research was explained to them), teachers who were actually interested in the subject matter professionally might have been more likely eager to participate. This may have distorted the results to some extent. The available selection also poses certain difficulties related to generalisation. Although the research was performed across all Slovak regions, it would be misleading to claim that the connections between professional reflection and burnout syndrome confirmed do apply to the basic research file that would represent all secondary school teachers in Slovakia. Therefore, another measurement should be performed on a larger research sample and focus on teachers with specific academic subject specialisation, which would narrow the potential generalisation area.

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#### Primary Paper Section: A

#### Secondary Paper Section: AM

# EFFECTS OF ORFF SCHULWERK CONCEPTION ON MUSIC ABILITIES OF PUPILS WITH MENTAL DISORDER

<sup>a</sup>ALICA VANČOVÁ, <sup>b</sup>MARGARÉTA OSVALDOVÁ

*Comenius University in Bratislava, Faculty of Education,  
The Department of Special Education, Račianska 59, 813 34  
Bratislava, Slovak Republic  
e-mail: <sup>a</sup>vancova@fedu.uniba.sk, <sup>b</sup>osvaldova@fedu.uniba.sk*

**Abstract:** Special primary schools are the most frequently used education institutions for pupils with mental disorder in Slovakia. A frequently discussed topic is the question of integration these pupils into an intact society. It is necessary to respect the specific needs of pupils, which precondition is a thorough knowledge of them. Pupils with mental disorder have deficiencies in cognitive functions, emotional abilities and motor skills. The development of music abilities contribute to their improvement. Positive approach in these domains is an important part of the aims in music education of pupils with mental disorder. As specified in the National Programme of Education, the teaching of music education at special primary schools for pupils with mental disorder is focused on developing competences within the Arts and cultural education and preparing pupils for practical life. In the research we used the conception of Orff Schulwerk which is mainly focused on the process of learning, communication and social integration. The development of music abilities such as music perception, sensory-auditory abilities as well as sensory-motor skills, creativity are more significant.

**Keywords:** mental disorder, Orff Schulwerk, music abilities, cognitive abilities, motor skills, social integration

## 1 Introduction

As determined in the National Programme of Education, the teaching of music education at special primary schools for pupils with mental disorder is focused on developing competences within the Arts and cultural education and preparing pupils for practical life. The conception of Orff Schulwerk is based on the process of learning, communication and social integration (Osvaldová, 2015, 2018). The development of music abilities such as music perception, sensory-auditory abilities as well as sensory-motor skills, creativity are more significant. The aim of the conception is to gain supportive experience in the group, improve not only music abilities but also in the field of cognitive and motor skills (Vančová, 2005, 2010). Positive approach in these domains is an important part of the aims in the education of pupils with mental disorder. Inclusion of Orff Schulwerk into effective music conceptions extends the base of the theoretical scope of special education (Vančová, 2014).

## 2 Theoretical Background

Getting to know the true level of pupils' cognitive, motor and emotional abilities is an important starting point for planning appropriate teaching methods, using appropriate aids, and is also important for the integration of these pupils into mainstream schools, which has recently been greatly accentuated (Osvaldová, 2018). Music activities can give an opportunity for pupils with intellectual disabilities to achieve similar results as intact pupils. At the same time, we help to integrate them and prevent their social exclusion and its' negative impact on the integrated pupils (Zikl, 2012).

But even in music activities, there are limited options of pupils with mental disorder, especially in activities where intellectual performance is needed. It is mainly a disrupted perception and to it related imagination disorder. Based on Orff Schulwerk (Orff, 1974), for the correction of disrupted perception and to it related imagination disorder we use the principle of multi-sense involvement. Pupils receive simultaneous mixing of sounds, colors through movement, speech, singing, body percussion, playing the instruments, using various props (Dunlap, 2008). We also integrate arts and dramatic activities into the music process. Motor skills of pupils with mental disorder demand the development of locomotion, balance, and manual skills. The fundamentals of Orff Schulwerk, based on the principle of activation through playing the music instruments we find efficient. Orff's instruments are motivating because by simple manipulation they can create interesting sound effects that

stimulate to music activities and help to develop rhythmic feelings, fine and gross motor skills (Blažeková, 2009, Nordoff, P., Robbins, C. 2003).

The principle of unity of movement, speech and music is one of the most important of these fundamentals of Carl Orff. As Keetman (1974) states, the unity of movement, speech and music is based and conditioned on rhythm. This rhythmically related unity is the resource for learning, developing skills and abilities in the area of movement, speech and music (Tichá, 2005, 2007, Procházková, 2007).

By applying the Orff's principle of learning in a group, social competences and their gradual application in society are significantly developed (Darrow, 2011). According to Jungmair (2003), in music group, the acceptance and observance of the game rules, the interplay, the ability to be in harmony with others in music improvisation, conditions for social behaviour, adaptation, mutual listening and empathic behavior can be created.

## 3 Method and Methodology

In his progressive music education method, Carl Orff designed activities with words, music, movement, playing the instruments. Inspired by the ideas of C. Orff and other music educators who, in the basis of reform education, emphasized the music activation of pupils with mental disorder, we realized experimental research in a special primary school in Bratislava, focusing on elementary music improvisation. The aim of the research was to find out the impact of music motion through music activities on development of music abilities of pupils with mental disorder at middle school age.

In the research, we have specified the following hypothesis: pupils doing group creative music activities in music lessons will better improve their music abilities compared to pupils completing collective music-reproductive activities in music lessons.

The target group of the research were pupils of special primary school at middle school age. Equivalent groups (experimental and control group) were organized from age-different groups of second and third year pupils. In consideration of the age criterion and the results of the entrance tests we arranged experimental and control group. The number of pupils has established to eight in both groups (Table 1.)

Table 1: Basic experimental data

| Experimental group  | Control group   |
|---|---|
| Second year class: 4 pupils   | Second year class: 4 pupils   |
| Third year class: 4 pupils  | Third year class: 4 pupils  |
| Gender: 3 boys, 5 girls   | Gender: 4 boys, 4 girls   |
| Number of hours: 24   | Number of hours: 24   |
| Input and output tests inspired by musical abilities test of E. E. Gordon | Input and output tests inspired by musical abilities test of E. E. Gordon |
| Test of short tasks of musical abilities                                  | Test of short tasks of musical abilities                                  |

We used the modified E. E. Gordon Melody and Rhythm Test (a test for mental disorder), the so-called A-test to determine pupils' music abilities and Test of Music Skills B-test (Table 2.). Individual A-test subtests have determined the sensory-auditory abilities of the pupils and the B-test subtests of the sensory-motor skills of the pupils: a sense of rhythm, stroke, and pitches with which the ability for imagination and memory is naturally associated. The tests were based on the auditory distinction between two melodic and rhythmic patterns, and the ability to

motorically reproduce pre-recorded music examples focused on rhythm, stroke and melody.

Table 2: Testing

|   |
|---|
| Sensory-Auditory A-test:                          |
| Auditory distinction between two themes:          |
| 1. melodic motifs - sense of pitch                |
| 2. rhythmic motifs - sense of rhythm              |
| Sensory-motor skills B-test:                      |
| Reproducing pre-recorded music examples aimed at: |
| 1. rhythm patterns                                |
| 2. melodic patterns                               |
| 3. stroke   |

Teaching program of each lesson of music is in methodological sheets. In the E-group (experimental group) and the C-group (control group) we considered the following criteria: vocal intonation, music perceptual, music instrumental and music movement activities were represented in both groups. In the E-group, music-dramatic activities have also been added to these activities. Methods and forms of work were significantly different (Table 3.). While in the C-group we focused on the music reproductive activities, in the E-group we emphasized the creative approach of music activities.

Although the music activities in the E-group presupposed an individual approach, our aim was to preserve the principle of the group form of teaching in music education.

Table 3: Differentiated activities, methods and forms of work in E-group and C-group

|  |  |
|--|--|
| Experimental group<br>Emphasis on creative approach of music activities  | Control group<br>Emphasis on music-reproductive activities   |
| Music activities:<br>Vocal intonation<br>Motion in music<br>Music instruments<br>Music perceptual<br>Drama in music  | Music activities:<br>Vocal intonation<br>Motion in music<br>Music instruments<br>Music perceptual  |
| Methods and Forms:<br>Vocal imitation based on creative forms of improvisation<br>Communication through vocal activities<br>Elementary improvisation (free music improvisation using melodic and rhythmic instruments)<br>Playing the melodic instruments based on improvisation<br>Playing simple children songs on melodic instruments<br>Dramatized fairy-tale with music and motion activities | Methods and Forms:<br>Vocal imitation<br>Collective rhythm playing by using Orff instruments<br>Learning the basics of how to read sheet music using coloured music notation<br>Using the melodic instruments for reading coloured music notation<br>Listening to music along with drawing<br>Music motion activities based on simple choreography |
| Group form of teaching with emphasis methods on creative approach  | Collective teaching with emphasis on demonstration methods   |

#### 4 Results and Discussion

The results of research exit tests compared to entrance test of the same group were following:

Table 4: Mean values - Gross score of input and output testing results of experimental and control group

| Tests | B_Reproduction of melody_input | B_Reproduction of melody_output | B_Reproduction of stroke_input | B_Reproduction of stroke_output | B_Reproduction of rhythm_input | B_Reproduction of rhythm_output | A_Distinguishing two melodic patterns_input | A_Distinguishing two melodic patterns_output | A_Distinguishing two rhythmic patterns_input | A_Distinguishing two rhythmic patterns_output |
|-------|--------------------------------|---------------------------------|--------------------------------|---------------------------------|--------------------------------|---------------------------------|---|--|--|---|
| EG    | 550                            | 1025                            | 600                            | 1138                            | 538                            | 1013                            | 650   | 1225   | 650  | 1200  |
| CG    | 500                            | 700                             | 550                            | 750                             | 513                            | 738                             | 525   | 763  | 525  | 763   |
| C     | 525                            | 863                             | 575                            | 944                             | 525                            | 875                             | 588   | 994  | 588  | 981   |
| P     | 0.92                           | 0.152                           | 0.781                          | 0.049                           | 0.89                           | 0.91                            | 0.32  | 0.010  | 0.428  | 0.010   |

Key: EG - Experimental group, CG - Control group, C - Cohere, P - P-value

Table 5: T-test values for both files together

|        | M      | N  | SD      | SEM    |
|--------|--------|----|---------|--------|
| Input  | 5.6000 | 16 | 3.01552 | .75388 |
| Output | 9.3125 | 16 | 3.71661 | .92915 |

Key: M - Mean, SD - Std. Deviation, SEM - Std. Error Mean

Table 6: T-test values within the input and output tests of each group

| Group  | N            | M | SD      | SEM     |
|--------|--------------|---|---------|---------|
| Input  | Experimental | 8 | 5.9750  | 3.21147 |
|        | Control      | 8 | 5.2250  | 2.97502 |
| Output | Experimental | 8 | 11.2000 | 3.35687 |
|        | Control      | 8 | 7.4250  | 3.19184 |

Key: M - Mean, SD - Std. Deviation, SEM - Std. Error Mean

Results in (Tables 4.,5.,6.) show that the average measured values in the Mann-Whitney test and the T-test in both groups at the final tests are statistically significantly higher than the average measured values achieved by the entrance tests.

Figure 1: Test profile for the entire file

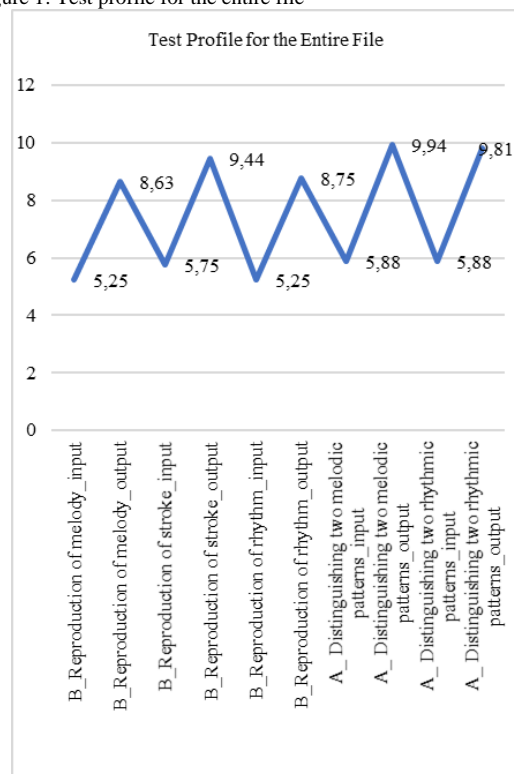


Figure 2: Tests in the control group

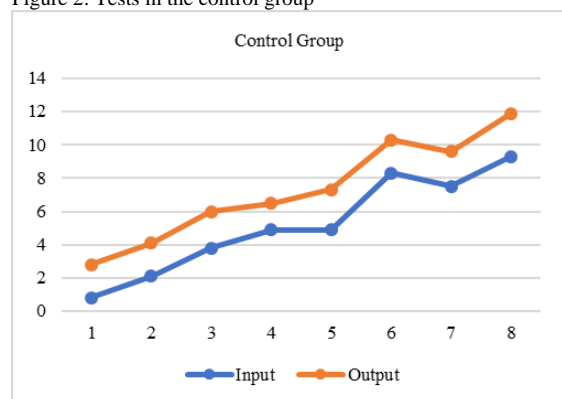
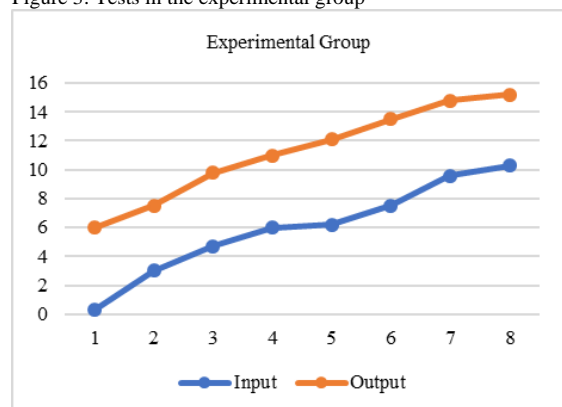


Figure 3: Tests in the experimental group



If we compare the average measured values in the gross score of the E-group and C-group final tests (Figures 1., 2., 3.), we find that the C-group achieves a low level in the final tests. The experimental group with its average measured values far outweighs the measured values in the control group.

Table 7: Mean values - gross score comparing experimental and control group improvements in individual tests relative to their previous results

| Group |        | B_Reproduction of melody | B_Reproduction of stroke | B_Reproduction of rhythm | A_Distinguishing two melodic patterns | A_Distinguishing two rhythmic patterns |
|-------|--------|--------------------------|--------------------------|--------------------------|---------------------------------------|--|
| E1    | input  | 5,50                     | 6,00                     | 5,38                     | 6,50                                  | 6,50                                   |
| E2    | output | 10,25                    | 11,38                    | 10,13                    | 12,25                                 | 12,00                                  |
| C1    | input  | 5,00                     | 5,50                     | 5,13                     | 5,25                                  | 5,25                                   |
| C2    | output | 7,00                     | 7,50                     | 7,38                     | 7,63                                  | 7,63                                   |
| PE    |        | 0,000                    | 0,000                    | 0,000                    | 0,000                                 | 0,000                                  |
| PC    |        | 0,000                    | 0,000                    | 0,000                    | 0,000                                 | 0,000                                  |

Key: E1 – Experimental, E2 – Experimental, C1 – Control, C2 – Control, PE - P-value, Experiment, PC - P-value, Control

Figure 4: Comparison of experimental group improvement in individual tests relative to their previous results

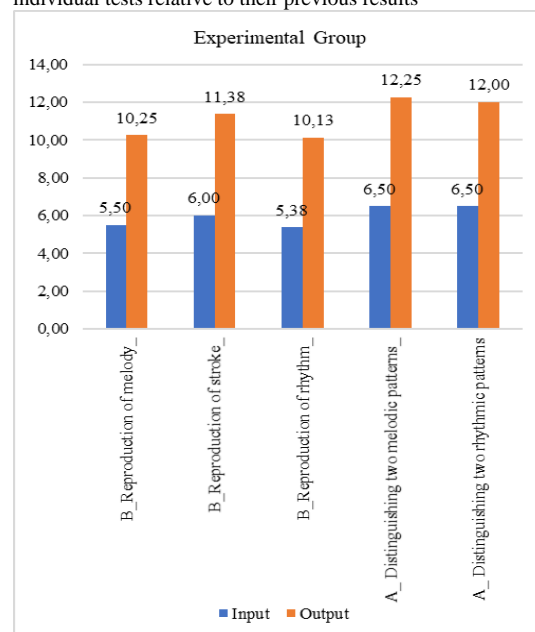


Figure 5: Comparison of control group improvements in individual tests relative to their previous results

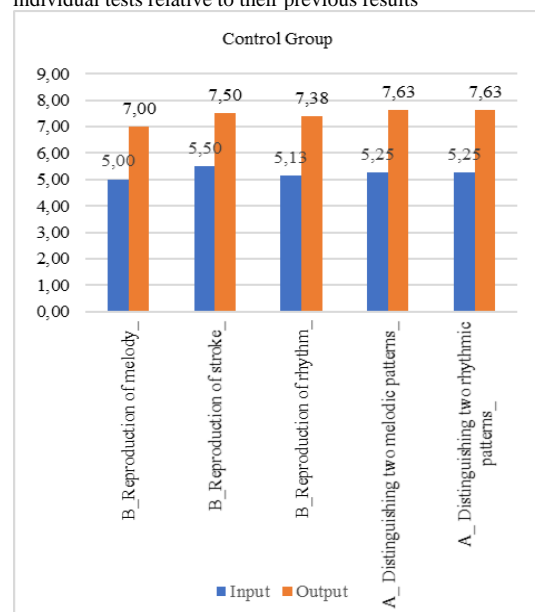


Table 7. and Figures 4., 5. present a comparison of E-group and C-group results in both tests. The B-tests realized in individual form, aimed at reproducing melody, stroke and rhythm - both groups achieved the highest score in the stroke reproduction subtest, the lowest score in the rhythm reproduction. Low values in the rhythmic activities of pupils can be due to the limited ability of motor skills, in which locomotion, balance and manual dexterity deficiencies occur. However, the level of music perception has improved in both groups. In particular, E-group improved in intonation and singing compared to entrance tests.

We can also deduced from the above data that higher values were recorded in the overall result of the A-test carried out in the group form than in the overall B-test result for both groups. It should also be pointed out that the A-test aimed at the auditory differentiation of musical patterns (melodic and rhythmic) was not as demanding as the reproduction of melody, tempo and rhythm. The overall result could also be influenced by the group form of the A-test and the individual form of the B-test.

Table 8: Average values - Gross score comparing individual group pupil improvements due to their previous results

| Group gender | Group gender | Pupils | Gender | B_Reproduction of melody_input | B_Reproduction of melody_output | B_Reproduction of stroke_input | B_Reproduction of stroke_output | B_Reproduction of rhythm_input | B_Reproduction of rhythm_output | A_Distinguishing two melodic patterns_input | A_Distinguishing two melodic patterns_output | A_Distinguishing two rhythmic patterns_input | A_Distinguishing two rhythmic patterns_output | Cohere | Input | Output |
|--------------|--------------|--------|--------|--------------------------------|---------------------------------|--------------------------------|---------------------------------|--------------------------------|---------------------------------|---|--|--|---|--------|-------|--------|
| 1            | 1            | 1      | 1      | 0                              | 4                               | 0                              | 5                               | 0                              | 6                               | 3   | 8  | 0  | 7   | 1      | 0,60  | 6,00   |
| 1            | 1            | 2      | 1      | 1                              | 4                               | 3                              | 8                               | 3                              | 7                               | 5   | 10   | 3  | 8   | 1      | 3,00  | 7,40   |
| 2            | 1            | 3      | 2      | 4                              | 8                               | 4                              | 9                               | 3                              | 8                               | 6   | 11   | 7  | 12  | 1      | 4,80  | 9,60   |
| 2            | 1            | 4      | 2      | 5                              | 10                              | 7                              | 12                              | 5                              | 9                               | 6   | 12   | 7  | 12  | 1      | 6,00  | 11,00  |
| 1            | 1            | 5      | 1      | 5                              | 11                              | 6                              | 12                              | 7                              | 12                              | 5   | 12   | 8  | 14  | 1      | 6,20  | 12,20  |
| 2            | 1            | 6      | 2      | 8                              | 14                              | 7                              | 14                              | 7                              | 12                              | 8   | 14   | 7  | 13  | 1      | 7,40  | 13,40  |
| 2            | 1            | 7      | 2      | 10                             | 15                              | 10                             | 16                              | 9                              | 13                              | 9   | 15   | 10   | 15  | 1      | 9,60  | 14,80  |
| 2            | 1            | 8      | 2      | 11                             | 16                              | 11                             | 15                              | 9                              | 14                              | 10  | 16   | 10   | 15  | 1      | 10,20 | 15,20  |
| 3            | 2            | 1      | 1      | 0                              | 2                               | 0                              | 2                               | 1                              | 3                               | 2   | 4  | 1  | 3   | 1      | 0,80  | 2,80   |
| 3            | 2            | 2      | 1      | 1                              | 2                               | 3                              | 5                               | 3                              | 5                               | 1   | 3  | 3  | 6   | 1      | 2,20  | 4,20   |
| 4            | 2            | 3      | 2      | 5                              | 7                               | 3                              | 5                               | 3                              | 5                               | 4   | 7  | 4  | 6   | 1      | 3,80  | 6,00   |
| 4            | 2            | 4      | 2      | 5                              | 7                               | 6                              | 7                               | 4                              | 6                               | 6   | 8  | 4  | 6   | 1      | 5,00  | 6,80   |
| 3            | 2            | 5      | 1      | 4                              | 6                               | 5                              | 8                               | 6                              | 8                               | 4   | 6  | 6  | 8   | 1      | 5,00  | 7,20   |
| 4            | 2            | 6      | 2      | 9                              | 11                              | 9                              | 11                              | 8                              | 10                              | 9   | 12   | 8  | 10  | 1      | 8,60  | 10,80  |
| 3            | 2            | 7      | 1      | 6                              | 8                               | 8                              | 10                              | 8                              | 11                              | 6   | 8  | 8  | 11  | 1      | 7,20  | 9,60   |
| 4            | 2            | 8      | 2      | 10                             | 13                              | 10                             | 12                              | 8                              | 11                              | 10  | 13   | 8  | 11  | 1      | 9,20  | 12,00  |

From the above we reached the following conclusions: in the overall result of the A-test the hypothesis was confirmed, The E-group improved compared to the C-group. The B-test results also confirmed the hypothesis. In all B-tests, the E-group had significantly better results than the C-group (Figures 4., 5., Table 8).

## 5 Conclusion

These results confirm the fact that music education, which creates space for creative group activity of pupils, significantly improves their musical potential. This thesis confirms the ideas of C. Orff, who emphasizes the group's creative approach in music activities. In music lessons, pupils in experimental group performed their music activities in groups in a creative-working atmosphere based on Orff's conception.

In research, we could also evaluate the behaviour of individual pupils. Based on the observation, we can conclude that other variables, such as low concentration, absence of motivation, tension of some pupils from entry and final tests, have reduced the validity of overall research.

Thus, the test results point to the value of a group form of music education process with an emphasis on the music activation of pupils with mental disability respecting the principles of C. Orff.

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Primary Paper Section: A

Secondary Paper Section: AM

## HEALTH FINANCING POLICY REFORM TRENDS: THE CASE OF LATVIA

<sup>a</sup>MĀRA PĒTERSONE, <sup>b</sup>KĀRLIS KETNERS, <sup>c</sup>INGARS ERINS

<sup>a,c</sup>*Riga Technical University, Kalnciema Str.6, LV-1048, Riga, Latvia*

<sup>b</sup>*BA School for Business and Finance, Kr. Valdemara Str. 161, LV-1013, Riga, Latvia*

*email: <sup>a</sup>Mara.Petersone@rtu.lv, <sup>b</sup>Karlis.Ketners@ba.lv, <sup>c</sup>Ingars.Erins@rtu.lv*

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**Abstract:** Health financing policy is one of major challenges for any health care system. The Latvian health care system faces challenges and financial pressures that threaten its long-term sustainability and the values of solidarity. The goal of this paper is to conduct the review of the financing resources of the health care in Latvia, to evaluate the development of the health care reform in Latvia and provide recommendations for future changes. To achieve the goal of the research, comparative analysis and methods of theoretical research, as well as for data processing and analysis, the statistical analysis methods are used.

**Keywords:** health systems; healthcare financing; taxation; universal health coverage.

### 1 Introduction

Health financing schemes have to raise revenues in order to pay for health care goods and services that serve the population. There are different types of revenues which can however be closely correlated with the financing scheme. In general, financing schemes can receive funding from the government, social insurance contributions, voluntary or compulsory prepayments (e.g. medical saving accounts, insurance premiums), and other domestic revenues and revenues from abroad as part of development aid (foreign financial assistance). The policy debate on health systems has been dominated in recent decades by concerns about sustainability and the system's ability to fund itself in the face of growing cost pressures (see Kluge et al. (2017), Kutzin (2013); Abiir and De Allegri (2015)). The recent financial crisis that has affected some countries as well as state budget fiscal rules have added to these concerns. The period 2009–2013 saw a general drop in health spending in many countries, but since then expenditure on health systems has been rising again across the region (Karanikolos et al., 2013; Reeves et al., 2014). Since health systems in Europe are mostly publicly financed, this financial pressure is typically expressed as a challenge for public budgets. Health expenditure in many European countries has been growing at a faster rate than the economy, accounting for an increasing percentage of gross domestic product (GDP) and creating unease about its economic competitiveness in an increasingly globalised economy. Containing costs has, consequently, become a significant priority for most health systems in the World Health Organization (WHO) European Region and beyond. Typically, policy-makers have sought to find a balanced combination of different strategies to tackle both the supply and demand sides of health services. While European health policy-makers are committed to shared values, and their systems may to varying degrees reflect them, the regional health systems remain very different. The two main traditional models of health financing – Beveridge and Bismarck have all been adopted in different national contexts and have evolved over time. Moreover, even if these categorisations no longer apply in practice, each regional health system has left its historical legacy in terms of health system structure and design, resources, infrastructure (buildings), and expectations about how the health system should work. Main challenges for Latvian health financing system are the application of different systemic approaches to the financing scheme and acute resource and hospital infrastructure issues. As stated by OECD Secretary-General A. Gurría (OECD, 2019a) Latvia is among the OECD countries

with the highest inequalities in income, health and among regions. One of the important governmental tasks is to build a more inclusive health sector. Out-of-pocket expenditure accounts for 45% of health spending, compared to 21% on average across the OECD. 10% of patients in the lowest income quintile skip doctors' appointments because they cannot afford to pay the fees. A continued commitment to universal access to healthcare and to increase spending will be crucial. Each country makes different choices about how to raise revenues, how to pool them and how to purchase services. Just because several countries decide to raise part of the revenue for health from compulsory health insurance premiums does not mean that they all pool the funds in the same way. Some countries have a single pool – e.g. a national health insurance fund – while others have multiple, sometimes competing pools managed by private insurance companies. Even when countries have similar pooling systems, their choices about how to provide or purchase services vary considerably. Two systems based largely on health insurance may operate differently in how they pool funds and use them to ensure that people can access services; the same applies to two systems that are described as tax-based. This is why the traditional categorization of financing systems into tax-based and social health insurance – or Beveridge versus Bismarck – is no longer useful for policy-making. It is much more important to consider the choices made at each step along the path, from raising revenues, to pooling them, to spending them (Kutzin, 2011; Bump, 2015). Based on early presented research (Pētersone, Ketners, Rakauskienė, (2018)) authors join the view of OECD experts (OECD (2019a)) that higher healthcare spending should be financed from general budget revenues rather than earmarked social contributions to simultaneously improve market labour outcomes and equity while simplifying the tax system. The goal of this paper is to conduct the review of the financing resources of the health care in Latvia, to evaluate the development of the health care reform in Latvia and provide recommendations for future changes. To achieve the goal of the research, comparative analysis and methods of theoretical research, as well as for data processing and analysis, the statistical analysis methods are used.

### 2 Health care expenditures and external environment of the Latvian system

Health care reforms are always in the focus of research, even for such countries in transition as post-socialism countries. Latvian health care reform, amongst other Baltic states was analysed by (Bankauskaite and O'Connor, 2008). Authors agree that health care policy in three Baltic States during the period from 1992 to 2004 developed in parallel, diverging or even converging ways. The similarity of the overall goals during this period could be identified, and policy content in primary health care, the hospital sector and financing is comparable. 2000s health policy in Estonia, Latvia and Lithuania have been progressing in parallel towards a Western European social insurance funding model, developing a primary care system anchored on a general practitioner service and lessening the hospital orientation of the pre-1990s system. There is evidence of convergence in key health policy and outcome characteristics. However, for the period after 2006, these patterns are explained partly by differing starting points and partly by political and economic factors over the 1992–2004 period. Similarities could be also accepted by data on total financing (Fig.1)

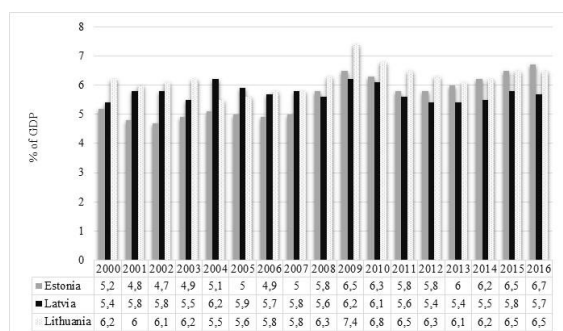


Figure 1: Health financing, % of GDP  
Source: (OECD, 2019b)

Before 2008, Estonian and Lithuanian financing schemes show relatively similar amounts; however differences appear in sources of financing and type of financing system, and after 2011 a decrease in the nominal amount of Latvian health care financing is detectable. Early reforms, similar across all the Baltic States, focused on improving quality, efficiency, and geographical and timely access to healthcare, but differences in politics, economy, and culture perhaps explain variations in the implementation of the reforms. After independence restoration, all three Baltic States adopted social health insurance systems. For these countries, with their deep-rooted distrust of government, a system in which organisational and health financing arrangements lay largely outside the state sector was an attractive prospect. Additionally, by introducing a purchaser-provider split, they hoped to increase transparency and efficiency. Finally, in a fragile economic environment, earmarked payroll tax was seen as a more stable funding source than general tax. However, in all three states, the decentralisation of the financing system resulted in an inefficient and fragmented allocation of resources and was followed by a gradual recentralisation. In the course of implementation of the reform, funds allocated in the 1990s for the financing of healthcare measures were divided into two separate programmes: the state programme and the basic programme and were directed towards service providers in several flows of financing. The programmes were financed from two sources: state funds and municipal funds, and the sources of such financing – state budget, municipal budget, and action grants from the state budget – changed every year. Although finance flows had been defined, the question of the sources of financing remained for late 1990 earmarked payroll tax (personal income tax) was used. As analysed by Arāja and Krūzs (2016) according to the principles adopted in 1994, it was planned to introduce a health tax already in 1995, payable in equal parts (three per cent of the taxable income of an employee) by the employee and the employer, but this tax has not been introduced. The basis for the State compulsory health insurance – part of the resident income tax and a grant from the state general budget – was defined in 1996. The state basic budget grant model was accepted in 2003, which abolished the special-purpose healthcare budget and envisaged the healthcare budget as part of the general state budget. Subsequently, because of apparent problems with decentralized planning and financing, a recentralization process was initiated. Recentralization led to the creation of one single fund, the State Compulsory Health Insurance Agency in 2002. In 2005, earmarking of a proportion of the collected personal income tax for health care was abandoned in favour of general tax financing. Finally, the centralization process culminated in the creation of the National Health Service (NHS) in 2011, effectively abandoning the concept of social health insurance. Functions of several previously existing institutions were incorporated into the NHS with the aim of creating one single institution for the implementation of health policies in Latvia (Mitenbergs et al., 2014). However, the purchaser-provider split was retained, with the NHS continuing to purchase care from independent public and private providers – just as the State Compulsory Health Insurance Agency had done before. In recent times, a

challenging economic climate has required some harsh austerity measures to balance public budgets.

As shown in (OECD, 2017b), governments provide a multitude of public services out of their overall budgets. Hence, health care is competing with many other sectors such as education, defence and housing. The size of public funds allocated to health is determined by several factors including, among others, the type of system in place and the demographic composition of the population. Relative budget priorities may also shift from year to year as a result of political decision-making and economic effects. In 2015, health spending by government schemes and compulsory insurance stood at around 15% of total government expenditure across the OECD (Fig. 2).

In Japan, Switzerland, New Zealand, the United States and Germany, more than 20% of public spending was dedicated to health care. On the other hand, less than 10% of the money spent by governments or compulsory health insurance was allocated to health care in Latvia and Greece.

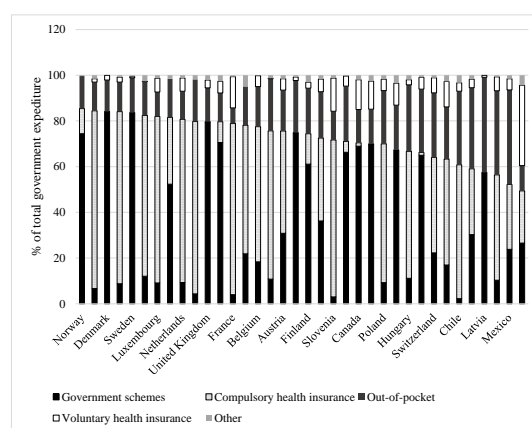


Figure 2: Health expenditure by type of financing, 2015 (or nearest year)  
Source: (OECD, 2017b)

The revenues of a country's government are strongly correlated with a country's system of health care financing. The role of governments as a financial source can be highlighted more clearly when only focusing on the composition of revenues for compulsory health insurance, which in most OECD countries consists of social health insurance (SHI). In the analysed OECD countries, governmental transfers are a source of revenue in each case but the importance differs significantly. In Japan, more than 40% of the revenues of SHI stems from governmental transfers. On the other hand government transfers in Estonia, Poland and Slovenia are less than 5%. In those countries, SHI funds finance their outlays nearly exclusively via social contributions. But variations exist when analysing the burden of SHI in more detail. For example, in Poland, employees bear the majority of social contributions, whereas in Estonia the financing responsibility falls on employers' side. Authors conclude that there is no optimal approach to the structure of the funding and basically relies on historical trends of financing. Some countries are planning to reduce their reliance on wage-based contributions in the face of shrinking labour markets and financial shocks, and are increasingly looking for ways to diversify their revenue base (OECD, 2015). While there is a little year-to-year change in the health financing structure and composition of revenues, some trends can be discerned over a longer time horizon (OECD, 2017a). In Belgium, for example, the share of social contributions in all revenues has fallen from over 50% to around 43% over the last decade. At the same time, governmental transfers have gained importance. The latter is also true for the United States, where the share from government transfers increased from 34% to 41% over the same period. In Korea, on the other hand, government transfers have stagnated while the share through social contributions has increased (OECD, 2017a).

Authors came to the same conclusion as (Mitenbergs et al., 2014), that financing scheme has to be viewed in the context of almost 27 years of reforms, which radically transformed the Latvian health system after the restoration of independence of the country in 1991. Similar as in Estonia and Lithuania, (van Ginneken et al., 2012) the reforms have been aimed at making a clear break with the Soviet-style Semashko model, which was characterised by central planning and universal access but suffered from inefficiency, hospital overcapacity, and inadequate healthcare.

### 3 Health care expenditures and problems of financing sources structure of the Latvian system

In Latvia (Fig.3) despite various institutional reforms and changes in financing sources done during the past 30 years, the the European Union (EU) and high-income countries.

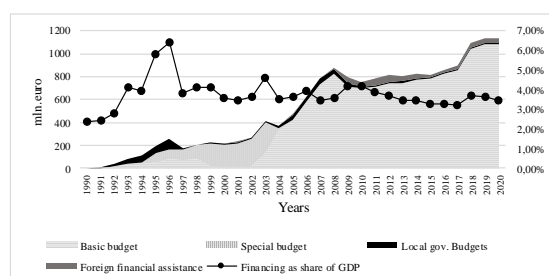


Figure 3: Public sector budget financing sources of health care. Source: Authors calculations based on Latvian annual report data (State Treasury), Ministry of Health data and Central Statistical Bureau data

In 2017 the Latvian health system provided coverage to the entire population (Latvians and non-Latvian residents) and paid for a basic services package, which is guaranteed by the constitution. The Latvian single health care purchaser – National Health Service (NHS) receives its resources from general tax revenues, and purchases care from independent public and private providers. Most hospitals are publicly owned by state or local government, while most general practitioners work as independent professionals. Specialists work either as independent professionals or as employees of hospitals. All dental practices and pharmacies are privately owned. Patients are encouraged to register with a general practitioner (family doctor) of their choice who expected to act as a “system gate-keeper”. After referral, patients can freely choose a specialist care provider, although the actual choice is often limited – in particular in rural areas – and waiting lists are substantial. For the health care system, two main problems could be defined – underfunding from public funds and significant amounts for direct payments and user charges.

As main problems of health systems authors see that the health care system is severely underfunded: total health expenditure in 2016 was only US\$1'466 PPP per capita, which was one of lowest amounts, spent on health in the OECD (OECD, 2017b). Furthermore, only about 57% of total spending came from public sources (OECD, 2017b). Inadequate public funding means that patients are exposed to substantial user charges and direct payments, in particular for pharmaceuticals.

Out-of-pocket (OOP) payments - expenditures are borne directly by patients and include cost-sharing arrangements and any informal payments to health care providers are amongst the highest in EU and OECD.

level of total public financing remains approximately the same – 3-4% of GDP. Abovementioned level of financing corresponds with low-income countries health financing and could be explained with the historical trend in the former Soviet Union (Balabanova et al., 2012) more than with sound and reasonable practice. Starting with 1996, when part of personal income tax and part of excise tax revenues was earmarked to special state budget for health, and financing scheme was changed from decentralised local financing into a regional system with centralised financing notwithstanding further changes from social health insurance to national health service, and single purchaser amounts remain the same - total health expenditure as a proportion of GDP is quite low compared to the levels seen in

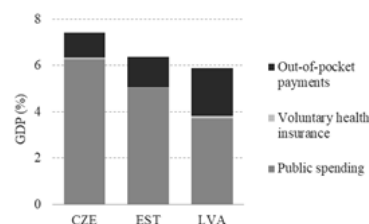


Figure 4: Public sector and OOP financing sources of health care. Source: WHO Regional Office for Europe, 2017

As shown in (OECD, 2017b) on average across the OECD, private households directly financed around one-fifth of all health spending in 2015. This share is above a third of health spending in Greece (35%), Korea (37%), Mexico (41%) and Latvia (42%), while in France it is below 10%. With the implementation of universal health coverage in some OECD countries over previous decades, there have been some significant reductions in the share of health care costs payable by households.

More recently, the share of OOP spending has been generally stable but with some notable increases in some European countries, also in Latvia. Out-of-pocket (OOP) problems in Latvia are stated by OECD experts and are subject to separate researches (See e.g., Cylus, Thomson, and Evetovits, 2018; Vāne, 2018). However since the share of OOP payments in total health spending is consistently among the highest in the EU, the necessity of additional financing to replace OOP with traditional financial sources is required for financial protection and universal health coverage assurance.

Based on authors analysis financing amounts could also be correlated with such health care outcome ratio as amenable mortality (Fig.5). Increase in public financing strongly correlates with a decrease in amenable mortality rates. The “additional financing break-even point” seems to be at approx — 1'300 EUR per capita. Based on authors calculations “full-service basket” for insurance of the entire population in comparable terms and prices could be 1'400 – 1'600 EUR per capita. Similar results were presented at Conference “Health Care System in Latvia - Structural Reforms and Financing Models” in 2016. However, Bank of Latvia (2016) proposed compulsory health insurance model with payments of 300 EUR. Based on the Cabinet of Ministers (2017) Conceptual report, additional financing necessary for health care services could be evaluated at 500 – 600 mln. EUR, which corresponds with the Ministry of Health presentations (see for example Ministry of Health (2017)).

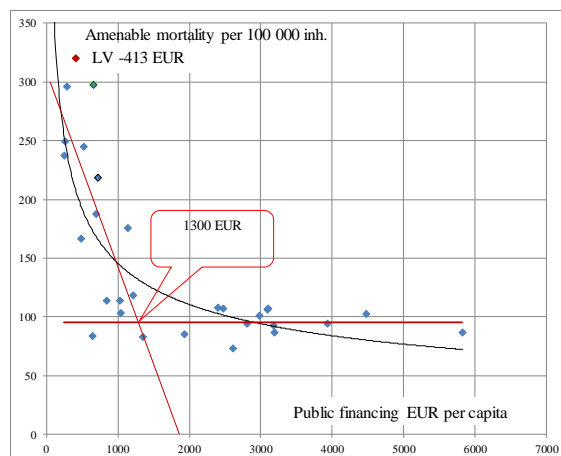


Figure 5: Correlation of granted public financing and amenable mortality ratio for EU and Norway (2013 data or latest available).  
Source: Authors calculations based on OECD Health Statistics, 2017 (OECD, 2017b).

Similar results for the existing relationship between health care expenditures and life expectancy (Fig.5) was obtained by Ortiz-Ospina and Roser (2017). Countries with higher expenditure on healthcare per person tend to have a higher life expectancy, and also by looking at the change over time, we can detect that as countries spend more money on health, the life expectancy of the population increases.

Based on the European Commission DG ECFIN note (European Commission (2015) and Przywara, B. (2010).we can conclude that ageing-related expenditure is projected to increase by 1.8% of GDP. Non-demographic factors are estimated to be the main drivers of health spending. Demand for health care is likely to increase with higher economic prosperity, as a better standard of living changes people's attitudes to their health. Since advances and improvements in medical technology, techniques and pharmacology are critical factors in delivering quality care, but also they are increasingly expensive. With a focus on high-cost products, medicine and technology are a major factor in driving health system expenditure. During the recent financial and economic crisis, GDP and public expenditures declined more in Latvia than in any other EU member state. Based on fiscal constraints significant spending cuts were made in the health care sector and public spending on health as a share of GDP dropped from 4.3% of GDP in 2007 to approx. 3.4% in 2012 (Taube et al., 2014). The proportion of the population reporting an unmet medical need because of costs doubled during the financial crisis, reaching more than 14% in 2011 before reducing to just above 10% in 2014. (Eurostat, 2018) Furthermore, essential inequities exist in Latvia as the proportion of the population with unmet medical needs (not only because of costs) is much higher in the poorest income quintile (29%) than in the wealthiest income quintile (10%). (Eurostat, 2018). In Latvian Stability program for 2016, Latvia requested a temporary deviation of 0.5% of gross domestic product from the required for the medium-term budgetary objective to implement structural reforms in health care with a positive impact on the long-term sustainability of public finances, based on the Public Health Guidelines 2014-2020. This solution solved short-term accessibility problems as well as provided additional financing for the health care system.

### 3 The future reform projections

Solving long-term financing structure issues there is the possibility to increase financing from general tax revenues or from earmarked revenues (e.g. mandatory social insurance). Under the pressure of the economic crisis, the most essential arguments at that time were that linking health services to the payment of tax would contribute to the increasing of tax revenues and that excluding Latvians who emigrated abroad (and consequently did not pay tax) from the receiving health services

at home would improve service availability for residents in Latvia. The discussion around the proposed financing reform illustrates that the concept of compulsory or social health insurance remains attractive – especially in condition of insufficient general budget revenue, it shows that a change from National Health Service to Social Health Insurer does not imply major institutional reforms, and it demonstrates the potential problems of introducing earmarked social health insurance, i.e. of linking entitlement to health services to the payment of contributions.

The Latvian parliament passed the Healthcare Financing Law in December 2017 and it will fundamentally change the principles of the national healthcare financing system. The aim is to convert the current system from general tax revenue funded National Health Service (NHS) system into a Compulsory Health Insurance (CHI) system by linking entitlement to health services to the payment of income-related mandatory social insurance contributions. The main aim of the Law is to ensure sustainable financing and raise revenues for health care system, to ensure solidarity in the system and linking entitlement to health services with the payment of social insurance contributions or special payment from persons, which are not covered by Social Health Insurance.

The Law would have major implications for the health system by modifying the modalities for the raising of revenues, by excluding the uninsured from comprehensive coverage, and possibly by compromising the effectiveness of the established primary care system. Reform does not require major institutional changes as the proposed system would be similar to health insurance systems in neighbouring Estonia and Lithuania.

Initially the Law stated that starting on 1<sup>st</sup> January of 2019 state-funded health care services will be provided for persons who are covered by general social insurance (employees and self-employed persons) who made social insurance mandatory contributions according to general provisions (social health insurance insured persons). However further on its implementation was postponed. According to the Law of 2017, two main changes should be implemented: (1) Earmarking a proportion of social insurance contribution revenues for health (1 percentage point). According to the estimation provided in the annotation to the law additional public funding raised by earmarked revenues will be 85 million Euros in 2018 and will increase gradually until 105 million Euros in 2020; and (2) linking eligibility to health services to the payment of state social insurance mandatory contributions. The underlying assumption is that making eligibility to healthcare services dependent on contribution payment will provide incentives to pay taxes, which would contribute to reducing the share of the shadow economy, and consequently lead to higher tax revenues. The estimation provided during discussions on the concept of the law by social partners (e.g. the Employers' Confederation of Latvia) shows approximately 300 thousand persons that are not paying social insurance contributions. This estimation includes persons who, according to the law "On state social insurance" are expected to pay state social insurance contributions or are paying state social insurance contributions under special conditions (microenterprises, patent payments, royalties). However, authors don't have any detailed break-down for these sub-groups at this time.

Eligibility for a full set of health care services would be also provided for "exempt" groups, including children under 18, retired or disabled people, registered in State employment agency unemployed persons and others.

For persons not covered by general social insurance regime or persons paying special microenterprise tax or patent fee eligibility of services is ensured if they make voluntary health contributions:

- In 2018 - 1% of minimum wage (430 EUR = 1% = 4.30);
- In 2019 – 3% of minimum wage amount;
- In 2020 and further – 5% of minimum wage amount.

It is also stated in the law that voluntary contributions should be paid for the current year of insurance and two previous calendar years (if contributions are not made).

Persons which are insured will be able to receive state-funded health care services (according to the regulations of Cabinet of Ministers) including family doctor (general practitioner) care, care provided by specialist doctors, diagnostic examinations, day care treatment, in-patient care (medical care in hospitals, observation beds, scheduled in-patient care, emergency medical assistance in outpatient hospital admission department), reimbursed pharmaceuticals and medical rehabilitation.

Currently, before the implementation of the Law the Latvian benefits basket is determined by a number of explicit inclusion and exclusion lists as well as by certain implicit criteria (Mitenbergs et al., 2012). On the one hand, explicit inclusion lists are the positive list of pharmaceuticals and a list of diagnostic, preventive and therapeutic interventions appended to the Regulation of the Cabinet of Ministers of Latvia No. 1529: "Regulations on organization and financing of healthcare." (hereinafter – the Regulation No.1529). Implicit criteria are the standard NHS contracts, e.g. with GPs, which broadly define that providers have to "ensure prevention, diagnostics and treatment of patients corresponding to the disease and normative legislation". On the other hand, the Regulations No. 1529 explicitly exclude certain services, such as dental care for adults, rehabilitation (with a long list of exceptions), medical check-ups required by occupational circumstances, sight correction and hearing aids (except for children), spa treatment, abortions (if there are no medical or social indications) and others. Furthermore, the terms of the contracts between the NHS and providers determine that children, pregnant women and people with urgent medical care are priorities for resource allocation, exposing other patients to substantial waiting lists for non-prioritized services, up to a point where they are implicitly excluded. In general, a referral from a family doctor is required in order for care or diagnostic examination from a specialist or hospital to be covered by the NHS (except for urgent cases). If patients do not have a referral, e.g. because they wish to avoid waiting times, all costs have to be covered out-of-pocket or through Voluntary health insurance (VHI).

Narrowly defined package of basic healthcare services would continue to be available to the entire population in order to ensure conformity with the constitution. Citizens of Latvia, non-citizens of Latvia, foreigners with permanent residence permits, stateless persons with temporary residence permits, refugees, persons granted alternative status would receive family doctors care (general practitioner's care), pregnancy and maternity care, emergency care and elective care plus reimbursed pharmaceuticals for selected patient groups (e.g. psychiatric, HIV, tuberculosis and cancer patients) and conditions (diseases with significant impact on public health or which pose a risk to public health).

The Law does not propose significant institutional changes to the health system, i.e. the pooling of resources by a single institution and the purchasing of care from independent providers would be retained. Funding would continue to flow from the state budget to the NHS, and care would continue to be purchased by the NHS with its regional branch offices. Cabinet of Ministers also will establish tariffs (prices) for state-provided services. Started in 2018 reform could be summarised as follows (Tab.1):

Table 1: Features of proposed Latvian health financing system

| Dimension            | Expected benefits  | Potential problems   |
|----------------------|--|--|
| Public health budget | Earmarked revenues will lead to the growth of the public health budget and greater | There are no specific binding expenditure targets in the law. The assumption that an insurance system with earmarked revenues for health through payroll |

|                      |  |  |
|----------------------|--|--|
|                      | sustainability of the healthcare financing system  | contributions offers more stable revenue for health is not supported by evidence.  |
| Effect of earmarking | Linking eligibility to payment of contributions will provide an incentive to pay taxes, leading to a reduction of the shadow economy and higher tax revenues | It is unlikely that motivation to pay taxes would increase if earmarking is in place. Workers in the informal economy could choose to remain uninsured or to pay voluntary premiums, which—at current premium levels—would be more attractive than paying social insurance contributions and personal income tax.        |
| Access to care       | More public resources for health will lead to improved access to healthcare services (for those covered by insurance)  | Universal coverage will be compromised: an estimated 300,000 people would be excluded from the public healthcare system (beyond basic healthcare services). There is also a risk of being excluded from the system despite eligibility for exemption. This could lead to delays in receiving services only after appeal. |
| Equity               | Improved equity because tax evasion will be reduced, making everybody contribute to health according to the ability to pay                                   | General tax financing has a greater potential to achieve equity in financing – the rich contribute with a greater share of their income than the poor.   |
| Efficiency           | Improved efficiency  | Undermining the established primary care system and potentially contributing to less efficient patterns of service provision. Additional costs associated with the implementation of the reform.   |

Current Law and the annotation does not include any estimates of the cost of the proposed model and long-term impact on the health status of the population; though a major difficulty in completing such a costing analysis is the lack of detail about how the proposed model would operate in practice, including what basket of services would be financed through NHS in 2019. Also there is no assessment of the impact on tax evasion and increase of contributions.

At the beginning of the 2019 year, Parliament adopted a final reading of a law to postpone the division of health services in two baskets by July 1. This was due to the fact that healthcare authorities did not actually have the possibility to verify the extent of individuals' rights to state-paid healthcare services, as the system was not fully prepared for the task to be carried out, the draft law was indicated at the time.

In June 2019 Latvian Parliament (Saeima) accepted amendments to the Health Care Finance Law to postpone the so-called two-service basket state health insurance system by 2021, which was originally scheduled to be introduced from the 2019 year.

The proposal by the Minister for Health, Ilze Vinkele, was also supported, providing that persons who are not insured under the law are not required to pay voluntary contributions. Amendments have also been accepted to ensure automatic reimbursement for people who have already made contributions. At the moment health insurance is introduced for all who earn income from employment and self-employment will pay the social security contribution to health at 1% of the social security contributions paid from the minimum wage. As the minimum wage increases, the payment will also increase accordingly, the minister added. As accepted in amendments to the law at the beginning of the year, individuals who will not be covered by the insurance scheme will have to make a health insurance payment of EUR 51, explained the minister. Similarly, as in the case of the real estate tax, they will be notified that this amount should be paid by a certain time, but people who have not made this contribution will be able to receive national health services at the time of need. It is currently envisaged that if a person has not made a compulsory contribution but will be in a situation where state-paid healthcare is required, he will be provided with a reminder that the payment has to be made. Regulations foresee that non-insurance contributions will accrue as debt, but this will not prevent a person from having access to health services.

#### 4 Conclusions and suggestions for further research

The Latvian Health Care Financing Law is meant to restore the operation of the compulsory health insurance system (SHI-Social Health Insurance) system, incorporating the opportunity for users to join the SHI system or to use only baseline health care basket which could affect those residents of Latvia for whom the state compulsory insurance contributions have not been paid and who are not members of the group secured by State.

In order to increase financial protection, financing of the healthcare system should be sharply increased. However, the proposed new law does not solve this problem, since, according to the proposed system, every inhabitant would be insured with the same basic healthcare packages and supplementary packages in certain circumstances, but the unmet needs are significantly higher than the additional funding available in 2018-2020. Although the Latvian Health Care Financing Law has the principle of receiving health care in accordance with SHI, general taxes will remain the main source of revenue for financing the health care system in the coming years. To date, there have been only a few studies which identify issues that could arise if the Dutch health system will be introduced in Latvia (Krasnopjorov and Wilerts, 2016). An analysis of the implementation of budgetary policies in the health sector gives the evidence that also in the future the health financing should be considered in the context of a reform of the whole health care system which should be viewed through the prism of interfering factor for the introduction of UHC and the achievement of SDGs target.

Out-of-pocket (OOP) payments, including informal payments to health care providers in Latvia, have been the highest in the EU and OECD countries until now. In Latvia, financial support within the family has traditionally been preserved, including covering the need for out-of-pocket (OOP) payments (in case of sickness), as there is a very low level of trust to the health care system.

Main suggestions for future research and policy decisions are to define minimum state-funded medical assistance guaranteed by the Latvian Constitution (Satversme) for anyone. To assure provisions of health care - access to publicly funded health care services for all residents of Latvia. Based on tax residency as criteria for health insurance continue realization of health insurance through general state social insurance mandatory contributions. Changes in state compulsory health insurance realized at the same time as changes in the tax system, considering an increase of funding of health care through general taxation revenues (e.g. value added tax) and introduction of health care related taxation (e.g. taxes on unhealthy products and

excises on tobacco). Increase in public financing should be accompanied by a reduction of OOP considering abolishment of co-payments for pensioners, people with chronic conditions or the introduction of the cap on co-payments to €100. This paper seeks to contribute to the debate, and the way for future researches is not only how to obtain money for health care but also ensure optimal financing source structure.

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**Primary Paper Section: A**

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## PHILOSOPHY FOR CHILDREN (P4C) IN NON-FORMAL EDUCATION

<sup>a</sup>GÁBOR PINTES, <sup>b</sup>SIMONA BORISOVÁ

*Constantine the Philosopher University, Faculty of Education,  
Department of Pedagogy, Dražovská 4, Post code: 949 74,  
Nitra, Slovakia*

*email: <sup>a</sup>gpintes@ukf.sk, <sup>b</sup>simona.borisova@ukf.sk*

The work was developed as part of research project solution VEGA No. 1/0098/17 Individual Conception and Strategy of Education within the Context of Teacher's Professional Development.

**Abstract:** This study identifies, in the context of contemporary trends, the challenges faced in educating today's teenagers. The postmodern age is characterised by not just moral relativism, but also a high degree of individualisation and changes in communications media, customs and traditions. For several decades, Philosophy for Children (P4C) has pursued objectives aimed at developing, critical, creative and caring thinking. Current conditions in institutional education provide a real opportunity for implementing P4C in non-formal education.

**Keywords:** Philosophy for Children, critical thinking, value oriented personalities and characteristics, iGen - iGeneration, non-formal education.

### 1 Introduction

Over the past decades, reforms in education have naturally reflected changing values, value orientations, customs and traditions. Nonetheless, even thirty years after Central Europe underwent major societal and political changes, the same questions are still being asked. Two of them are what the goal of education is and what strategy is most appropriate for future generations. Yet another is how to achieve educational results that would let today's teenagers be truly competitive and have the opportunity for a high-quality, successful and happy life. Besides the problems formal education in Slovakia is encountering, there are also "question marks" about non-formal education. Our research was founded on the argument that both formal and non-formal education should, on one hand, fulfil specific objectives and the roles they play, while on the other hand they should complement each other as they pursue common goals and promote quality education as a whole. Due to the low degree of flexibility and innovative potential in formal education, there has been a shift to some viable non-formal education models and activities. We really see no place Philosophy for Children (P4C) can occupy in formal education, even though it pursues objectives which are an absolute priority for a contemporary "school", namely to develop critical and creative thinking. Our study presents a theoretical anchoring of P4C in the context of educational science and practice, while analysing its potential relative to current educational challenges and presenting an empirical study of how it affects non-formal education.

### 2 Theoretical anchorage of Philosophy for Children (P4C) in the context of contemporary theory and practice of education

Philosophy has sought since its inception to build knowledge and understanding on different foundations than what had been earlier. The entire history of philosophy is clear proof that innumerable factors can cause a change in thinking. Sometimes a single person's intellect was enough, while on other occasions it was a chain of events that caused a new thought construct to emerge, often leading also to a philosophical concept. Since the late 18<sup>th</sup> century, however, Western civilisation may have been witnessing the gradual disintegration of major philosophical concepts. The postmodern age even "boasts" the end of great discourse. It is also similarly evident in philosophy's impact on the science of education, where its retreat from former positions is unambiguous. Whether this tendency has contributed to all education science moving in the correct direction is doubtful. So the question arises of how philosophy could be returned to educational sciences and practice? Another question considered by us is whether it would be able to contribute even more to addressing either the tendency earlier mentioned or the phenomena of what philosophy could be the most beneficial for

educational sciences and educational practice. Yet for some, emphasising the benefits might be an obstacle. Nonetheless, our belief is that philosophy would be similarly rejected and shunted aside as has been the case in recent decades (and still today) unless it can "usefully" contribute to educational sciences and practice.

Addressing the impact of philosophy and the possibility to philosophise the phenomena of educational sciences and practice begins with identifying the reasons why educational sciences has shifted away from it. In examining the phenomena of education, Průcha (2000, p. 45) blames educational philosophy's speculative nature and the ambiguity of where it starts off. Other studies could be found whose line of argument aims toward stressing how unnecessary both philosophy and educational philosophy are. It is visibly evident that the problem is particularly educational science's reluctance to accept and take philosophy into account in determining its main course. Often there is a feeling like educational philosophy, together with some other disciplines, only "suffers" among an exclusive circle of those that are modern and progressive. Therefore, it is critical for philosophy (and likewise educational philosophy) to find a fully acceptable way to penetrate into the educational sciences and practice and be able to play a part in contributing toward their development.

One possible way for educational sciences to accept philosophy again and for it to penetrate into educational practices is by exploring the possibilities of applied philosophy. Initially, the suggestion is to explore possible convergence of educational science and applied philosophy because even applied philosophy has yet to fully clarify its positions either in its own science or in relation to other sciences and scientific fields. It would be too hasty to "leap" into applied philosophy as the focal point for educational science with philosophy and then consider the issue to have been resolved and close it.

However, any proposed convergence would not be as simple as it might seem. In many central European countries, applied philosophy has almost no tradition and is rarely studied academically. Yet despite its "lower visibility", applied philosophy's presence can be identified in various forms and areas, endeavouring to meet the demands and expectations of society that classical philosophy in principle fails to address. Philosophy's fields of application are innumerable, ranging from genetics through law, economics, ethics, art and literature to family, human rights and globalisation, while covering educational science, too. Closing the circle, we come to our goal of linking applied philosophy to the issues found in educational sciences and practice. But applied philosophy is more than a chance for the science of education to clarify its starting points. It is also a challenge and an opportunity for philosophy to assert itself in various spheres of our lives.

### Philosophy for Children (P4C) as an applied philosophy

Several options are used to identify Philosophy of Children as an alternative to applied philosophy. Several terminologies can be found, such as:

- Philosophy for children
- Philosophy of children
- Philosophy with children
- Philosophy of childhood.

From the aspect of substantive analysis, different understandings of what the philosophy for (of) children entails can be worked out and both "philosophy" and "child" can be examined in different relations.

One of these aspects to be examined is the philosophical exploration of the specifics and particular features found in childhood. In this case, it parallels the typically ontogenetic investigation inherent in psychology. Research of this kind could

be attributable in part to philosophical anthropology and would provide a new aspect alongside conventional psychology. To date, there is no clear stance towards a specific area within philosophy to examine childhood according to philosophy of childhood criteria. Tim Sprod at the University of Tasmania, Australia argues that a better philosophy would probably be worked out if childhood issues were incorporated into philosophical research. Appropriate topics for this type of research would be the following:

- Childhood in the context of rationality and emotionality;
- Childhood autonomy (how a child becomes an autonomous moral being);
- Children and communication;
- Children and morality, etc. (Sprod, 2002)

But opening up the philosophy covering the world of children unleashes another problem; is a child capable of similar philosophical analysis, in other words to reflect on things like an adult? Obviously, this is a rhetorical question since children's philosophies need to be built on different foundations than what is in common practice. Nevertheless, no one denies that a child is not capable of philosophising. The opposite is more likely to be the case. However, adequate conditions need to be achieved and created to be not merely spontaneous, but rather direct philosophising. For example, Krajník (2002) adopts the attitude taken by existentialist philosopher Karl Jaspers, not seeking the essence of philosophy in a scientifically justified – academic – philosophy but instead in spiritual philosophising aimed at revealing and understanding the essence of truth and being. Jaspers believed every child to have the ability to philosophise, but, problematically, most would lose this ability as they grew into adults (Krajník, 2002). Therefore, it is incumbent to create such a particular approach to Philosophy in Children to take into account all the specificities of childhood necessary to apply it successfully in practice.

#### What is Philosophy for Children?

The very question of clarifying what Philosophy for Children is could itself be understood as philosophical. Since the dawn of philosophy, it has tried to ask questions and seek the answers to them. All philosophical searches and exploration should be directed toward finding wisdom and the path that leads to it. There have been times when philosophers managed to find the “right” answer, although sometimes it took them a thousand years. Philosophical reflection of human reality and life has raised some questions that often form the essence of philosophical research. What is reality? What is the truth? What is beauty? How can I be sure about what I know? What is correct? These and countless other questions develop philosophical thinking. One of philosophy's oldest disciplines is logic, including non-formal logic, which focuses on critical thinking. However, neither philosophy nor philosophising should be understood solely as a spiritual process. Philosophers most often attempt (and have done so in the past) by training their minds to better know, understand and clarify some phenomena and facts. The primary objective behind P4C is to create in their minds such thoughts to enable them to ask questions and find the answers to them. Even children need to devote themselves to “big questions”, where research leads them to develop critical thinking. The classic concept of education requires children to answer pre-formulated questions, not to ask them themselves. Philosophy for Children seeks to change this classic approach.

#### What is the sense of Philosophy for Children?

To seek the meaning of Philosophy for Children, reducing the question could be the place to start. What point does philosophy have at all? Following up on this response could then direct the issue toward childhood, too. Nonetheless, it is assumed that the previous sections have been able to clarify the subject of research to some extent being not only educational philosophy, but also philosophy itself. When philosophy is understood to be a meta-science, it could be argued that it examines everything, exploring questions of being, cognition, thinking, corporate governance and the world of values. There would be an even broader and more comprehensive view of philosophy if the

issues in applied fields were added to philosophical exploration. It would likely be incredibly difficult to find an area in the world and in our lives that could not be covered with philosophical reflection. It means that philosophy, from the most basic intriguing questions to the most specific ones, is a product of our complicated world and our lives in it. Now take the next step and ask yourself the (original) question of what sense can Philosophy for Children make? The dilemma of whether philosophy can also apply to children growing up was outlined a few lines earlier. Below are a few questions and discussion topics attributable to children:

- I'm wondering whether ghosts are real or not!
- If my dad or mom tells me it's good, what does that even mean?
- Why would someone be my best friend?
- What is fair and what isn't?
- Why does time sometimes seem to fly and at other times drag?
- I think a baby is a real person and not just a thing!
- Mommy told me it wasn't a solid point. What was she thinking?
- My parents asked me to tell the whole truth!
- Where is grandpa now since he recently died?

Even more ideas and questions of a similar nature and content can be cited, but at this stage of the analysis what concerns us the most is whether they form the basis for children to philosophise. A number of philosophers could probably be found that would clearly reject any connection between these questions and philosophical reflection. Yet it can be rooted in the conviction that these ideas and questions are a kind of translation of the “great philosophical issues” into the language and world of children. Why should there be doubts about a child's interest in spirituality and the nature of knowledge? Why is there a belief that they are never thinking why something today may be different tomorrow? Why does something have value for me and not for someone else (or vice versa)? Why? Why? Why? Accepting the meaning of these questions while in most cases confronted with them on a daily basis, whether in a family or school environment, there is no reason to question Philosophy for Children.

### 3 The present challenges and strategic objectives of non-formal education

Unlike formal education, non-formal education makes it possible and provides the opportunity to plan and implement such educational intentions which have not been so successful in compulsory education. The substantive reforms Slovakia put in place during 2008 were designed through school-based education curricula to give schools much more freedom, liberty and autonomy. These should and could have made a difference in what should and could have resulted in originality between schools. However, eleven years of this (unrealised and unsuccessful) reform has shown schools not to have changed much and formal education remains dictated by rather traditional and rigid goals and practices. Nonetheless, they are not capable of responding to current conditions and challenges because they are still based on the notion and belief that “what worked decades ago still works today is likely to continue working in the future”. But (fortunately) this point of view does not exist in non-formal education, nor does it have barriers that would prevent the design and implementation of progressive and pragmatic objectives and methodologies. There have been several reports analysing education and youth in Slovakia. It is enough to remember (Burjan, 2017) *Učíace sa Slovensko (Learning Slovakia)*, a strategic document released in 2017, and the think-tank analyses and initiatives bundled under the title of *To dá rozum (It's Common Sense)*.

A U.S. expert researcher on generational traits who has identified current characteristics in contemporary adolescents, Jean Twenge (2017), calls today's young generation (born after 1995) the iGeneration or iGen. “I” in this case can mean both absolute bonding to the Internet and also an individual and

largely egocentric focus among the generation. She describes an interesting phenomenon, highly debatable in comparison with young people of previous generations. Research conducted on a huge sample (of more than 11 million respondents and participants) and analysed interviews revealed an interesting phenomenon, namely that iGens are much more tolerant and more acceptable in statistical terms than previous generations. Examples include becoming independent later ("spending more time in the family circle"), decreased alcohol use and less instances of first sexual experiences at a younger age along with a significantly higher degree of openness and acceptance of differences among people. Yet the essence of this generation's uniqueness and still unrecorded phenomena lies in a deeper analysis into motivation and attitudes evoking states no longer able to be perceived positively.

Philosophy for Children (P4C), through the development of three-dimensional thinking where the three dimensions are creative, critical and caring, provide the ideal conditions for the development of such a personality, able to communicate their views and attitudes in life situations, withstand the manipulative efforts and pressures from people and organisations seeking to control masses of people, dictate to them and enforce their own ideologies, all under the cover of democratic principles and rules. To become "healthy" in a critical, authentic and free sense in the realm of true morality in the realm of morality and decency requires the development of those thought dimensions P4C offers. The group in which an individual develops his or her own creative, critical, and caring thinking is called a community of inquiry.

#### 4 Empirical research in a community of inquiry

In education and psychology, critical thinking is frequently inflected due to the insufficient level of study in Slovakia's schools. The methods employed in Philosophy for Children have not been sufficiently utilised in them and, likewise, there is an absence of research into the impact its methods have on the level of critical thinking, all of which drove us to focus on it. The key objective in our research was to determine the level of critical thinking that has developed in secondary school students, based on sessions with a community of inquiry in order to ascertain the responses to the following questions:

- Question 1: Can model lessons from Philosophy for Children develop a level of critical thinking within two months?
- Question 2: To what extent can critical thinking be developed from P4C model lessons within those two months?

#### Research methods and methodologies

Due to the research problem, the aim of the research derived from it and the questions themselves, we opted to use quantitative-qualitative research methods.

#### Experiment

The experiment design used to achieve the goals was for several reasons "quasi-experimental (for example, both the sample experimental and control groups were small and there was only one secondary school involved in the research), yet despite the situation we strove to focus on as much objectivity as possible. The input and output measurements described above covered two roughly aligned groups, using a critical thinking appraisal test that had been developed to measure it. Research was conducted on a small sample of a population of secondary school students, yet it provided many findings that can be used on a larger scale.

#### Tool for measuring the level of critical thinking

The Watson-Glaser Critical Thinking Appraisal (W-GCTA), a standardised psychological test (Watson, Glaser, 2000) named after the scientists who developed it. There are several types of this test and it has been used to measure critical thinking since 1926. The decision to use the Watson-Glaser test was made for several reasons. One of them was because the test contains 80 exercises and there were insufficient time conditions to utilise the agreed sessions with the students in the experimental group. The Watson-Glaser tests are extensive and we were not able to change the scope and wording of them.

#### Observation

Another significant method used in the research was observation through individual sessions. Here it was necessary to use recording equipment to document the hours spent with the students in order to have a closer look at the phenomena that had been set out in advance for each category. They had been told that the sessions would be recorded, while being assured that these were not rehearsals and their names would not be published. Indirect observation dominated and it was planned and systematic, with the manner and time of the observation precisely determined (Gavora et al., 2010). A type of structured observation was chosen that focused on individual critical thinking components.

Analysis of structured observation in the community of inquiry Several expressions of critical thinking were noticed in the community of inquiry, with just selected examples shown in the table below. None of the examples were evaluated for accuracy because some of the problems had no single correct answer. The age range (16-19 years) of the students in the experimental group was taken into account alongside the maturity expressed in the individual statements they made.

Besides these baseline components, other expressions of critical thinking were noted, such as the use of examples and counterexamples in Session 7, where Student 1 said that atheists believe in nothing and Student 2 added, "Atheists believe in themselves, but believe in other things; for example, they have faith in themselves," to which Student 3 offered her own opinion: "If we take some atheists who suddenly find themselves in a dangerous situation where they can possibly die, they will start praying as if it were natural for them to call to God, so maybe it's like second nature to humans."

#### Pre-test and post-test assessment methodologies

The critical thinking tool developed by us contained 12 questions and the time limit for solving them was 12 minutes. Both a pre-test and a post-test were conducted with the questions in the tests formulated differently, but measuring individual components of critical thinking. Therefore, the questions in the two tests were parallel. Most of the questions were open-ended, but there were also closed questions. The guidelines for assessing the critical thinking test specifically included taking the accuracy of the response into account and acknowledging any grammatical or spelling errors in the answers. The "eloquence" of the responses was not assessed, but rather the ability to capture the essence of the solution to the problem. The students' free answers to the open questions may have to some degree influenced the test assessment, so we decided to have it evaluated by two (or more persons) according to the guidelines for assessing the critical thinking test. Different questions therein ascertained the level of components in critical thinking.

Table 1: Critical thinking components applied at community of inquiry sessions - observations

| Critical thinking components               |  | Session examples  |
|--|--|---|
| Knowledge base                             | <ul style="list-style-type: none"> <li>Critical thinking relies on a certain knowledge base (facts, knowledge, skills) to help create relevant arguments.</li> </ul> | <ul style="list-style-type: none"> <li>Reflected particularly when defining terms:</li> <li><b>SESSION 1:</b> "Perfection is ideal only in our heads because for anyone something different is perfect."</li> </ul>   |
| Reasoning                                  | <ul style="list-style-type: none"> <li>Justifying facts, analysing evidence and defending it.</li> </ul>   | <ul style="list-style-type: none"> <li><b>SESSION 1:</b> "Women didn't use to be pressured about how they should look because today's media is pushing us an idea of beauty that's not real."</li> <li><b>SESSION 8:</b> When asked whether the characteristics of a name "matched" the characteristics of the person, one student thought it was done on purpose to peg someone." Another student added that had learned about it in psychology class as a trick like what is done with horoscope signs.</li> <li>There are people sometimes reading horoscopes and, when they do, they right away try to take it seriously."</li> <li>Question: How do you justify to someone else that we believe God exists?<br/>Student 1: "Well, it's only because we exist."<br/>Student 2: "Also based on these signs, there have been miracles even when the Virgin Mary appeared."<br/>Student 3: "I'd ask him how he believed he came into being."</li> </ul>  |
| Making judgements                          | <ul style="list-style-type: none"> <li>Indicating the various reasons for linking two different situations.</li> </ul>   | <ul style="list-style-type: none"> <li><b>SESSION 1:</b> When asked about whether it was better to think of herself as not perfect or perfect, a student replied: "I'd rather think of myself as not perfect and strive to improve myself than to think I'm perfect and humiliate everyone else."</li> <li>"Women didn't use to look at themselves like they do now because work overwhelmed them so much."</li> <li>When asked about the criteria for beauty (such as pricing apples in a shop according to whether they were scratched or not), one student replied about whether it meant scratched apples weren't tasty.</li> <li><b>SESSION 5:</b> "Everyone around us is judged by their appearance and we probably couldn't do it otherwise because appearance is the first thing we see."</li> <li>I don't believe any of us are racists but all of us have some prejudice against other people or tend to have it, such as when somebody's staggering down the street and right away we're asking ourselves about what'd happened."</li> </ul> |
| Assessment                                 | <ul style="list-style-type: none"> <li>Setting criteria and priorities or expressing an opinion.</li> </ul>  | <ul style="list-style-type: none"> <li><b>SESSION 1:</b> "Beauty contests have no deeper value. All they're doing is promenading across the stage."</li> <li><b>SESSION 2:</b> "If we get to know somebody from a society and they're bad, then we're judging the society itself even if someone from it can be good."</li> <li><b>SESSION 4:</b> "Children behave much worse than in the past because they're not punished so much either verbally or physically and few are setting the boundaries for their children not to be punished."</li> <li><b>SESSION 5:</b> "I believe society is just paying attention to what's worse about the Roma to have something to talk about."</li> <li>"Calling a Roma a "gypsy" does not mean I'm a racist because that's what they call themselves."</li> <li>"Roma are lumped together because we're not trying to gain insight about them but merely looking just at the surface."</li> </ul>  |
| Problem-solving capability and willingness | <ul style="list-style-type: none"> <li>Desiring to compare and analyse phenomena, willing to receive new information from various</li> </ul>                         | <ul style="list-style-type: none"> <li>This component was visible in the responses to different questions following up on others (recorded in Sessions 1-8). While some</li> </ul>  |

|                                |  |   |
|--------------------------------|--|---|
|                                | perspectives and using the new information practically.  | group members were more involved than others, everyone was offered space to talk.   |
| Capacity to ask questions      | <ul style="list-style-type: none"> <li>Taking the initiative to ask questions and desiring to know the answers.</li> </ul>                                   | <ul style="list-style-type: none"> <li>Questions the students asked (either when they were initially asked or during the dialogue)</li> <li><u>SESSION 1</u>: Why do people want to be somebody other than who they are?" "Why does everyone think they're not perfect?" "Why do people feel they have to meet someone else's needs?"</li> <li><u>SESSION 2</u>: "What does school fill you with and how does it prepare you for life?"</li> <li><u>SESSION 3</u>: "Why do some people like animals more than people?" "Why are pets important to people?"</li> <li>In the dialogue: Student 1: "We like animals more because they aren't phony."</li> <li>Student 2: "What about cats?"</li> <li>Student 1: "Aha, they can be phony."</li> <li><u>SESSION 4</u>: A student raised the topic of sibling rivalry and parenting by asking about corporal punishment.</li> <li><u>SESSION 8</u>: "Can you really believe anything?"</li> </ul> |
| Creative ability               | <ul style="list-style-type: none"> <li>Readily, flexibly and originally suggesting how to tackle problems.</li> </ul>  | <ul style="list-style-type: none"> <li><u>SESSION 4</u>: Student 1: "Living conditions for siblings need to be the same in order for them not to argue. Because siblings are competing for things such as their parents' love and what they own, they don't envy each other when everything is equal between them. Or one of them has to budge when arguing with the other, only it's difficult sometimes because there are many things neither of them is aware of because they haven't encountered it, for example in books."</li> <li>Student 2: "Here you have to realise yourself that siblings need to help each other and not quarrel."</li> </ul>   |
| Ability to think logically     | <ul style="list-style-type: none"> <li>Making the right decisions by distinguishing between incorrectly reasoned and carefully weighed arguments.</li> </ul> | <ul style="list-style-type: none"> <li><u>SESSION 6</u>: "Because sales assistants go to a shop every day does not necessarily mean everyone who goes to a shop wants to be a sales assistant."</li> </ul>  |
| Ability to work in a group     | <ul style="list-style-type: none"> <li>Accepting or rejecting opinions from group members and letting them develop or modify your own views.</li> </ul>      | <ul style="list-style-type: none"> <li><u>SESSION 2</u>: "I agree with Adie, but would like to add a slightly different point of view."</li> <li><u>SESSION 3</u>: "Interestingly enough, I've never thought about something similar from that perspective."</li> <li>"I agree with Dominika, but I'd like to add that the intelligence of cats can't be seen like the intelligence of people. For example, cats can't write and no one expects them to, but people can. So there's a difference between animals and people."</li> </ul>  |
| Ability to think independently | <ul style="list-style-type: none"> <li>Creating your own opinion through the group's influence, but reaching it yourself.</li> </ul>                         | <ul style="list-style-type: none"> <li>Everyone participating in the session knew what everybody else thought about something, yet had the opportunity to form their own opinions.</li> </ul>   |

Table 2: Components of critical thinking in the Critical Thinking Test – pre-test

| Critical thinking components               |  |
|--|--|
| Knowledge base                             | ▪ Critical thinking relies on a certain knowledge base (facts, knowledge, skills) to help create relevant arguments.                                 |
| Reasoning                                  | ▪ Justifying facts, analysing evidence and defending it.   |
| Making judgements                          | ▪ Indicating the various reasons for linking two different situations.   |
| Assessment                                 | ▪ Setting criteria, priorities and expressing an opinion.  |
| Problem-solving capability and willingness | ▪ Desiring to compare and analyse phenomena, willing to receive new information from various perspectives and using the new information practically. |
| Capacity to ask questions                  | ▪ Taking the initiative to ask questions and desiring to know the answers.   |
| Creative ability                           | ▪ Readily, flexibly and originally suggesting how to tackle problems.  |
| Ability to think logically                 | ▪ Making the right decisions by distinguishing between incorrectly reasoned and carefully weighed arguments.   |
| Ability to work in a group                 | ▪ Accepting or rejecting opinions from group members and letting them develop or modify your own views.  |
| Ability to think independently             | ▪ Creating your own opinion through the group's influence, but reaching it yourself.   |

Table 3: Components of critical thinking in the Critical Thinking Test – post-test

| Critical thinking components               |  |
|--|--|
| Knowledge base                             | ▪ Critical thinking relies on a certain knowledge base (facts, knowledge, skills) to help create relevant arguments.                                 |
| Reasoning                                  | ▪ Justifying facts, analysing evidence and defending it.   |
| Making judgements                          | ▪ Indicating the various reasons for linking two different situations.   |
| Assessment                                 | ▪ Setting criteria, priorities and expressing an opinion.  |
| Problem-solving capability and willingness | ▪ Desiring to compare and analyse phenomena, willing to receive new information from various perspectives and using the new information practically. |
| Capacity to ask questions                  | ▪ Taking the initiative to ask questions and desiring to know the answers.   |
| Creative ability                           | ▪ Readily, flexibly and originally suggesting how to tackle problems.  |
| Ability to think logically                 | ▪ Making the right decisions by distinguishing between incorrectly reasoned and carefully weighed arguments.   |
| Ability to work in a group                 | ▪ Accepting or rejecting opinions from group members and letting them develop or modify your own views.  |
| Ability to think independently             | ▪ Creating your own opinion through the group's influence, but reaching it yourself.   |

#### Analysis of pre-test and post-test results

The critical thinking tool confirmed pre-test input measurements in both the experimental and control groups, with no significant difference between the groups found in the results. A maximum twenty points was what the students could score in the pre-test and post-test. In the baseline measurements, the control group scored 157 points for an average of 8.26 points per student (there were 19 students participating in the control group), while the experimental group scored 156 points for an average of 8.21 points per students (the experimental group likewise had 19 students participating). Question 1 had asked if a level of critical thinking could be developed within two months from model lessons in Philosophy for Children (P4C). Post-test results in the

experimental group showed intervention to have increased the level of critical thinking, with participants in the group scoring a total 40 points higher than in the pre-test results. Participants in the control group scored a total two points higher than in the pre-test results. Question 2 followed up on Question 1, asking to what extent critical thinking could be developed from P4C model lessons within those two months. Although the responses were formulated for critical thinking to develop, there was no radical improvement evident after two months (8 sessions). Despite this, the results could be seen as favourable compared to the control group, where the level of critical thinking hardly changed.

Table 4: Pre-test and post-test results in the experimental and control groups

| Group                            | Pre-test score               | Intervention   | Post-test score               |
|----------------------------------|------------------------------|--|-------------------------------|
| Experimental group (19 students) | 156 (average of 8.21 points) | Between 18 January and 1 March 2018                                  | 196 (average of 10.32 points) |
| Control group (19 students)      | 157 (average of 8.26 points) | No intervention due to the unique nature of Philosophy for Children. | 159 (average of 8.37 points)  |

## 5 Conclusion

Summarising the findings that pertain to the research questions, it can be said that the secondary school students had experienced the development of critical thinking through the use of individual P4C methods during the intervention sessions. The research provided us with an exploration of the conditions in a Slovakian secondary school and a more comprehensive idea for using P4C methods.

In closing, we can express our conviction that under current education conditions existing in Slovakia, P4C can be

implemented in non-formal education. The advantage of non-formal education, in terms of content and process, is the greater degree of freedom and autonomy compared to formal education. The content of extracurricular and leisure-time educational activities is created at the institution level (of course, provided there is compliance with the baseline reflected in current legislation). Another advantage, and yet also a disadvantage, of non-formal education is its voluntary nature. There is no guarantee of accessibility to everyone, causing only a part of the population to be able to participate. Therefore, the challenge to be faced in the future is implementing P4C both in the content and process of formal and non-formal education. This would

open up the possibility of implementing a programme to develop thinking in different age groups, where at the strategic level it pursues the goals Slovakia's education system identifies as scarce and inadequate.

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**Primary Paper Section: A**

**Secondary Paper Section: AM**

## INTERDISCIPLINARY COOPERATION IN THE CONTEXT OF AUTISM SPECTRUM DISORDERS IN SLOVAKIA

<sup>a</sup>BEÁTA BALOGOVÁ, <sup>b</sup>ZUZANA POKLEMBOVÁ

*Institute of Educology and Social Work, 17. November 1, 080 01 Prešov, Slovakia*

*email: <sup>a</sup>beata.balogova@unipo.sk, <sup>b</sup>zuzana.poklembova@unipo.sk*

This poster is an output of VEGA Research Project No. 1/0134/17 „The importance of value orientation - expectations and perspectives of the young generation in the context of its application on the labor market“ and VEGA Research Project No. 1/0288/17 „Factors of Institutionalisation of School Social Work“

**Abstract:** The paper focuses on the importance of interdisciplinary cooperation between helping professionals in Slovakia. The primary focus is on the distinctiveness of cooperation between social work and other helping professions in the context of autism spectrum disorders in the Slovak Republic. It also presents partial findings of the research the main objective of which was to identify and describe the current situation in the area of Social work with a family with a member with Autism spectrum disorder. Partially, this research has underlined the eminent importance of cross-professional cooperation in the context of autism spectrum disorders.

**Keywords:** Autism spectrum disorders (ASD), Pervasive developmental disorders (PAS), Social work, Interdisciplinary cooperation, Cross-professional cooperation, Helping professions,

### 1 Introduction - context of Social work with Autism spectrum disorder in Slovakia

The presented paper aims to accentuate the importance of cooperation between social work and other helping professions in the context of autism spectrum disorders in the Slovak Republic, and also to offer some of the opportunities it brings.

To meet such objectives, it is necessary, at least briefly, to mention and theoretically examine the possibilities of social work with a family whose member suffers from ASD in general, and both theoretically and empirically to elucidate its possibilities particularly in Slovakia. It describes a wide range of factors that have influence on social work in the context of ASD, comparing to others social work target groups (Šlosár, Lichner, Halachová et al., 2017). Due to restricted space, however, the present paper cannot offer a holistic view of the possibilities of social work with a family with an autistic spectrum disorder member and to identify and describe all its possibilities in Slovakia.

Finally, it also presents partial findings of research, the main objective of which was to identify and describe the current situation in the area of Social work with a family with a member with Autism spectrum disorder in Slovakia. Partially, this research has underlined the eminent importance of interdisciplinary cooperation in the context of autism spectrum disorders.

#### 1.1 Primary research

The research was conducted in 2010-2019, and focused on the area of *one of Slovakian regions* and selected institutions and organizations, which were (or were supposed to) provide social work with families with an ASD member.

Complete data and findings and overall information about the research is available in *Sociálna práca s rodinou s členom s poruchou autistického spektra - Social work with a family with an Autism spectrum disorder member* (Balogová, Poklembová, 2018); it also describes a wide range of factors influencing social work in the context of ASD.

The data were recollected in 2018/2019. The research data were collected using an electronic questionnaire and processed in SPSS. The research sample (N=56) consisted of helping professionals (mostly social workers, psychologists, caregivers and speech therapists) working for institutions that provided for social work with autism spectrum disorders (Tab 1).

### 2 Social work in the context of Autism spectrum disorders

The area of social work with clients with Autism spectrum disorder, especially variety of symptoms, places high expectations on social workers regarding the background in psychology and psychiatry. This field is often considered to be a realm of other helping professions, e.g. psychology or special pedagogy.

However, we believe that in intervention and assessment of Autism spectrum disorders, social work has its irreplaceable position and it is highly beneficial to its clients as well as to other helping professions in interdisciplinary cooperation.

Tab. 1: Social work in participating institutions

|                                  | % of institutions |
|----------------------------------|-------------------|
| Social assessment of family      | 39.3 %            |
| Social assessment of individuals | 28.6 %            |
| Social consulting                | 80.4 %            |
| Sociotherapy                     | 33.9 %            |
| Social skills training           | 67.9 %            |
| Mediation or facilitation        | 16.1 %            |
| Administrative                   | 67.9 %            |
| Accompanying clients             | 48.2 %            |
| Family group conferences         | 1.8 %             |
| Support groups or Peer-groups    | 10.7 %            |
| Social prevention                | 37.5 %            |

People with Autism spectrum disorder will most likely become social work clients. Early (and correct) assessment and subsequent intervention could greatly improve ASD people's adaptation to their social environment. For the prevention of possible and for the detection of existing social problems, social workers' knowledge of ASD distinctive features (MKCH-10-SK-2016, 2016) is inevitable. Relying on the well-known research findings and emphasizing an increased burden on families with an autistic member (Luther et al., 2005), we consider family social work to be crucial in social work intervention in the context of Autism spectrum disorder.

As far as Autism spectrum is concerned, context plays an important part in social prevention, in avoiding the creation of new or the aggravation of existing social problems. Therefore, we consider the role of school social work (Skyba, 2018) to be crucial in preventing study problems caused by ASD or by comorbid learning and developmental disorder, and also in solving peer social conflicts with possible threat of bullying or conflict with teachers (Jašková, Sabolová Fabiánová, 2019).

The economic situation, age, or gender, all of those could be a potential threat or problem trigger for individuals with Autism spectrum disorder. Autism spectrum disorders are often associated with child and youth clients (Edwards et al. 2012). There is a high risk of overlooking people with Autism spectrum disorder who have not been diagnosed yet, or are (or were at the time of assessment) just below the border (Tantam 2012).

### 3 Cross-professional cooperation in the context of Autism spectrum disorders

The justification for the necessity of interdisciplinary professional attitude and cross-professional cooperation in social work with people with Autism spectrum disorders has roots in the very characteristic of autism and in the wide range of symptoms and co morbidities affecting personal and professional life of clients in different ways and to a highly individual extent. The role of social workers in the context of Autism spectrum disorder is, among other tasks, professional and personal readiness to cross-professional and interdisciplinary cooperation and work.

As a main challenge, we see the creation of multidisciplinary teams built from different helping professionals. Increasing the accessibility of social services and their networking with other helping professionals in one cooperating system can significantly help to prevent stressful situations and support the acquiring of appropriate coping strategies and solving algorithms for demanding life situations which client with Autism spectrum disorder can avoid.

At the same time, those teams create space for personal and professional growth of the helping professionals involved.

#### 4 Findings, conclusion and possible implication for social work practice

The introductory three chapters focused on the theoretical and methodological backgrounds of the topic with the aim to offer the necessary conceptual framework of the theoretical and methodological starting points of cross-professional cooperation, including social work with autism spectrum disorders.

The primary research objective was to find out whether the chosen institutions and organizations in the area of the *one of Slovakian regions* offer conditions for social work with a family with an ASD member. It can be concluded that social work with the family and individuals with ASD is an area that has created space in Slovakia, but it necessitates more theoretical and empirical attention. Identifying its possibilities, the opportunities that it offers, and putting them into practice will help improve the quality of life of individuals suffering from autistic spectrum disorder and that of their families.

In accordance with the focus of this paper, it can be said that the majority of respondents (more than 88 %) would like to cooperate with social workers while working with families with autism spectrum disorder, and more than 82 % of them have already experienced cross-professional cooperation including social workers. According to Kruskal-Wallis test, there were no significant differences between respective helping professions (Tab 2).

Tab 2: Attitude to and experiences with cross-professional cooperation including social workers

| Cooperation with social work  | Caregiving/nursing | Psychology | Special pedagogy | Others  |
|---|--------------------|------------|------------------|---------|
| Already have cooperated and would like to cooperate in the future                 | 100,00 %           | 80,00 %    | 80,00 %          | 83,33 % |
| Have not cooperated but would like to cooperate in the future                     | 0,00 %             | 0,00 %     | 13,33 %          | 0,00 %  |
| Already have cooperated and would not like to cooperate in the future             | 0,00 %             | 0,00 %     | 0,00 %           | 0,00 %  |
| Have not cooperated and do not know if they would like to cooperate in the future | 0,00 %             | 10,00 %    | 6,67 %           | 16,67 % |

Even though our research have not confirmed a significant difference between respective helping professionals neither in the level of interest in interdisciplinary cross-professional cooperation with social work and in, nor in level of positive approach towards social workers, respondents reacted positively to questions about their past experiences with cooperation with social workers. All other helping professionals expressed positive expectation towards cooperation with social work in future.

In everyday practice, social work most often encounters in interdisciplinary collaboration: psychology, special pedagogy, physiotherapy, nursing, medicine, health and occupational therapy. Base of interdisciplinary cooperation between social work and those disciplines is in information sharing, social counseling, street work, support and peer groups, direct work with clients, developing and monitoring the individual client plans and coordinating mutual cooperation.

The requirements on social workers knowledge and skills are high and wide, they are expected not only to be professionally trained, have practical experiences and knowledge, but also to be able cooperate with other helping professionals. In that we can see a wide area of opportunities for educators in social work in personal and professional training of future social workers as well as in presenting social work as a field of study and a profession.

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#### Primary Paper Section: A

#### Secondary Paper Section: AN, AM

## PERFORMANCE MANAGEMENT IN SMALL AND MEDIUM-SIZED MANUFACTURING ENTERPRISES OPERATING IN AUTOMOTIVE IN THE CONTEXT OF FUTURE CHANGES AND CHALLENGES IN SR

<sup>a</sup>MARIANNA PSÁRSKA, <sup>b</sup>SIMONA HAŠKOVÁ,  
<sup>c</sup>VERONIKA MACHOVÁ

*Institute of Technology and Business, School of Expertness and Valuation, Okružní 517/10, 37001 České Budějovice, Czech Republic*

email: <sup>a</sup>psarska@mail.vstecb.cz, <sup>b</sup>haskova@mail.vstecb.cz,  
<sup>c</sup>machova@mail.vstecb.cz

**Abstract:** The aim of the paper is to review and outline the strategic changes and their main impact on the developing of KGI and KPI indicators in the selected performance management model that is the Balanced Scorecard, further referred to as BSC. The monitored market subjects are primarily both the micro and the small and medium-sized enterprises in the automotive industry in the Slovak Republic. The paper focuses on both modern and traditional performance indicators. The core of the analytical part is the review of the current situation of the selected KGIs of the automobile industry in Slovakia and the analysis of the predicted changes that have been transferred into the individual BSC perspectives and particular KGI and KPI indicators. The discussion and recommendation contain the analysis of the key strategic changes, threads and adaptability to the challenges of industry 4.0 in the Slovak Republic. It is especially a systemic perspective on the subject and the analysis of the specific changes in the strategic, operative and process-related indicators including the updated data from the automotive industry that is so enlightening. The paper also outlines the possible solutions and measures in relation to the monitored changes of the selected and most frequently used KGI indicators. Moreover, it could be very useful when the performance management models are implemented in small and medium-sized enterprises in the conditions of Slovak reality.

**Keywords:** business strategy, performance management models, future changes, automobile industry, KGI, KPI, Balanced Scorecard

### 1 Introduction

The paper is focused on the frequently discussed topic of the approaching changes in the internal conditions of businesses in Slovakia. Its objective is to simulate the incoming strategic changes under certain conditions, along with their impacts on the formation of the business performance management model and its changes for specific KGI and KPI indicators. The selected model is the Balanced Scorecard and the focus of research is mainly on small and medium-sized enterprises. The category of micro, small and medium-sized enterprises (SMEs) consists of businesses employing less than 250 persons, with the annual turnover not exceeding EUR 50 million and / or the total annual balance sheet amount not exceeding EUR 43 million. The given classification is an excerpt from Article 2 of the Annex to Recommendation 2003/361 / EC. The importance of the topic is confirmed by the fact that the automotive industry is a key branch of the Slovak economy. The automotive industry accounts for up to 30% of the total industry, which is obviously a large proportion. Moreover, there is a significant risk for Slovakia if it fails to deal with the approaching challenges in terms of both the macroeconomic and microeconomic perspective of the individual companies.

The main concepts of the paper are 'strategy', 'performance', and 'future direction' of the small and medium-sized enterprises in the automotive industry in Slovakia. Their selection is directly derived from changes which seem to come from several directions and are examined by various authors. In this context, the term of 'Industry 4.0' is used most often at first. It refers to the process of optimizing production processes using state-of-the-art technology to increase production. The concept originated in Germany in 2013. It was an initiative of the German government which was analysing the impact of new technologies on the country's economy at that time. The Slovak economy is very closely tied to the German one in the common European market and will therefore be significantly affected by the process of the coming years.

Ludbrook et al. (2019) said that although the relevance of business models for sustainable innovation in Industry 4.0, only limited research has been conducted on this topic.

The program of Industry 4.0 is about to integrate horizontally and also vertically within the society. This step is also considered to be the Fourth Industrial Revolution in terms of the development of production (Wang et al., 2016).

In the next step there is often mentioned the arrival of new technologies, artificial intelligence, robotization, and subsequently also the arrival of autonomous vehicles, which will lead to the reduction of the number of vehicles on the roads, the product turnover cycle should be prolonged and the quality of production will probably also be improved. At the same time, digitization, dematerialization, demonstration, greening and more democratization will take place. The whole environment where the businesses operate is expected to change gradually. New business models are already being discussed within the enterprises. In fact, the approach to employees and the prevailing corporate culture should gradually change. Not only linear changes are predicted, but also exponential ones, the failure of which means that many businesses will cease to exist.

Business strategy as one of the proven tools and success factors can capture the incoming changes and adapt to them, as it is claimed by Mc Kinsey, for example. Henry Mintzberg characterizes the strategy by the means of the alternative 'Five P's', and so are we. In a systemic perspective the strategy is characterized as a Plan, the direction as a Pattern in the sense of Code of Conduct in the following period. Moreover, there is also a Position focused on defining specific products and markets in detail even at the lowest level. Furthermore, there is Perspective, which is focused on the way an organization makes things, and finally there is Ploy, which is a specific manoeuvre to outwit the rivals and competitors. The basis for a strategy creation is a traditional Porter's model, which defines its essence as a competitive advantage that a business possesses, develops and maintains even in the future. The coming changes are going to test the essence of the strategy which will either help the businesses or make them gradually cease to exist, which will eventually prove their functionality. Considering the focus of the selected strategies, it can be concluded that the product differentiation strategy is going to become prominent in relation to the future changes. In fact, it is an individualization of product together with a leading position at low costs, which is a significant challenge for current businesses and emphasises the need for establishing savings at every level.

According to Frosen et al. (2016), from the perspective of business marketing, the most widely used strategies used by businesses are marketing performance measurement and market orientation. However, experts have not yet agreed on the optimum combination of these two strategies to maximize business performance.

Considering the viability of strategy and the fulfilment of strategic objectives, the authors are inclined to accept Thompson-Strickland's (2007) concept, which states that a business strategy is made up of activities and business attitudes that lead employees to achieve their business performance. They also state that the strategy is both proactive and reactive. In the real world, it is certainly not possible to predict and plan all possible changes, such as natural disasters, political changes, changes in laws, new technological discoveries or others. This implies that the strategy must inevitably be flexible enough to respond to these unforeseen changes and must therefore appropriately combine the planned activities with sufficient scope to respond adequately to current developments. Steinöcker (1992) offers a complementary view of these changes. He points out to what individual businesses need to do in order to meet the demands that they will face in the future. First and foremost, they will have to both tackle and avoid problems by prevention and a long-term comprehensive and systematic perspective. It is also essential to constantly question the validity of one's own

patterns of thought and behaviour. It is necessary to follow new paths, analyse concepts of things and then act quickly and create one's own concept of business performance.

Suryasaputra et al. (2011) states that it is very important to keep business performance at a good level in the long term in order to make business sustainable. Business performance includes four criteria: sustainable development, corporate social responsibility, stakeholder theory and corporate responsibility theory.

According to Richard et al. (2009), any scientific work on business performance must be based on very solid theoretical foundations, as the whole issue of business performance is very complex. Nevertheless, it is one of the most important measures for a management to evaluate the success of a business. Performance evaluation must not only be determined by individual indicators in the business but must be very complex and subject to consistent validation of results. It should not be ignored that the business performance is also influenced by countermeasures that could result in the reduction of its performance.

For the purposes of this paper, performance is considered from the systemic perspective. This point of view is very often used by the ISO 9000 series standards, but they do not define it. The European Foundation for Quality Management (EFQM) defines performance as „measure of achieved results by individuals, groups, organizations and processes“<sup>1</sup> Performance therefore represents a kind of intermediate step for increasing the business value, which can be understood vice versa, that it is possible to measure the value of the company thanks to its performance and a selected KGI. For example, Neumaierová and Neumaier (2002) maintain that the value of a business is determined by its performance. In order to increase the value of a business, it is necessary to increase its performance by proper management. That is, if we want to improve business performance, we should effectively manage and enhance the performance of business core processes (through KPIs) to meet the strategic goals and vision of the business. Suddenly, a question arises, how to achieve this? What will be changed, reclassified and added within the performance management model in the context of future changes in the automotive industry? These are questions that form the core of the theoretical and practical part of our paper. Our intention is to be of assistance to small and medium-sized enterprises despite the fact that the researches confirm there are few Slovak managers who are familiar with this method and use it in their business. The manager's task is to maintain adequate growth of the company (Vochozka, 2011).

Sabbagh et al. (2019) argue the automotive industry has also begun to change globally in recent years as management tends to view car manufacturing as a service. Therefore, car manufacturers focus more on identifying the management of overall quality and financial and non-financial KPIs.

Moreover, for the purposes of this paper, it is necessary to emphasise that so far there has not been carried out a comprehensive study of the BSC introduction as a performance management model and the implementation of a business strategy in the Slovak Republic (Gavurová, 2011, p. 165). We have tried to undertake our own research through a questionnaire survey, but the return rate of the questionnaires was only 1% of the total number of questionnaires sent, which in any case is not a relevant sample for our paper. It should also be noted that there is relatively little empirical evidence of how many Slovak businesses are or have implemented the BSC system and, above all, whether it is functional.

## 2 Literature research

### 2.1 The performance and choice of the management model of the business performance

Since more specific understanding of a business performance is classified according to the relationship between interest groups in a business, it is necessary to fully answer to the question for

whom, or in regard to whom we manage, assess, interpret, and evaluate the business performance. In this case, business management is to be dealt with. Its decision-making consists in implementing business strategies and specific strategic goals, which follows the broad line of this article. The Balanced Scorecard (BSC) is considered as an integrated strategic system of assessing and managing the business performance and which is able to construct reliable indicators. The system was developed at the beginning of 1990s by economists R.S. Kaplan and D.P. Norton, who published the first article on this issue in journal *Harvard Business Review* in 1992 (Gavurová, 2012), published a book called 'Balanced Scorecard: Translating Strategy Into Action' in 1996. The authors (2008, p. 62) dealt not only with an overall management of the system of the company management and a plan for a successful implementation of the strategy, but also with a set of managerial instruments illustrated in the examples of HSBC Rail, Cigna Property and Casualty and Store 24.

Veber (2009, p. 540) argues that what is here to be dealt with is a method that establishes a relation, i.e. unavoidable connection between company's policies implemented in strategic business plans and operational activities focused on assessing the performance. After all it refers to a controlling instrument with a wide range of application. Its advantages are dynamics, complexity and it also provides a double feedback which means that the management must supervise the performance of prescribed activities using KGI and KPI methods so that employed techniques result in achieving goals of defined strategic aims, which may currently be highly appreciated. This model is rather complex in relation to the time summary of the system; it connects the conception, strategy and operational goals and can be continuously updated and improved. The bright side of the Balanced Scorecard and carefully chosen performance indicators is that it permanently enhances the competitiveness, makes a greater use of tangible and intangible assets of the company by abandoning efforts which do not lead to achieving goals so that losses are incurred. Besides, it also partially assesses potential risks, which means that the company becomes more transparent and straightforward for its management. It is a technique that helps link together goals and activities from individuals, teams and departments to the whole enterprise. It thereby helps the enterprise be successful and financially stable on a long-term basis. On the other hand, the drawbacks are that such a situation may arise when this system of the performance management was not accepted by employees so that defined standards and overall required performance would fail to be fulfilled. The next considerable threat might be an inadequate support of the top management or inconsistent methodology of following separate KGI and KPI in regard to the responsibility. However, these drawbacks can also be overcome if identified and tackled on time.

Chiang and Lin (2009) declare that BSC is an ideal complementary instrument for the Data Envelope Analysis (DEA). These two models may also complement each other. BSC can provide outputs of the performance for DEA and DEA may define benchmarking for companies relying on inputs and outputs. The results showed a mutual relationship between BSC and DEA. Eliat et al. (2008) argue that the combination of BSC and DEA can be used for assessing the success rate and attractiveness of projects to customers. Managers of these companies can thereby acquire greater knowledge of how the company's development influences its clients.

What is evident is that it is the right choice of the model of the performance management of the corresponding indicators, assessment methods and the assessment of the business performance together with its specifications that may touch on central issues and shortcomings which need to be tackled (Kožená and Jelínková, 2014). Wagner argues (2009, p. 56) that a business should obtain a complete information support regarding the management of the business performance in relation to its strategy, tactics and operation. We can thereby say that to know, assess and manage the business performance is necessary not only in the present situation, but its significance

will also be acquired in the future. Currently, most of the popular opinions on managing performance of organizations result from a very careful consideration which, according to Wagner (2009, p. 34), might be posed as a challenge: 'An effort to a mutual integration and harmony of individual performance aspects is the best way to bring about a synergic effect from which the organization and all interest groups in its environment may benefit.' In our opinion it is this interesting challenge that best illustrates methods and complexity of the performance management model and points out not only the comprehensiveness or specificity of the issue of performance management, but also the extraordinary ability of the management model to adapt, which is highly useful in the group of small and medium-sized manufacturing enterprises existing in the automotive industry in Slovakia.

## 2.2 The model of the performance management of the Balanced Scorecard and KGI and KPI indicators

Wagner (2009, p. 231) argues that it is possible to divide the monitored performance parameters BSC into four basic groups labelled as perspectives:

1. Financial perspective.
2. Customer perspective.
3. Internal processes perspective.
4. Knowledge and growth perspective.

In order to carry out a closer and more in-depth analysis of individual perspectives and their indicators, Table 1 from Fibirová (2005, p. 47) was drawn up for that purpose. The table focuses on separate KPI indicators according to the perspectives. However, we must not omit that the compilation of the table considers only the then conditions and the analytical part will deal with its updates to the current situation and expected future challenges.

Tab. 1: KPI indicators according to perspectives and their relations to output indicators

| Indicators of the financial perspective   |  |   |   |
|---|--|---|---|
| Output indicators   | Driving forces   |   |   |
|   | Marketing mixture  | Costs reduction   | Exploitation of resources (investments)   |
| Economic value added (EVA), EBIT, ...   | Generation of sales according to segments of customers, % yields from new products and customers, the development of the profit rate in relation to customers, ... | Costs reduction (costs management), ...   | The return of investments % expenses of the research and development, ...   |
| Indicators of the customer perspective  |  |   |   |
| Output indicators   | Driving forces   |   |   |
|   | Time   | Quality   | Price   |
| The volume of sales (in Euro, pieces) % share on the market, % share of a customer, the profit rate | % meeting of the deadline, the reasonable time of the feedback, % service interventions, ...   | The number of complaints, the number of guarantee repairs, questionnaires on the subjective quality assessment, ... | % comparison of prices with competing parties, % comparison of prices with the last period, the measuring price per unit, ... |
| Indicators of the internal processes perspective  |  |   |   |
| Output indicators   | Driving forces   |   |   |
|   | Duration of the process  | The process quality   | The process costs   |
| The deadline for repaying the costs, the development from the „profit“ of selected products, ...    | The net duration of the process to the overall duration of the products, % number of new products, investments ...   | The degree to which the product is damaged, the amount of waste, % of processes with a statistical control, ...     | The use of ABC method, ...  |
| Indicators of the knowledge and growth perspective  |  |   |   |
| Output indicators   | Driving forces   |   |   |
|   | Employees' abilities   | Abilities of the  | Motivation  |

|  |  | IT system   |  |
|--|--|---|--|
| The assessment of employees' satisfaction (questionnaire), ... | The ratio of engaging strategic jobs, fluctuation, ... | The ratio of covering strategic information, % of data in real time | % of motivated managers, employees and the degree of knowledge of the project, |

Source: Fibirová (2005, p. 47).

KGI (Key Goal Indicators) refer to summarized key goal indicators of the financial performance, i.e. in Table 1 referred to as output indicators; these indicators have been set according to process goals resulting from the strategic document and the enterprise's conception. They demonstrate what should be achieved by the whole business process (the establishment of goals). The concept of KGI arises from COBIT<sup>1</sup> methodology. They establish the goal from which KPI (Key Performance Indicators) are derived. These indicators assess the performance of an already specific process through the establishment of partial goals. Considering standard and modern models, the most convenient is their mutual combination so that the monitored enterprise may achieve a great profit and far-reaching effect. KPI constitute key indicators that express the required performance (quality, effectiveness and economy).

Pavelková et al. (2018) analysed the identification of KPI combined with the indicator of Economic Value Added (EVA) in the area of automotive industry in the Czech Republic.

Gavurová (2012) argues that this method has not been so far much employed in Slovakia, mostly in a view of the fact that the use of this method had not been extensively explored by companies. On the other hand, the Czech Republic has had this method thoroughly adopted and results show that only 55% of companies confirmed a sound knowledge of BSC; however, they do not plan to implement it in the future. As a matter of fact, only 3% of companies in the Czech Republic make use of BSC system. Furthermore, 20% of companies admitted that they would like to play BSC system in the future and 17% of companies have never heard about the system.

## 2.3 Selected KGI indicators and their calculation

The assessment of financial performance through key goal indicators is implemented in our article by a financial benchmark of economic value added even when it is not proved that enterprises use it. The reasons to choose this benchmark are for instance that it enables to work out a value and reliably estimate the participation of individual subjects in the overall outcome, by means of which BSC enables generous rewarding and motivation. Režňáková (2010, p. 14) argues that focusing on one key goal prevents conflicts of all business participants. The calculation of the economic profit (over-profit) from operational activities (EVA<sub>2</sub>) is carried out in the analytical part using a profit rate indicator of the equity ROE. An advantage of EVA is also the relatively simple approach compared to other evaluation criteria (Stehel and Vochozka, 2016).

$$EVA = VI * (ROE - Nv) \quad (1)$$

Where:

VI – enterprise's equity,  
ROE – equity profit rate,  
Nv – equity costs.

Equity costs (Nv) generally refers to opportunity costs which depend on the risk from business activities of the company. The higher the risk is, the higher the required profit rate of the company's equity and the equity costs are. According to Fotr and Souček (2011, p. 118) the formula for calculating equity costs is devised as follows:

<sup>1</sup> COBIT refers to a framework of the most useful approaches to IT governance). This integration is carried out by connecting business and IT goals, defining benchmarks and models for assessing whether the required goals have been achieved and assuming responsibilities of individual owners of business or IT processes. [cit. 27.1.2019] Available on [www.managementmania.com/sk/cobit-5-control-objectives-for-information-and-related-technology](http://www.managementmania.com/sk/cobit-5-control-objectives-for-information-and-related-technology).

<sup>2</sup> The calculation was verified in a real business whenever it was possible.

$$PV = r_o + RP_3 \quad (2)$$

Where:

PV – the required profit rate of the equity

$r_o$  – the profit rate of risk-free investments (including without limitations the profit rate of bonds and debentures)

RP – risk premiums  $RP = \beta$  coefficient  $\times (R_m - R_d)$ ,

$\beta_4$  – coefficient (professional approach) – if a company which has not penetrated the stock market is to be dealt with

$R_m$  – the average annual profit rate of stock market shares portfolio

$R_d$  – the average annual profit rate of bonds

Other monitored factors which are often considered as companies' KGI include the net profit, growing total revenues in terms of the growth rate or achieved level of the overall added value, the work productivity and combined indicators such as the average profit margin or a gross margin. All these factors were calculated according to Finstat methodology.

### 3 Materials and methods

The analytical part in connection with the monitored businesses is based on data of Finstat, where data from the financial statements of particular businesses are found in the most up-to-date form. The combined data available as of 7 May 2019 were used to calculate the indicators and thus one block of data consists of the 2016 financial statements and the other block presents the financial statements for 05/2019, which are available for 2017 and 2018. The data are adjusted to average or sum or expressed in % and absolute in Euros. The methodology of performance calculation consists of modern and traditional methods of financial character. Based on this classification, the specific and most commonly used KGIs are defined.

## 4 Result

### 4.1 Current state of achieved KGI in automotive industry SR 2016-2018

The following Tables 2 and 3 show not only clearly the absolute and value differences between businesses but also the differences in the weighted average cost of capital achieved or, in terms of profitability, the average profit and gross margin and indicative changes between the periods under review. I am talking about the indicative changes because the year 2018 is not yet finalized and much depends on what type of method a person chooses for which indicator. As the selected indicators are not particularly demanding except for the EVU, I will stay with them in particular. Although its values are negative, see below, does not mean that all businesses have it negative. In 2017, 24% of indicators achieved a positive EVA indicator and in 2018 it was 20% of companies. In terms of the volume of its creation and size structure, these were mainly medium-sized and large companies. In terms of focus it was SK NACE 29310 i.e. manufacture of electrical and electronic equipment for motor vehicles and manufacture of motor vehicles. We would like to point out that there is a lot of room for improvement of this indicator also in other SK NACE and if we look at both tables we find that in year-on-year comparison it worsened.

3 The calculation of the equity costs often involves a specific risk surcharge, which is also included in our calculation. This surcharge considers the size of the enterprise according to its capitalization. The capitalization was verified in various ways and, eventually, it was the value of enterprise assets that was chosen for that purpose (CFO, 2014).

4 Beta coefficient shows a degree of volatility throughout changes in debts via the difference between the beta for an indebted company debt-free company. The coefficient consists in that debts included in the capital structure increase the risk for the investor to invest in the equity (the debts are superior to owner's investment in the equity). Debt-free companies typically demonstrate a lower beta (unlevered beta), which indicates lower risks compared to indebted companies (levered beta). The coefficient is calculated as follows:

$$\beta_1 = \beta_u + \beta_u \cdot CK \cdot \frac{(1 - Sdp)}{VK}$$

Tab. 2: Selected indicators of KGI for 2016 (in EUR'000)

| Types of businesses (EUR) | Overall profit (EUR) | Total sales (EUR) | EVA together (EUR) | Average WACC (%) | Average profit margin (%) | Average gross margin (%) | Additional value (EUR) |
|---------------------------|----------------------|-------------------|--------------------|------------------|---------------------------|--------------------------|------------------------|
| small                     | 4,933                | 202,091           | -7 757             | 53.49            | 303.31                    | 33.15                    | 48,247                 |
| micro                     | 7,100                | 124,249           | 75,271             | 44.74            | -17,784.64                | -5.16                    | 12,253                 |
| medium                    | 34,237               | 1,597,105         | -10,255            | 28.70            | 46.04                     | 23.70                    | 219,471                |
| large                     | 593,198              | 2,493,8020        | -134,131           | 24.58            | -321.92                   | -12.94                   | 3,209,112              |
| total sum                 | 639,468              | 26,861,466        | -76,873            | 38.43            | -6,236.71                 | 4.78                     | 3,489,083              |

Source: Authors.

Tab. 3: Selected indicators of KGI for 2017-2018 (in EUR'000)

| Types of businesses | Overall profit (EUR) | Total sales (EUR) | EVA together (EUR) | Average WACC (%) | Average profit margin (%) | Average gross margin (%) | Additional value (EUR) |
|---------------------|----------------------|-------------------|--------------------|------------------|---------------------------|--------------------------|------------------------|
| Small               | -5.160               | 252.168           | -31,053            | 17.24            | -7,130.63                 | -8.72                    | 45,092                 |
| Micro               | 11.682               | 52.887            | -54,077            | 35.67            | -14,326.28                | 4.55                     | 8,194                  |
| Medium              | 38.343               | 1,834,439         | -35,136            | 30.32            | 116.39                    | 24.95                    | 249,832                |
| Large               | 580,727              | 25,225,826        | -150,526           | 35.95            | 110.16                    | 21.22                    | 3,379,657              |
| Total sum           | 602,228              | 27,365,320        | -270,792           | 31.68            | -6,576.31                 | 9.46                     | 3,682,775              |

Source: Authors.

### 4.2 KGI and KPI in the context of future changes

The following subchapter of the analytical part deals with the pillars of the whole model of business performance management from the organizational, procedural and target but also human point of view, supplemented by particular possible indicators of KGI and KPI together with the anticipated future changes the businesses will have to face in the near future to face. Table 4 thus represents an update of the perception of performance indicators of the BSC management model used so far by Fibirová (2005, p. 47).

Tab. 4: Key future prospects for KPIs and KGIs

| Indicators for the financial perspective   |  |   |   |   |
|--|--|---|---|---|
| Output   | Driving forces (KPI)   |   |   |   |
| KGI  | Marketing mix  | Cost reduction  | Individualization and personalization   | Use of resources (investments)  |
| Economic Value Added (EVA), Discounted Cash Flow, Market Value Added (MVA), EBIT1, EBITDA2, etc.   | Changing the overall business and marketing system will increase the difficulty of across-the-board evaluation, but the indicators of sales growth and profitability development ban. remain.                                      | Reducing costs and generating savings together with their monitoring and evaluation (savings mainly in raw materials, energy and materials).  | Not only in access to external but also to internal subjects. In the promotion of creativity and innovation, thus enabling the continuous growth of the added value of each individual in the company (increase in investment in human capital).  | Pressure to accelerate return on investment (period), growth in R&D spending, information and security system. Monitoring via IRR, NPV and others |
| Indicators for customer perspective  |  |   |   |   |
| Output   | Driving forces (KPI)   |   |   |   |
| KGI  | Time   | KGI   | Time  | KGI   |
| Sales volume (in Euros, pcs), % market share, % customer share and stability = satisfaction, Profit margin, Product profitability, etc., | % meeting deadlines, average response time, % service interventions, the range of services at the price of the product will increase. And building the long-term. Relations gets in the forefront.                                 | Sales volume (in Euros, pcs), % market share, % customer share and stability = satisfaction, Profit margin, Product profitability, etc.,  | % meeting deadlines, average response time, % service interventions, the range of services at the price of the product will increase. And building the long-term. Relations gets in the forefront.  | Sales volume (in Euros, pcs), % market share, % customer share and stability = satisfaction, Profit margin, Product profitability, etc.,          |
| Internal business process perspective indicators   |  |   |   |   |
| Output   | Driving forces (KPI)   |   |   |   |
| KGI  | Duration of the process  | Process quality   | Effectiveness   | Process costs   |
| Cost reimbursement period, Value added creation, Labor productivity per employee, per hour,  | Net processing time to total product lifetime, % number of new products and close trend monitoring. Trend shortening and streamlining process through the system of improvement proposals (indicators in terms of their benefits). | Product damage rate, amount of waste, % of processes under control. This is done using robotic systems – cognitive technologies, autonomous systems, miniaturization and systematic collection, sorting and evaluation of data. | Continuity of production, monitoring and evaluation of specific types and causes of downtime, delays in fulfilling orders. Frequency of problems, failures and their nature and identification of the exact causes and ensuring remediation in a short time in order to minimize costs. | Use of improvement methods such as ABC, Six Sigma, Cost Attack, Reengineering, Outsourcing, Kaizen etc.   |

| Indicators for learning and growth perspectives   |   |  |   |   |
|---|---|--|---|---|
| Driving forces (KPI)  |   |  |   |   |
| Output  |   |  |   |   |
| KGI   | Employee skills   | Capabilities of information system   | Complexity  | Motivation  |
| Measuring employee satisfaction, monitoring trust in a company and attitude to corporate culture and values. Including risk assessment, Altman Z-score and monitoring external development of selected sectoral macroeconomic indicators. | The ratio of occupation of strategic jobs and turnover in these jobs. Substitutability. A system of lifelong learning and regular monitoring of access to change. Appeal for flexibility and a positive approach to change. | Strategic information coverage ratio. A system of sorting information into meaningful and meaningless is likely to be one of the key algorithms bringing meaningfulness into a very large and ever-increasing flow of information. | Reflecting in customer and employee satisfaction and SME collaboration to get bigger projects. Localization in the environment and cooperation with surrounding institutions. Greening. | % of motivated executives, employees, level of awareness of projects and events, support of teamwork and building relationships of full trust among them in terms of meeting the common corporate goal (s). |

Source: Authors according to structure by Fibírová (2005, p. 47).

### 4. 3 BSC in the automotive industry in Slovakia

One of the aims of this paper was to make a detailed analysis of the state of BSC implementation in Slovakia. For this purpose we created a questionnaire which contained all the necessary questions. However, the return on questionnaires<sup>5</sup> reached only 1% and it is therefore impossible to draw relevant conclusions under such conditions. Until businesses are obliged to respond to questionnaires of this type, or they are taken over by the statistical office or other institution, which will be legally captured, the information is likely to be absent in the long run. What is certainly a pity, because they would also represent a kind of benchmarking or an incentive to improve specific businesses.

### 5 Discussion

As only a small part of the business has an established performance management system in terms of implementation, we have also looked at the research that deals with this phase and verifies the success of this model. Gavurova says (2011, p. 175) in her partial research on the implementation phase of BSC that 56% of respondents see the greatest benefits in the fact that implementing this system results in the increase of the strategic performance of the business and 44% of them see these benefits in the change of the perspective, which means that data actually needed for management are preferred over the financial indicators. It is a sample of mostly medium-sized and large enterprises that are not focused on the selected sector of the economy. The key to the selection is to know and implement the BSC. There is a very interesting conclusion in connection with the gradual development of this model and its latest phase. Up to 80% of respondents in the Slovak Republic, who draft a strategic map<sup>8</sup> at the organizational level, report that the use of the BSC system has significantly improved values of at least 3/4 indicators. The remaining 20% do not monitor this information. Only 50% of businesses have noticed this significant improvement without a strategic map. Let us examine the strategic map (3rd generation BSC) a little closer. Its creation is associated with the aim of linking visions, missions and strategies with goals within the individual perspectives.

Amini and Babil (2011, pp. 220-228) also defend the important position of strategic maps in their case studies from a particular business. They point out to the difficulties and emphasise the need for a strict focus on the specific conditions of each business and the necessity to improve acceptance by all personalized sections of the business. Garengo and Biazio (2012, pp. 79-102) presents a somewhat broader concept of the measurement system for business performance of small undertakings. He points out to a one-sided and top-down approach in relation to the transformation strategy, which considers business activities, but it does not take into account the fact that small businesses do not to give great importance to formalizing strategic decisions. Therefore, it points out to the need for an individual approach to each business. Thus, he proposes a methodology for these businesses which would link a real strategy to an intended strategy, which emphasises the process of observation and the clarification of vision. However, we consider this approach appropriate when a small business attempts to gradually implement a performance management model, which is rather a

first step. Especially these abilities to transform the strategy, and to develop and focus on systematic long-term, purposeful and accepted perceptions of objectives in terms of the BSC's performance management model are essential for the capacity to rise to the challenges. There are other research works carried out, for example, in the conditions of American businesses from the Balanced Scorecard Institute (BSI<sup>8</sup>). Other research focuses on the implementation phase in terms of IT infrastructure, e.g. Sandkuhl, Meissen and Hacker (2003, pp. 26-30). The so-called moral point of view is especially important in each sphere. No matter if it is in the context of the setting of goals, implementation, calculation of methodology or other business impacts affecting not only the business environment but also the employees, see the moral dilemma of economic optimization examined by Vochozka, Stehel and Maroušková (2018, pp. 1331-1338).

Considering the current perspectives of future development and the necessity of updating these trends or changes to BSC, it is important for the business to have them established at least in the basic structure. If they are not established, they can be built with respect to the challenges and future trends. Stanek and Ivanov (2017) claim small and medium-sized enterprises have long neglected the relations of business opportunities to the general characteristics of social consumption, in other words, it has been a poorly interconnected business with market needs.

Moreover, there is outsourcing and offshoring that have developed a new business space in terms of cooperation with large businesses. It has enabled to transfer the cost and efficiency problem to small and medium-sized subcontractors, but it puts pressure on them to build up inevitable savings and reduce fixed costs. The situation is beneficial for big entities, who deal with sales. However, constant pressure remains on the costs of the small and medium-sized enterprises. Subcontracting chains have emerged in the automotive industry. Transnational businesses are going to try to push Slovakian subcontractors into maximum responsibility for their economic results and eventually transmit problems on them, which will probably cause that the subcontractors will make effort to reduce their dependency on transnational businesses. Other changes include the creation of so-called personalized economy, offering quality of services along with preserving and supporting human creativity, implementing environmental standards within society or developing services related to personal development, which not only do open up other business opportunities for companies but also greater opportunities for the development of their own employees. Since there is a continuous debate about the so-called information society, it is information with its accuracy, availability, security, comprehensiveness and timeliness that is and will be of the greatest importance. Current and anticipated disproportions in the area of taxes, levies, administration and forms of assistance are not addressed in the paper.

Societies 4.0 and 5.0 mean a complex social transformation. The development of a shared economy in terms of new communication with customers, the development of autonomous transport systems, which will change the nature of local transport, personalized smart technologies and greening processes, while minimizing waste will be crucial to the automotive industry. This is a change in two principles from the perspective of business philosophy, which are namely personality and complexity. It will require a new quality of cooperation of small and medium-sized enterprises with each other. Consequently, trust, cooperation and correctness will have to return into their relationships, as they will not be able to operate without the change of thinking and attitude. Especially small and medium-sized enterprises will play a particularly important role in the adaptation process, as they will know the specific conditions that will enable them to transform specifically under the influence of the fundamental changes mentioned above. Their adaptability will be crucial. The question is how to transform? These changes can be transformed into the internal business environment precisely through the business performance management model and selected KGI and KPI indicators that ensure regular monitoring and

implementation of the necessary measures to manage the changes.

As it seems to be clear that the overall extent of the change is expected to be in relation to introducing robots, digitization and artificial intelligence processes, therefore these changes in particular will need to be incorporated in three key phases, namely:

- to identify the expected processes and their possible impacts on the business,
- to create a model image of a particular virtual form of the future situation and to identify the directions of its future development in relation to the monitored business,
- to implement the adaptive processes to the coming change by a transformation into the performance management model.

## 6 Conclusion

The objective of the paper was to evaluate the current situation in terms of applied performance management models in automotive of the SR, with a focus on most widely used KGI. The next step was to update the individual perspectives and adapt them to the new conditions by means of learning about strategic changes and their main impact of the formation of KGI and KPI indications in a selected performance management model (BSC).

In short, in order to maintain the efficiency, bottom-up innovating will be necessary, as well as to learn constantly, cross discipline boundaries, and to have a complex view of the future in order to be able to update the business vision and strategy. Another step will be integration of exponential technologies, IT, greening, humanization, and developing the employee creativity, and as a priority, to integrate them into the processes as much as possible.

In the context of current situation in which the businesses operate, all the aforementioned assumed changes represent an area or a network of intersecting opinions, interests, and strategies. However, one thing is clear: the current strategic goals of small and medium-sized enterprises in the form of increasing profit, expanding the customer portfolio in terms of series-produced products will gradually cease to work as the overall trade and marketing systems have been changing. The decisive changes will include a new form of communication with customers, business partners, individualization of the production as well as the approach to the entities that are in contact with the company, a significant increase in using software in business processes, which is a crucial factor of flexibility, greening, and mainly the directed and individual promotion of human resources education, since those are the carriers of change. Relations will be reconsidered in terms of a kind of partner dialogue creating the prerequisites for a ration and joint pooling of forces in order to achieve a joint effect and maximum benefit, which is not possible without mutual trust.

First of all, it will be inevitable to introduce BSC performance management system and consider it in terms of the company vision, culture, long-term success, and solution of an expected situation in the context of a continuous integration of resulting changes as much in advance as possible. This is also confirmed by selected KGI indicators for automotive of the SR between 2016 and 2018. In terms of risk for small and medium-sized enterprises, lack of information and enormous pressure put on saving and streamlining can be the Achilles heel. In terms of company specialization in order to achieve permanent success, the authors share the opinion of Košťuriak and Chal' (2008, p. 61, p. 31), who see the following as the decisive focus:

1. systematic innovations a permanent ability to change,
2. development of human resources in a company, creating values and development of business culture.

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**Primary Paper Section: A**

**Secondary Paper Section: AH**

# INFLUENCE OF EMPLOYEE ENGAGEMENT AND EMPLOYEE BENEFIT SCHEMES ON JOB SATISFACTION

<sup>a</sup>ALICE REISSOVÁ, <sup>b</sup>JANA ŠIMSOVÁ, <sup>c</sup>KAROLÍNA FRÍČKOVÁ

*Jan Evangelista Purkyně University in Ústí nad Labem, Faculty of Social and Economic Studies, Moskevská 54, 400 96 Ústí nad Labem*

email: <sup>a</sup>alice.reissova@ujep.cz, <sup>b</sup>jana.simsova@ujep.cz, <sup>c</sup>frickova.k@gmail.com

**Abstract:** Currently, there are shortages of qualified labour on the market. Businesses struggle to attract new employees, which is why they strive to retain their current employees. They pay great attention to overall job satisfaction of their employees. Satisfaction of employees can be affected by their engagement or rate of satisfaction with employee benefits. The objective of the study was to identify whether the overall job satisfaction of line employees in a manufacturing corporation is influenced more by employee engagement or satisfaction with the benefit scheme. The applied linear regression shows that a benefit scheme affects the increase in overall satisfaction less than the assessment of engagement at work. Employee engagement was monitored in three areas: satisfaction with management, work atmosphere and potential personnel turnover rate. The largest influence was reported in the assessment of the work atmosphere. Another important finding is a statistically significant difference between the assessment of work atmosphere given by Generation X and Y. If employers want to manage work performance efficiently, they should respect the differences between these generations when preparing incentive schemes. The issue should be examined in the field of science and research as well.

**Keywords:** job satisfaction, employee engagement, benefits, Generation X, Generation Y, work atmosphere

## 1 Introduction

The unemployment rate in the Czech Republic has been declining over a long period of time. The data provided by the Czech Statistical Office at the turn of the years 2018 and 2019 show that it has dropped to 2% (CZSO, 2019). A low unemployment rate is a sign of economic prosperity, which is a positive trend, however, it entails particular difficulties when attracting new staff members or retaining existing employees considering human resource management. With more or less the same manning levels in a specific locality/region, the demand for labour is growing. Consequently, employers put great emphasis on caring for their employees and a number of financial indices which can indicate a potential risk. Such indices may comprise monitoring of overall employee satisfaction, employee satisfaction with the benefit scheme in place or employee engagement.

Engaged staff members are devoted, energetic and committed to their job. Work engagement positively affects the work atmosphere, safety at work, relationships with peers and career opportunities. On the other hand, poor relationships at work, a negative work atmosphere or high demands at work can result in personnel fatigue (Petrović et al., 2017). Čulibrk et al. (2018) state that engagement is the condition when satisfied personnel have a positive attitude not only to their job, but also to the whole organization. Madan (2017) formulated a recommendation on how to increase employee engagement. He says employers should focus on several fundamental areas: respecting employees (appreciated respect increases their loyalty), fair treatment, objective assessment of employee performance, a fair remuneration policy (both tangible and intangible) and care for the health and social needs of the personnel. Other important conditions for increasing employee engagement is awareness of employees (setting communication channels correctly, feedback in place), involving employees in what is happening in the organization and, last but not least, a good employer reputation (Madan, 2017).

Job satisfaction is one frequently monitored factor at work, particularly at a time of high demand for labour on the labour market when it is very easy to change employer (Gosse & Hurson, 2016). Satisfied personnel are a major driver of an organization (Rani et al., 2011). Hence, companies should focus on personnel satisfaction (Cimperman, 2016). Satisfied personnel generate long-term productivity (Borcherding &

Oglesby 1974; Shikdar & Das 2003, cit. Albattah et al., 2017) and efficiency of an organization (Minder & Balina, 2015). It has been verified that satisfied personnel are usually more creative, come up with new ideas and are a source of innovation. On the other hand, employee dissatisfaction results in stagnation (Prayogo et al., 2017). Čulibrk et al. (2018) state that job satisfaction is a key element in personnel motivation. Job satisfaction is substantially affected by factors such as working environment, relationships at work or financial and social factors. It is therefore crucial to know what the expectations of personnel are and then try to respond to their requirements (Aksoy et al., 2018).

Employee satisfaction can undoubtedly be increased using a variety of tangible and intangible rewards as part of an incentive scheme. Since employers spend considerable amounts on motivating their personnel, the incentive scheme should be regularly monitored and evaluated so that it responds to changes (Hitka et al., 2015). The most frequent employee benefits offered by organizations to employees are contributions towards catering, pension and life insurance, contributions to cultural events or holidays and sports. Sick days, employer's contributions to pension schemes and language courses are the most desired benefits (Němečková, 2016). The benefit scheme can also include longer annual leave or other contributions (such as to living, transport or education). Employees who prefer a healthy lifestyle will appreciate contributions to sports activities or contributions focusing on health, such as rehabilitation, supplemental health care, vaccinations, or contributions to buying vitamins for employees (d'Ambrosiová, 2015). As mentioned above, employee satisfaction is crucial. However, the question is whether job satisfaction is affected more by employee engagement or the benefits offered by the employer, into which it usually invests a considerable amount of money. The objective of this study is to answer the question.

## 2 Methodology

The objective of this study is to identify whether the level of engagement of line employees in a selected business enterprise has a greater impact on their overall job satisfaction than the level of satisfaction with the available benefit scheme.

The investigation was carried out in a manufacturing corporation which has 478 line employees (mostly men). The method of written questionnaires was selected to collect data. Firstly, respondents used a four-level scale (strongly agree to strongly disagree) to answer the question whether they are satisfied with the employee benefits offered by their organization. The next question to answer was related to their overall satisfaction in their organization. They responded using a scale of 1-100 %, where 1 % means that a respondent is definitely not generally satisfied, and 100 % means that a respondent is completely satisfied. The same scale was used to answer the question about their current overall satisfaction with the employee benefit scheme. Further questions focused on employee engagement, which was investigated in three areas – work atmosphere, satisfaction with management and potential personnel turnover. A four-level scale ranging from strongly agree to strongly disagree was used to answer the questions. As to the work atmosphere, respondents answered questions such as whether they have good colleagues at work, whether their colleagues are willing to perform well, whether there is usually a good atmosphere among colleagues at work or whether they learned something new at work in the past. As to satisfaction with management, respondents answered the question of whether their opinion is valued, whether their superior managers are interested in them as human beings, whether their good performance is recognised by their superiors, whether their superiors encourage their personal development, or whether they think their organization enjoys a good reputation. Questions focused on potential personnel turnover answered by the

respondents were - would you leave your current job if a comparable job was offered to you, have you considered leaving the job over the last 6 months, are you currently looking for another job, or do you think colleagues often leave jobs in this company. The questions relating to engagement were taken from expert studies (Reissová, Šimsová, Hásová, 2017a; Lee et al., 2017). At the end of the questionnaire research, the respondents answered identification questions, specifically, they were asked about their length of employment with the organization, the department they work in, age, gender and the highest education achieved.

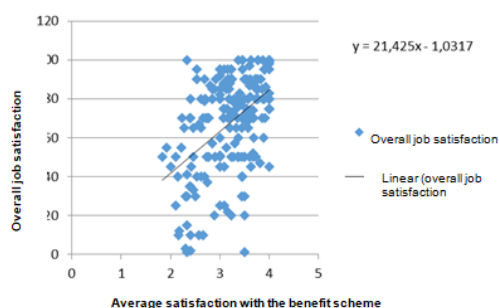
The data were collected in May 2018. The selection group consisted of 212 blue-collar workers. The survey response rate was 69.7 %. Of the total number of respondents 91 % were men and 9 % women. Of these respondents, 25 % of the workers were aged between 15 and 29, 42 % of the workers between 30 and 40, 24 % between 41 and 50 and 9 % of the workers were aged 51 or more. With regards to the length of employment, 15 % of respondents have been working for the company for less than 12 months, 15 % 1 to 3 years, 46 % of respondents between 4 and 14 years and 23 % for 15 or more years. Most of the respondents completed secondary schools with a certificate of apprenticeship (71 %). 21% of respondents have a certificate of secondary school leaving education. 4% have completed elementary education and 3% of respondents are university graduates.

MS Excel and MS Statistika were used to collect and process the data. Statistical methods of the linear regression, F-test of overall significance in regression analysis and the Mann-Whitney U test were used to evaluate the data.

### 3 Results

The description of dependence of the overall job satisfaction on the satisfaction of employees with the benefit scheme was established using the linear regression. The most suitable regression function was a linear function. We looked for the impact model of the “employee engagement on their overall job satisfaction”. As to satisfaction with the employee benefit scheme, the resulting correlation coefficient was 0.482, which means an averagely strong dependence between the variables of Satisfaction with the employee benefit scheme and Overall job satisfaction. The p-value of the F-test was  $1.39 \cdot 10^{-13}$  in this case, which means that the model is statistically significant when compared to the significance level of 0.05. The dependence of overall job satisfaction and satisfaction with the employee benefit scheme can be described using the following function:  $y = 21.425x - 1.0317$ . The graphic representation of the regression model depicting the dependence between overall job satisfaction and satisfaction with the benefit scheme is shown in Figure 1.

Fig. 1: Regression model of dependence between overall job satisfaction and satisfaction with benefits

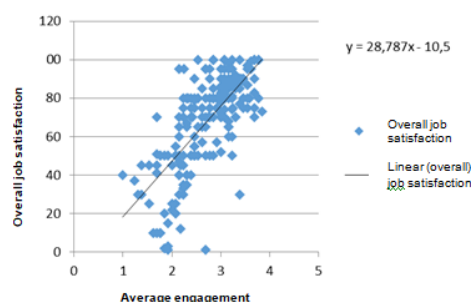


Source: own processing

A correlation coefficient of 0.709 was established in employee engagement, which suggests a strong linear dependence between the variables of Employee engagement and Overall job satisfaction. The p-value of the F-test was very low here too, namely  $2.57 \cdot 10^{-33}$ , which confirms that the model is

statistically significant when compared to the 0.05 significance level. The results also show that an increase in the assessment of the engagement of one unit is followed by an increase in the overall job satisfaction of 28.8 % and an increase in the assessment of the satisfaction with the employee benefit scheme of one unit is followed by an increase in the overall job satisfaction of 21 %. The dependence between overall job satisfaction and employee engagement can be expressed using the function:  $y = 28.787x - 10.5$ . The regression model of the dependence between overall job satisfaction and employee engagement is shown in Figure 2 in the graph below.

Fig. 2: Regression model of the dependence between overall job satisfaction and employee engagement



Source: own processing

Consequently, we looked for the model of dependence of “Overall job satisfaction on the Employee satisfaction with their benefit scheme” and “Employee engagement” simultaneously. Even in this case, the result showed a relatively strong dependence, since the correlation coefficient was 0.715. However, in this model, the regression coefficient of Employee satisfaction with their benefit scheme was statistically insignificant. Such situation is explained by the fact that the assessment of satisfaction with the employee benefit scheme and assessment of engagement are mutually correlated. The correlation between the assessment of satisfaction with the employee benefit scheme and assessment of employee engagement is 0.58. Apparently, employee engagement also affects satisfaction with the employee benefit scheme.

Both cases of testing show that the level of engagement of line employees has a greater impact on their overall job satisfaction than the level of satisfaction with the current benefit scheme. Obviously, employee engagement is a crucial factor employers should pay attention to. Consequently, the issue was further analysed. Differences between individual generations are often referred to at present. The analysis investigated whether younger employees (often called Generation Y, i.e., born between 1980 and 2000) differ from the generation of older employees designated as Generation X (i.e., born between 1960 and 1980) in terms of employee engagement. The analysis focused on individual factors of engagement. The monitored variables were satisfaction with management, work atmosphere and potential personnel turnover rate.

It was established using the Mann-Whitney U test that there are statistically significant differences between the generations in the area of assessment of the work atmosphere. Table 1 shows the results.

Tab. 1: Differences in the assessment of employee engagement between Generation X and Y

Mann-Whitney U Test (w/ continuity correction) by variable generation. Marked tests are significant at  $p < 0.05000$

| Variable   | U        | Z        | p-value  | Z adjusted | p-value  |
|------------|----------|----------|----------|------------|----------|
| Management | 3770.500 | -1.13768 | 0.255256 | -1.14207   | 0.253424 |

|                    |          |          |          |          |          |
|--------------------|----------|----------|----------|----------|----------|
| Atmosphere         | 3298.000 | -2.41452 | 0.015756 | -2.44271 | 0.014578 |
| Personnel turnover | 4103.500 | -0.23780 | 0.812033 | -0.23953 | 0.810697 |

Source: own processing

Work atmosphere was investigated using several questions in the questionnaire. Questions were then identified in which different responses between individual generations were established. Table 2 was used as a basic underlying document to calculate the level of disagreement with the statement "My superior manager gives me recognition for good performance". Only 37.5 % of employees from Generation X disagreed as opposed to 58% of respondents from Generation Y.

Tab. 2: Comparison of responses to the question "My superior manager gives me recognition for good performance"

| Generation | Strongly disagree | Disagree | Agree | Strongly agree | Sum |
|------------|-------------------|----------|-------|----------------|-----|
| X          | 4                 | 20       | 34    | 6              | 64  |
| Y          | 17                | 59       | 36    | 19             | 131 |
| Sum        | 21                | 79       | 70    | 25             | 195 |

Source: own processing

The results show that younger employees (Generation Y) think they are given recognition for their good performance more frequently than the older generation (Generation X).

The next statement to investigate employee engagement was: "There is usually a good atmosphere among colleagues at work". The table shows the absolute frequency of responses used as the underlying document to calculate the level of disagreement with the statement.

Tab. 3: Comparison of responses to the question "There is usually a good atmosphere among colleagues at work"

| Generation | Strongly disagree | Disagree | Agree | Strongly agree | Sum |
|------------|-------------------|----------|-------|----------------|-----|
| X          | 11                | 30       | 19    | 4              | 64  |
| Y          | 47                | 66       | 12    | 6              | 131 |
| Sum        | 58                | 96       | 31    | 10             | 195 |

Source: own processing

The level of disagreement of Generation X was lower (64 %) than the level of disagreement of Generation Y (86%) in this case as well. It means that younger employees also give a more positive general assessment in this case and they think the atmosphere among their peers at work is generally good. The third and last statement which was analysed was defined as follows: "My colleagues are willing to work and perform well". Table 4 shows the absolute frequency of responses to the statement.

Tab. 4: Comparison of responses to the question "My colleagues are willing to work and perform well"

| Generation | Strongly disagree | Disagree | Agree | Strongly agree | Sum |
|------------|-------------------|----------|-------|----------------|-----|
| X          | 14                | 42       | 8     | 0              | 64  |
| Y          | 50                | 70       | 9     | 2              | 131 |
| Sum        | 64                | 112      | 17    | 2              | 195 |

Source: own processing

The level of disagreement of Generation X is also lower (87.5 %) than that of Generation Y (91.5 %). Nonetheless, the differences between individual generations are relatively small and it can be concluded that both generations have a good opinion of their colleagues and think they are willing to work and perform well. However, the opinion of Generation Y is stronger.

The Mann-Whitney U test was used to find out whether the established differences in the level of disagreement

with individual statements are statistically significant. The results are shown in Table 5.

Tab. 5: Verification of the statistical significance of established differences between Generation X and Y

Mann-Whitney U Test (w/continuity correction) by variable generations 1 Marked tests are significant at  $p < 0.05000$

| Statement | Z        | p-value  | Z        | p-value  |
|-----------|----------|----------|----------|----------|
| 1         | -1.88217 | 0.059814 | -2.00195 | 0.045291 |
| 2         | -3.34818 | 0.000814 | -3.6311  | 0.000282 |
| 3         | -1.95513 | 0.050569 | -2.22155 | 0.026314 |

Source: own processing

Table 5 shows that in all three statements:

1. "My superior manager gives me recognition for good performance"
2. "There is usually a good atmosphere among colleagues at work".
3. "My colleagues are willing to work and perform well", statistically significant differences were established, the most significant differences being the second statement with the first statement being the least significant. The results indicate that employers should take into account the age structure of their personnel when managing work performance and developing incentive reward schemes since it is evident that there will be certain differences between these generations.

#### 4 Discussion

Many studies have been devoted to the importance of employee engagement and no one disputes its value (Albrecht and Anglim, 2018; Jung and Yoon, 2018; Jena, Pradhan and Panigrahy, 2018; Siti and Nik, 2019). This study, however, established a very interesting fact - that employee engagement has an even greater effect on overall job satisfaction of employees than satisfaction with the benefit scheme. The conclusions of this study are extremely important considering the amounts of money spent by employers on benefit schemes and the attention paid to them (Jaworski et al., 2018; Purdon, 2018; Szeiner, Szobi and Sklenár, 2018; Sreenath et al., 2019), because they show that a more efficient way to increase job satisfaction (leading to higher retention and performance) is by way of the attention paid to developing work engagement, particularly the work atmosphere. It is not completely explicit whether job satisfaction affects the performance of employees in reality. Some studies state there is definitely a positive relationship (Octaviannand et al. 2017), while others emphasise a neutral relationship by contraries (Cimperman, 2016). The fact that the results of some studies show positive and others negative effects of employee satisfaction on work performance can result from operationalisation (definition) of job satisfaction as well as the method of measuring performance. The time factor is another important factor, i.e., satisfied employees need not necessarily increase their performance instantly but they can maintain a stable performance over time, which is an indisputable asset for an employer as well. There are other factors which can affect investigations into employee satisfaction, such as the industry. Albattah et al. (2017) established that the happiest personnel are those in the building industry. This was the conclusion of extensive research conducted in the USA which lasted the whole business cycle and where the selection group consisted of more than 13,000 respondents. Another important finding made by Albattah et al. was that satisfaction, or factors affecting it, changes in employees depending on the business cycle. Recession is characterised by growing demands for a higher salary and, on the other hand, demands for career growth go down. Hence, the importance of external motivation grows during a recession.

Some studies devoted to job satisfaction rank among factors affecting satisfaction factors classified by other authors as "employee engagement". A typical example is work atmosphere,

which is ranked among factors affecting job satisfaction by some authors (Florea & Amuza, 2015; Hitka et al., 2015; Janićijević et al. 2015; Octaviannand et al., 2017). Apparently, it is irrelevant how the terms are defined from the practical point of view, nonetheless, it is always necessary to verify the operationalisation of individual variables considering science and research. It has been confirmed that different operationalisation can lead to different results and conclusions. Employee engagement was investigated in the studies conducted by Čulibrk et al. (2018); Reissova, Šimsova a Hášová, 2017.; Victor & Hoole, 2017; Rudaleva & Mustafin, 2017; Aksoy et al., 2018. Čulibrk et al. (2018) state that personnel working in manufacturing corporations are more satisfied and engaged than those working in the tertiary sector. Other interesting findings related to the length of employment and education. The longer people work in an organization, the lower satisfaction and engagement they show. Employees with higher completed education show lower engagement at work.

Obviously, work engagement is affected by a number of variables. As the conclusions of this study suggest, age and falling within the respective generation is an important variable, too. Although authors disagree about an exact specification of time for Generation X and Y, generally, people born between 1960 and 1980 are considered Generation X and the following generation (between 1980 and 2000) is considered Generation Y. Generation Y represents a substantial and constantly growing percentage of the work force on the labour market. The available studies show that attracting and retaining employees from Generation Y is rather complicated for businesses because Generation Y has different opinions compared to Generation X in many areas. The younger generation finds the image of the organization important, they expect and demand a higher standard of living and put emphasis on the balance between work and life. The research conducted in Olomouc on 350 respondents showed that employees from Generation Y find the financial remuneration, work team, job description and working hours the most important at work (Kasalová et al., 2015). Employees from Generation Y are also very ambitious, they tend to come up with new ideas and innovations which would bring better, faster and more effective results, they demand a modern work environment, good work atmosphere, good relationships with superior executives and open communication with other staff members. If an organization wants to retain staff members from Generation Y, it must make sure to provide its personnel with a pleasant work environment, which will considerably affect their loyalty and long-term work engagement. These employees find it important to have a certain kind of freedom, creativity and flexibility, they look for more demanding assignments and challenges, they are much more talented in using information technology, the feeling of being recognised is very important for them, as well as interest from other staff members and responsibility. Employees from Generation Y need to develop constantly, learn new things, train and share information (Moravcova-Skoludova & Vlckova, 2018). The need for recognition is confirmed by the authors Naim & Usha (2018), too. They state that personnel from Generation Y need to get feedback about their work results, they need to feel that they are given support by their superiors and peers, which can help share information with others, they need to develop, which can lead to better retention, build links to the organization and consequently, to their engagement. The research conducted by Valickas & Jakštaitė (2017) on 850 employees of one company confirmed that representatives of Generation Y are open to changes and they need to know why the work performed is important and whether the work will be useful and purposeful in the future. The research established that Generation Y needs superior managers who are willing to listen to their opinions and give them recognition. It was confirmed by this survey as well that not only wages, intangible benefits and development of competences are the most important incentives for representatives of Generation Y, but also self-esteem, work environment and relationships with colleagues and superior managers, recognition, and possibility being able to have their say. As the conclusions of the research suggest, these employees are very ambitious. Similar conclusions are stated in other

surveys devoted to finding a place for Generation Y on the labour market (Civelek et al, 2017; Horácková and Kopáček, 2018; Putri, Sjabadhini and Mustika, 2018). The above-stated conclusions as well as other studies (Bencsik, Horváth-Csikós and Juhász, 2016) show that personnel managers must be able to respond to the specifics of individual generations and prepare incentive and retention schemes that take into account the differences between the generations.

## 5 Conclusion

The main objective of this study was to identify whether employee satisfaction is affected more by employee engagement or level of satisfaction with the employee benefit scheme. The regression analysis established that employee engagement is more closely related to overall employee satisfaction than satisfaction with the benefit scheme. The models in question proved that an increase in the assessment of engagement of one unit has a greater effect on overall job satisfaction (nearly 29 %) than an increase in satisfaction with the employee benefit scheme (only 21 %).

Due to the importance and significance of employee engagement, the survey investigated which of the three monitored factors (satisfaction with management, work atmosphere and potential personnel turnover rate) mostly affect the assessment of engagement. The Mann-Whitney U test proved that assessment of the work atmosphere is the most important. Work atmosphere was therefore analysed in detail and individual statements were examined in detail in consideration of the age of the respondents (Generation X and Y). Responses to statements were tested: "My superior manager gives me recognition for good performance", "There is generally a good atmosphere at work among my peers" and "My colleagues are willing to work and perform well".

The results show that there are statistically significant differences between the generations in their assessment of work atmosphere. The younger Generation Y appreciate the situation more positively than Generation X. This finding is important for practice. Employers should take into consideration for which generation they prepare their schemes, either incentives, development, performance or others. The schemes will likely be effective if they take into account the specifics of the respective generations. This topic should be investigated in detail due to its importance.

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#### Primary Paper Section: A

#### Secondary Paper Section: AE, AN

## THE USE OF PERVASIVE TECHNOLOGIES IN BUSINESS PROCESSES

<sup>a</sup>VLADIMÍR BOLEK, <sup>b</sup>ANITA ROMANOVÁ, <sup>c</sup>PATRIK RICHNÁK, <sup>d</sup>KLAUDIA PORUBANOVÁ

*University of Economics in Bratislava, Faculty of Business Management, <sup>a,b</sup>Department of Information Management, <sup>c,d</sup>Department of Production Management and Logistics, Dolnozemska cesta 1, 852 35 Bratislava, Slovak Republic*  
 email: <sup>a</sup>vladimir.bolek@euba.sk, <sup>b</sup>anita.romanova@euba.sk,  
<sup>c</sup>patrik.richnak@euba.sk - corresponding author,  
<sup>d</sup>klaudia.porubanova@euba.sk

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**Abstract:** Innovative pervasive technologies are ubiquitous, integrated into the environment, and their main task is data collection. In the current era of widespread business process digitalization, the volume of data that needs to be collected, sorted, analysed and evaluated for the most accurate management decisions is continuously increasing. The article focuses on the area of digital production and its fundamentals, which include data, data acquisition sensors, the Internet of Things and information systems. Based on the analysis of the current state of use of individual innovative pervasive technologies in enterprises in the Slovak Republic, we point out the differences in their use among Slovak enterprises.

**Keywords:** data, innovative pervasive technologies, sensors, digitalization, digital production

### 1 Introduction

The emergence of innovative pervasive technologies has prompted the requirements of Industry 4.0 and they, on the other hand, contribute to its development. Innovative pervasive technologies and the Internet network, which triggered an industrial revolution in society, are becoming hyper-aware systems, featuring highly flexible technologies, following clear algorithms, responding not only to human commands but also to their own perception and guidance. In literature, when it comes to integrating innovative technologies into business processes, we encounter the concepts of data collection and analysis, new ubiquitous technologies, sophisticated sensors, robotics, cloud computing, Internet of Things, digital manufacturing, autonomy, systems interoperability, digitalization, virtualization, artificial intelligence, augmented reality, surrounding intelligence. Implementation of these technologies in business processes creates a new environment, which we call the ambient intelligence of a company.

New innovative technologies change individual business processes and areas. Kagermann (2014) introduces four key technologies, Industry 4.0 components, which include cyber systems (connections between the real and virtual world), the Internet of Things, the Internet of services and smart products, machine to machine (M2M) communication. M2M communication and smart products are not considered independent parts. M2M is the activator of the Internet of Things and smart products are a part of cyber-physical systems.

The article focuses on the digitalization of production and its fundamentals, which include data, data acquisition sensors, the Internet of Things and information systems. The conceptual apparatus is covered by definitions of domestic and foreign authors. The main objective is to analyse the current status of use of selected innovative pervasive technologies in enterprises in the Slovak Republic and to identify differences in their use among Slovak enterprises.

### 2 Literature Review

In the last decade, individual areas of production have been considered a highly developing area of IT. The digitalization of production is one of the main strategies of the European production vision and the strategic agenda towards knowledge-based production. It is driven by the application and standardization of information and communication technologies

and increasing demand for operational efficiency in global networks (Westkämper, 2007).

The production environment is turbulent and requires continuous adaptation of production systems. Production engineering covers a wide range from networks to processes and from real time to long-term operations. The tools of future engineering and production management are digital and distributed.

Chrysosouris et al. (2009) point out the integration of information and communication technologies in production, which can significantly reduce production time, reduce costs, reduce product development costs, improve product quality and accelerate market response.

Digitalization of production cannot do without information technologies, data collection, data analysis, simulations, virtual reality, process automation and ultimately, e-commerce.

The introduction of three-dimensional printers and direct digital production brings a new paradigm, direct digital production (Chen et al., 2015) with a significant impact on society. Direct sustainability aspects of digital production are closely related to social, economic and environmental dimensions. Direct digital production combines the benefits of other production paradigms and has a positive impact on sustainable development, however a number of technical and societal challenges need to be addressed. Currently its incorporation into new types of assembly lines can already be observed and a high level of specification is becoming the norm.

Significant social aspects of digital production include lifestyle changes, changes in the labour market, working environment, waste management and others. Integration of information and communication technologies, virtualization and development of ambient intelligence bring about the formation of various paradigms, subdomains also in the area of digital production.

Important digital production fundamental items include data, data acquisition sensors, the Internet of Things, innovative pervasive technologies and information systems.

The volume of processed digital data doubles every 2 years (analogy to Moore's hardware law) (Grantz and Reinsel, 2012). The growth of digital data is not everything; at the same time, changes in the type of these data can also be observed.

The types of data processed can be divided into 3 main groups (Tyagi, 2012), namely structured data, semi-structured data and non-structured data. There is no exact definition of big data. There are many definitions in scientific publications by domestic and foreign authors, each of which is correct, but with a focus on a different aspect.

The importance of digital data is also increasing from an economic and social perspective. In 2015 the value of data in the European Union economy was over € 285 billion, which represents more than 1.94% of the EU's GDP. In 2016 the year-to-year growth of 5.03% of the data value increased their value to € 300 billion, representing 1.99% of the EU's GDP.

If EU countries and businesses operating in it support investment in ICTs, favourable political and legislative conditions will be created, and the European Commission estimates that the value of the European data economy could increase to € 739 billion by 2020, which is 4% of the total GDP of the European Union.

The increasing volume of these digital data creates volumes that exceed the capacities of conventional database systems. Hurwitz et al. (2013) defines big data as a combination of old and new technology that allows large amounts of data to be processed at a reasonable rate to provide the desired analyses at a given moment. Ohlhorst (2012) provides a more versatile definition -

"big data is such an extremely large data set that traditional data processing is insufficient for the required analysis." The concept of big data was more comprehensively defined by Dumbill (2012): "they are data whose processing exceeds the capabilities of conventional database systems. These data are too large, they move too fast, or their structure does not correspond to the existing database architecture. To acquire a value from such a data file, you need to choose an alternative method of processing."

Gartner analyst Doug Laney (2001) operates in a research study with the term big data complementing it with the 3V dimension. He names the term big data as a set of data whose size is beyond the ability to capture, manage and process data with commonly used software tools within a reasonable time, not only in terms of data volume but comprehensively in a three-dimensional context naming it as 3V (Volume - expresses an exponentially increasing amount of data within the relevant business area, Variety - information varies in countless types, resources, formats, structures, coding, syntax, etc., Velocity - the speed at which data are generated and the need for their real-time analysis).

In his study, Kaptein (2018) points out how to consider new data categories and big data, such as "future data" and the role of uncertainty in designing a new generation of ambient intelligence. Ambient intelligence in terms of digital data needs:

- data that describe the current state of the world for devices operating in it;
- data processing, either through explicit human coded rules or more implicitly, machine-learned relationships;
- estimates of activity results.

The technologies that make up the Internet of Things must be designed with respect to economic demands versus technological demands. The portfolio of devices that enter the Internet of Things can be divided into the following three categories according to the way devices communicate with the application: passive, active and managed.

Passive - this group includes sensors operating on the principle of code (EAN, QR code), or RFID chip. From a physical point of view, an RFID small microchip is connected to an antenna, often in the form of a sticker. Scientific and technological advances have also brought semi-passive RFID, which are battery-powered. Information from these devices is read through a scanner, a reader. Their mass use in industry can be observed in particular in logistics.

Active - most sensors that communicate in only one direction are called active devices. They are a source of data that can be sent continuously or at the user's request. These are mostly various motion, door sensors, sensors, meters, cameras. In all these cases, the direction of communication from the device to the application is the priority.

Managed - these are devices that, in addition to collecting data and sending data based on an algorithm, can receive a managed instruction. These include lighting, thermo heads, security cameras (positioning, sharpening), sound equipment and many other. Such a device sends data to a controlling application. This can then change the behaviour of the device based on a program or user requirements.

Data from special sensors or other devices are sent over the Internet to the service provider. These data are then normalised in the IoT I/O interface module. Thus, the data of the various devices are adopted in a uniform format so that they can be stored in a database. Normalisation depends on the type of connected devices and the scope of services offered.

### 3 Methodology and data

The data that formed the basis for the statistical detection in order to determine the current situation in enterprises in the Slovak Republic and verification of the research hypothesis were obtained by a questionnaire survey conducted by occasional sampling in the period of 09/2018 - 06/2019 in enterprises in the Slovak Republic. Individual questions and variables were formulated based on induction, deduction and some degree of abstraction. The questionnaire (complying with the conditions of validity and reliability) contained open, closed questions, which were measured by nominal, ordinal and interval variables. The Likert scale of 0 - insignificant to 6 - very significant influence was applied. When confronting our conclusions, we also used secondary statistical data.

The object of the investigation were enterprises in the Slovak Republic. The relevant respondents whose responses were included in the analysis were 206. The survey structure consisted of 79% of commercial enterprises, 6% of self-employed persons and 15% of other enterprises. The representativeness of the sample was ensured by regional equilibrium, while the sample was from all regions of Slovakia. The structure of the sample by sectors approximates the distribution of enterprises in the national economy (statistical classification of economic activities - SK NACE).

The biggest share belonged to enterprises from industrial production (24%), other activities (13%) and wholesale and retail (12%). We segmented enterprises by size (table 1) based on the European Commission's Recommendation 2003/361/EC, based on the number of employees (micro 1-9, small 10-49, medium 50-249, large enterprise  $\geq 250$ ).

Table 1: Survey sample structure

| Enterprise size | Number  |
|-----------------|---------|
| Micro           | 17.48%  |
| Small           | 19.42%  |
| Medium          | 24.76%  |
| Large           | 38.35%  |
| Total           | 100.00% |

Source: Authors' own research

We use an extensive set of mathematical-statistical methods to evaluate the data obtained by a questionnaire survey. We measure the accuracy and dependability of this research tool through reliability - Cronbach Alpha - because the items the questionnaire is made of are not dichotomous, but have a larger range (Likert scale). We analysed the reliability of the scales used. The reliability of the scale of individual platforms examined is  $\alpha = 0.843$ . Field and Hole (2010) report that a Cronbach alpha level above 0.8 is an acceptable level, a lower value means a relatively unreliable scale. The author Anýžová (2015) works with the value of Cronbach's alpha at the level of 0.7, which she denotes as the lower confidence limit.

In the research results, we analysed whether companies differ in their use of innovative pervasive technologies depending on their size. A hypothesis was set for the purpose of exact investigation:

$H_0$ : Enterprises depending on their size (micro, small, medium, large) do not differ significantly in the use of individual innovative pervasive technologies.

$H_1$ : Enterprises, depending on size (micro, small, medium, large), differ significantly in the use of individual innovative pervasive technologies.

In the individual analytical parts we used descriptive statistics to analyse the current state of integration of these pervasive technologies. We verified the assumption of normal data distribution using the Kolgomor-Smirn test. Since the conditions for normal data distribution were not met, we used the non-parametric Kruskal-Wallis test. Among the variables, we also examined dependence using the eta coefficient.

#### 4 Results

To streamline business processes, it is necessary to capture data from individual processes that take place in the enterprise. These data are transformed into repositories, then processed by appropriate methods, resulting in decision-making data, and thus affecting production, operational and business processes. The core environment is the Internet, which allows you to transmit information inside, within the enterprise and with the outside world. In manufacturing enterprises, it is usually difficult to connect devices directly to the Internet, so several technologies are used to transfer data that need to be interconnected. Ultimately, the data obtained from these devices need to be distributed over the Internet, transformed into an information system, and provide appropriate inputs/outputs for individual downstream processes.

In this section, we analyse the current state of use and the intention of enterprises to implement selected technologies that serve for data collection.

Table 2: Implementation of data collection

| Data collection         | Micro   | Small   | Medium  | Large   | $\Sigma$ |
|-------------------------|---------|---------|---------|---------|----------|
| we do not carry out     | 11.11%  | 15.00%  | 1.96%   | 3.80%   | 6.80%    |
| we carry out internally | 72.22%  | 70.00%  | 90.20%  | 83.54%  | 80.58%   |
| we carry out externally | 16.67%  | 15.00%  | 7.84%   | 12.66%  | 12.62%   |
| $\Sigma$                | 100.00% | 100.00% | 100.00% | 100.00% | 100.00%  |

Source: Authors' own research

Each enterprise generates data that is a valuable resource for business management decision making. The results specified in Table 2 report that 81% of enterprises collect data internally, 13% externally. Internally, data are primarily collected by medium and large enterprises. Micro and small enterprises use external form of data collection, or some of them do not collect these data at all.

Internal data collection is favoured more by manufacturing companies - 84% of manufacturing enterprises, 10% external data collection and 6% do not carry out data collection. The external form of data collection is more favoured by non-manufacturing enterprises 15%, compared to manufacturing companies 10%. Non-manufacturing enterprises (78%) use internal data collection and 7% of non-manufacturing enterprises do not collect data.

Table 3: Data collection via RFID

| Enterprise status/size                          | Micro   | Small   | Medium  | Large   | $\Sigma$ |
|---|---------|---------|---------|---------|----------|
| Cannot be carried out                           | 61.11%  | 70.00%  | 35.29%  | 35.44%  | 46.60%   |
| We only know theoretically                      | 27.78%  | 20.00%  | 33.33%  | 11.39%  | 21.36%   |
| We have considered, but we do not carry out yet | 2.78%   | 0.00%   | 19.61%  | 11.39%  | 9.71%    |
| We will carry out                               | 8.33%   | 0.00%   | 3.92%   | 5.06%   | 4.37%    |
| We have already taken the first steps           | 0.00%   | 2.50%   | 1.96%   | 5.06%   | 2.91%    |
| We are gradually implementing                   | 0.00%   | 2.50%   | 0.00%   | 12.66%  | 5.34%    |
| Implemented                                     | 0.00%   | 5.00%   | 5.88%   | 18.99%  | 9.71%    |
| $\Sigma$  | 100.00% | 100.00% | 100.00% | 100.00% | 100.00%  |

Source: Authors' own research

Several technologies can be used for data collection. RFID is one of them. The level of use by enterprises (Table 3) is very low  $M = 1.50$ ,  $SD = 2.01$ , up to 78% of enterprises do not use this technology, 13% plan to implement it and only 10% of enterprises already have this technology. The RFID technology is present the most in large enterprises in terms of size. Micro and small enterprise have encountered this technology only to a

very small extent and are not even considering its implementation. The structure within manufacturing/non-manufacturing enterprises is very similar. 90% of manufacturing and 92% of non-manufacturing enterprises do not use RFID, 5% of manufacturing and 8% of non-manufacturing are planning to implement RFID. Only 5% of manufacturing enterprises use the RFID technology.

Table 4: Data collection by means of barcodes

| Enterprise status/size                          | Micro   | Small   | Medium  | Large   | $\Sigma$ |
|---|---------|---------|---------|---------|----------|
| Cannot be carried out                           | 55.56%  | 55.00%  | 35.29%  | 22.78%  | 37.86%   |
| We only know theoretically                      | 13.89%  | 12.50%  | 11.76%  | 7.59%   | 10.68%   |
| We have considered, but we do not carry out yet | 5.56%   | 2.50%   | 5.88%   | 6.33%   | 5.34%    |
| We will carry out                               | 5.56%   | 0.00%   | 5.88%   | 2.53%   | 3.40%    |
| We have already taken the first steps           | 5.56%   | 5.00%   | 3.92%   | 2.53%   | 3.88%    |
| We are gradually implementing                   | 5.56%   | 5.00%   | 5.88%   | 7.59%   | 6.31%    |
| Implemented                                     | 8.33%   | 20.00%  | 31.37%  | 50.63%  | 32.52%   |
| $\Sigma$  | 100.00% | 100.00% | 100.00% | 100.00% | 100.00%  |

Source: Authors' own research

Data collection can also be carried out using barcodes, EAN codes. This technology is used by enterprises (Table 4) at the level of  $M = 2.74$ ,  $SD = 2.66$ , 54% of enterprises do not use it, 14% plan to implement it and 33% of enterprises have this technology. Compared to previous the RFID technology, the use of barcodes, or planned use, also occurs with smaller businesses. It is mainly used by large and medium-sized enterprises, manufacturing enterprises 20%, while 10% enterprises plan to implement it. In the case of non-manufacturing enterprises, it is used only by 8% and 17% would be interested in using it.

Table 6: Data collection carried out by means of QR codes

| Enterprise status/size                          | Micro   | Small   | Medium  | Large   | $\Sigma$ |
|---|---------|---------|---------|---------|----------|
| Cannot be carried out                           | 50.00%  | 55.00%  | 45.10%  | 25.32%  | 40.29%   |
| We only know theoretically                      | 25.00%  | 22.50%  | 15.69%  | 10.13%  | 16.50%   |
| We have considered, but we do not carry out yet | 19.44%  | 2.50%   | 13.73%  | 13.92%  | 12.62%   |
| We will carry out                               | 2.78%   | 2.50%   | 7.84%   | 2.53%   | 3.88%    |
| We have already taken the first steps           | 0.00%   | 5.00%   | 5.88%   | 12.66%  | 7.28%    |
| We are gradually implementing                   | 0.00%   | 0.00%   | 5.88%   | 13.92%  | 6.80%    |
| Implemented                                     | 2.78%   | 12.50%  | 5.88%   | 21.52%  | 12.62%   |
| $\Sigma$  | 100.00% | 100.00% | 100.00% | 100.00% | 100.00%  |

Source: Authors' own research

A technologically higher level of data collection is provided by QR codes. Their use in enterprises (Table 5) is at the level of  $M = 1.92$ ,  $SD = 2.18$ , this form of data collection is carried out only by 13% of them, while 18% of enterprises plan to implement them. QR codes are used by large businesses (22%). Micro, medium and small enterprise are mostly aware of this technology only on a theoretical level, but are considering introducing it. This technology is mainly used by 13% of manufacturing enterprises and 8% plan to introduce it. With non-manufacturing enterprises, only 3% use QR codes to collect data and 3% plan to use QR codes for data collection.

Table 6: Data collection carried out by means of sensors

| Enterprise status/size                          | Micro  | Small  | Medium | Large  | $\Sigma$ |
|---|--------|--------|--------|--------|----------|
| Cannot be carried out                           | 52.78% | 47.50% | 23.53% | 20.25% | 32.04%   |
| We only know theoretically                      | 5.56%  | 10.00% | 3.92%  | 5.06%  | 5.83%    |
| We have considered, but we do not carry out yet | 16.67% | 7.50%  | 7.84%  | 3.80%  | 7.77%    |

|                                       |         |         |         |         |         |
|---------------------------------------|---------|---------|---------|---------|---------|
| We will carry out                     | 8.33%   | 2.50%   | 11.76%  | 1.27%   | 5.34%   |
| We have already taken the first steps | 5.56%   | 5.00%   | 7.84%   | 8.86%   | 7.28%   |
| We are gradually implementing         | 2.78%   | 10.00%  | 19.61%  | 8.86%   | 10.68%  |
| Implemented                           | 8.33%   | 17.50%  | 25.49%  | 51.90%  | 31.07%  |
| $\Sigma$                              | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |

Source: Authors' own research

Based on the results of the analysis, it can be concluded that companies especially use various sensors for data collection (Table 6) at the level of  $M = 3.06$ ,  $SD = 2.55$ , which is closely determined by the nature of the business. This technology is used by 31% of enterprises, 23% of enterprises plan to implement and use them in data collection, and 46% do not use this technology. The use of these technologies is predominantly present in large (52%) and medium enterprises (26%), but is gradually being introduced in small enterprises as well. Sensors are especially used by manufacturing enterprises, 18% of them are already fully collecting data from these technologies, 18% plan to implement these technologies. In case of non-manufacturing enterprises, only 8% of them use sensors in data collection and 17% of enterprises plan to introduce them.

The following part presents the results of the survey focused on the transformation of the acquired data into an information system. In business practice, it often happens that enterprises collect data but do not transform it into an information system for further analysis and evaluation.

Table 7: Transformation of acquired data into information system

| Enterprise status/size                          | Micro   | Small   | Medium  | Large   | $\Sigma$ |
|---|---------|---------|---------|---------|----------|
| Cannot be carried out                           | 11.11%  | 5.00%   | 3.92%   | 2.53%   | 4.85%    |
| We only know theoretically                      | 11.11%  | 5.00%   | 1.96%   | 2.53%   | 4.37%    |
| We have considered, but we do not carry out yet | 19.44%  | 0.00%   | 3.92%   | 1.27%   | 4.85%    |
| We will carry out                               | 5.56%   | 10.00%  | 9.80%   | 2.53%   | 6.31%    |
| We have already taken the first steps           | 2.78%   | 10.00%  | 5.88%   | 2.53%   | 4.85%    |
| We are gradually implementing                   | 5.56%   | 17.50%  | 11.76%  | 10.13%  | 11.17%   |
| Implemented                                     | 44.44%  | 52.50%  | 62.75%  | 78.48%  | 63.59%   |
| $\Sigma$  | 100.00% | 100.00% | 100.00% | 100.00% | 100.00%  |

Source: Authors' own research

We positively evaluate the level of transformation of the obtained data into an information system (Table 7), which reaches the value of  $M = 4.90$ ,  $SD = 1.81$ . Up to 61% of businesses transform the collected data into an information system for the purpose of a deeper analysis. In 22% of enterprises, their management considers the idea of introducing a data transformation process into their information system in order to streamline processes and decision making. However, there is still a certain percentage of enterprises (14%) that passively collect data but do not transform it into an information system. Relatively satisfactory values are achieved by all four sizes of enterprises, transformation into the information system is most often carried out by large enterprises (79%), medium enterprises (63%), small enterprises (53%) and micro enterprises (44%).

Transformation of data into an information system is not carried out in inverted sequence by micro enterprises (11%), small enterprises (5%), medium enterprises (4%) and large enterprises (3%). In particular, manufacturing enterprises (53%) transform the collected data into an information system, while 38% of manufacturing enterprises are considering implementing these processes. Non-manufacturing enterprises (44%) carry out the transformation of collected data into the information system, 14% of them consider introducing this transformation and 42%

do not and will not carry out the transformation of data into an information system in the near future.

Table 8: Manual import of data into information system

| Enterprise status/size                          | Micro   | Small   | Medium  | Large   | $\Sigma$ |
|---|---------|---------|---------|---------|----------|
| Cannot be carried out                           | 2.78%   | 25.00%  | 5.88%   | 21.52%  | 15.05%   |
| We only know theoretically                      | 2.78%   | 0.00%   | 7.84%   | 7.59%   | 5.34%    |
| We have considered, but we do not carry out yet | 11.11%  | 2.50%   | 1.96%   | 1.27%   | 3.40%    |
| We will carry out                               | 5.56%   | 2.50%   | 3.92%   | 0.00%   | 2.43%    |
| We have already taken the first steps           | 22.22%  | 5.00%   | 9.80%   | 2.53%   | 8.25%    |
| We are gradually implementing                   | 13.89%  | 12.50%  | 11.76%  | 5.06%   | 9.71%    |
| Implemented                                     | 41.67%  | 52.50%  | 58.82%  | 62.03%  | 55.83%   |
| $\Sigma$  | 100.00% | 100.00% | 100.00% | 100.00% | 100.00%  |

Source: Authors' own research

The level of data collection and its subsequent manual import into an information system (Table 8) is  $M = 4.36$ ,  $SD = 2.30$ , 24% of enterprises do not manually import the collected data into an information system, 20% of enterprises deal with the idea of their manual import into their information system. Manual data import (56%) is used in particular by large and medium-sized enterprises. It is necessary for these enterprises to move towards full automation.

Similarly, 20% of non-manufacturing enterprises and 29% of manufacturing enterprises do not collect data with manual import into an information system, with 24% of non-manufacturing enterprises and 14% of manufacturing enterprises consider the idea of introducing this form of import. Up to 55% of non-manufacturing enterprises manually import data into an information system, in case of manufacturing enterprises it is 57%.

Table 9: Automatic data import into an information system

| Enterprise status/size                          | Micro   | Small   | Medium  | Large   | $\Sigma$ |
|---|---------|---------|---------|---------|----------|
| Cannot be carried out                           | 19.44%  | 30.00%  | 7.84%   | 2.53%   | 12.14%   |
| We only know theoretically                      | 13.89%  | 5.00%   | 5.88%   | 0.00%   | 4.85%    |
| We have considered, but we do not carry out yet | 25.00%  | 10.00%  | 9.80%   | 7.59%   | 11.65%   |
| We will carry out                               | 8.33%   | 5.00%   | 11.76%  | 2.53%   | 6.31%    |
| We have already taken the first steps           | 11.11%  | 5.00%   | 3.92%   | 1.27%   | 4.37%    |
| We are gradually implementing                   | 5.56%   | 22.50%  | 21.57%  | 24.05%  | 19.90%   |
| Implemented                                     | 16.67%  | 22.50%  | 39.22%  | 62.03%  | 40.78%   |
| $\Sigma$  | 100.00% | 100.00% | 100.00% | 100.00% | 100.00%  |

Source: Authors' own research

When building ambient intelligence, integrating innovative pervasive technologies, it is necessary to move data collection and import into an information system to the level of full automation. This method is for the analysed enterprises (Table 9) at the level of  $M = 4.09$ ,  $SD = 2.18$ , 29% of enterprises do not carry out automated data collection and its import into an information system, 31% of enterprises would like to implement this method and 41% of enterprises already use this form. Meanwhile, enterprises prefer to use the manual form of data collection and import to automatic, although in terms of percentage the differences are not too big. Automatic data collection is used primarily by large enterprises, up to 62% of them. Only 2.5% of large enterprises do not carry out this collection and do not even consider this form in the near future. Automated data collection is largely not carried out by micro and small enterprises.

Communication is important not only between individual information systems, but also technologies that provide for data collection. The following section analyses the communication of devices within an enterprise.

Table 10: Interactive communication between technologies and information systems using NFC

| Enterprise status/size                          | Micro   | Small   | Medium  | Large   | $\Sigma$ |
|---|---------|---------|---------|---------|----------|
| Cannot be carried out                           | 55.56%  | 55.00%  | 33.33%  | 34.18%  | 41.75%   |
| We only know theoretically                      | 13.89%  | 22.50%  | 29.41%  | 15.19%  | 19.90%   |
| We have considered, but we do not carry out yet | 8.33%   | 2.50%   | 9.80%   | 12.66%  | 9.22%    |
| We will carry out                               | 5.56%   | 0.00%   | 3.92%   | 10.13%  | 5.83%    |
| We have already taken the first steps           | 8.33%   | 0.00%   | 3.92%   | 5.06%   | 4.37%    |
| We are gradually implementing                   | 5.56%   | 7.50%   | 5.88%   | 3.80%   | 5.34%    |
| Implemented                                     | 2.78%   | 12.50%  | 13.73%  | 18.99%  | 13.59%   |
| $\Sigma$  | 100.00% | 100.00% | 100.00% | 100.00% | 100.00%  |

Source: Authors' own research

The use of the NFC technology (Table 10), which represents a short-range, high-frequency, contactless connection allowing data exchange between devices, is at the level of  $M = 1.82$ ,  $SD = 2.18$ , of which it is at the lowest level of all the analysed technologies. Only 14% of enterprises use this technology, while 16% of enterprises consider its implementation. The NFC technology is most represented in large enterprises (19%), medium enterprises (14%) and small enterprises (13%). The NFC technology is used mainly by manufacturing enterprises (13%), non-manufacturing enterprises (3%) for communication between devices. However, as many as 19% of non-manufacturing enterprises are considering implementing it, while only 8% of manufacturing enterprises would like to implement this technology. The most important reason for the low penetration of the use of this technology is the short-range connection.

Table 11: Interactive communication between technologies and information systems using WIFI

| Enterprise status/size                          | Micro   | Small   | Medium  | Large   | $\Sigma$ |
|---|---------|---------|---------|---------|----------|
| Cannot be carried out                           | 36.11%  | 30.00%  | 23.53%  | 17.72%  | 24.76%   |
| We only know theoretically                      | 5.56%   | 2.50%   | 5.88%   | 7.59%   | 5.83%    |
| We have considered, but we do not carry out yet | 8.33%   | 2.50%   | 7.84%   | 5.06%   | 5.83%    |
| We will carry out                               | 8.33%   | 0.00%   | 7.84%   | 3.80%   | 4.85%    |
| We have already taken the first steps           | 2.78%   | 7.50%   | 3.92%   | 5.06%   | 4.85%    |
| We are gradually implementing                   | 13.89%  | 7.50%   | 17.65%  | 8.86%   | 11.65%   |
| Implemented                                     | 25.00%  | 50.00%  | 33.33%  | 51.90%  | 42.23%   |
| $\Sigma$  | 100.00% | 100.00% | 100.00% | 100.00% | 100.00%  |

Source: Authors' own research

Enterprises primarily use WIFI technology to communicate between devices (Table 11). The use of this technology is at the level of  $M = 3.63$ ,  $SD = 2.54$ , the technology provides much wider use than the NFC technology. This technology is used by 42% of enterprises for communication between devices (production, sensors, etc.), 21% of enterprises are considering using it and 36% of enterprises do not use this technology yet. Communication between devices via WIFI technology reflects the percentage of usage associated with WIFI coverage. Enterprises that collect data through various technologies (sensors, codes, etc.) and have WIFI coverage of the entire enterprise also use this technology to communicate between these technologies. The communication of devices via WIFI is secured mainly with manufacturing enterprise (50%), 15% of

companies would like to use this technology in communication with devices. With non-manufacturing enterprises, 25% of enterprises use WIFI technology for communication between devices and 25% plan to use this technology for communication between individual devices.

Table 12: Interactive communication between technologies and information systems using Bluetooth

| Enterprise status/size                          | Micro   | Small   | Medium  | Large   | $\Sigma$ |
|---|---------|---------|---------|---------|----------|
| Cannot be carried out                           | 50.00%  | 52.50%  | 43.14%  | 36.71%  | 43.69%   |
| We only know theoretically                      | 25.00%  | 15.00%  | 9.80%   | 20.25%  | 17.48%   |
| We have considered, but we do not carry out yet | 11.11%  | 5.00%   | 13.73%  | 6.33%   | 8.74%    |
| We will carry out                               | 2.78%   | 2.50%   | 3.92%   | 5.06%   | 3.88%    |
| We have already taken the first steps           | 0.00%   | 5.00%   | 1.96%   | 1.27%   | 1.94%    |
| We are gradually implementing                   | 2.78%   | 0.00%   | 13.73%  | 5.06%   | 5.83%    |
| Implemented                                     | 8.33%   | 20.00%  | 13.73%  | 25.32%  | 18.45%   |
| $\Sigma$  | 100.00% | 100.00% | 100.00% | 100.00% | 100.00%  |

Source: Authors' own research

Another alternative that can be provided between devices (manufacturing, sensors, etc.) in an enterprise is the use of Bluetooth technology (Table 12). The utilisation by analysed enterprises is at the level of  $M = 1.94$ ,  $SD = 2.35$ . Bluetooth is used only by 18% of enterprises, 12% consider introducing it. Bluetooth is most represented with large enterprises (25%) and then small enterprises (20%). This technology is particularly used by manufacturing enterprises (20%), 8% of enterprises plan to implement this technology. Non-manufacturing enterprises use Bluetooth to a very limited extent, with only 8% of enterprises, 6% plan to implement the technology, and 86% do not use this technology at all.

In relation to the analyses of the data collection and communication platforms used we analysed the use of the Internet of Things. We also examined individual areas of use of this platform.

Based on the analyses, we can observe that the Internet of Things penetration is the highest in the area of data processing 73%, communication 68% and information security 68%.

For a more detailed analysis, we chose the area of the collection of data that are subsequently processed and form the basis for decision making.

We verified the assumption of normal data distribution using the Kolmogor-Smirn test. Data were not normally distributed RFID  $p < 0.000$ , EAN  $p < 0.000$ , QR  $p < 0.000$  and sensors  $p < 0.000$ . Since the conditions for normal data distribution were not met, we used the non-parametric Kruskal-Wallis test.

Based on the results of the statistical analysis, we conclude that companies differ statistically significantly in the use of individual RFID tools ( $M = 1.51$ ,  $SD = 2.01$ )  $\chi^2(3) = 27.437$ ;  $p < 0.000$ , EAN ( $M = 2.74$ ,  $SD = 2.66$ )  $\chi^2(3) = 26.735$ ;  $p < 0.000$ , QR ( $M = 1.92$ ,  $SD = 2.18$ )  $\chi^2(3) = 26.081$ ;  $p < 0.000$ , sensors ( $M = 3.06$ ,  $SD = 2.55$ )  $\chi^2(3) = 32.554$ ;  $p < 0.000$ , depending on the size of the enterprise.

We reject  $H_0$  hypothesis and accept  $H_1$  hypothesis: Enterprises, depending on size (micro, small, medium, large), differ significantly in the use of individual innovative pervasive technologies.

Based on the results of statistical testing we conclude that the size of an enterprise has a significant impact on the use of innovative pervasive technologies, sensors intended for data collection in the enterprise.

Among the variables, we also examined dependence using the eta coefficient. After statistical testing, we concluded that up to 15.76% of RFID technology use is affected by the size of an enterprise ( $\eta = 0.397$ , i.e. a moderate correlation coefficient). 12.74% of the effect of using EAN codes is influenced by the size of the enterprise ( $\eta = 0.357$ , moderate dependence). 14.82% of the effect of using QR codes is influenced by the size of the enterprise ( $\eta = 0.385$ , which is also a moderate correlation coefficient). In the case of sensors ( $\eta = 0.399$ , it is also a moderate, substantial dependence) up to 15.92% of their use is influenced by the size of the enterprise.

## 5 Discussion

Data and information are currently one of the enterprise's most valuable resources. Data and information transforms business across multiple segments, enabling companies to achieve success, identify new opportunities, and solve problems they were previously unable to resolve. When looking for a meaningful boundary between data volume and relevancy, the basic prerequisite for working with them is the understanding of what business users really need. In accordance with our findings, we identify with the statements of the authors (Geissbauer, Vedso and Scharauf, 2016; Mesaros, 2016; Stuchlý and Látečková, 2017; Maulen, 2017; Kaptain, 2018), who consider data and data analytics as an important element of ambient intelligence.

Data collection and the Internet of Things are closely related. It is currently estimated that about 8 billion devices are connected to the Internet, which together make up the Internet of Things. When estimating the number of devices connected to the Internet in 2020, various sources differ significantly. In August 2016, IEEE published an article (Nordrum, 2016) with findings where the estimated number of devices is supposed to reach 50 billion. Based on this forecast, the number of these devices should increase six times from the current number in the course of next 2 years. A slightly more pessimistic forecast was published in February 2017 by Gartner (Maulen, 2017). According to its forecast 20.5 billion devices will be connected to the web at the end of 2020. Along with them, the volume of data transmitted over the Internet will increase opening the continuum of the Internet of Things and big data.

Schwab and Davis (2018) in his book *Shaping the Fourth Industrial Revolution* claims that "unlike previous industrial revolutions, the digital content expansion of new technologies evolves at an exponential rather than a linear pace..." Innovative pervasive technologies can shorten delivery times, increase the usability of means, maximize the quality of products and services. Their application and utilisation is broad regardless of industry or business activity.

## 6 Conclusion

Businesses entities should accept ongoing changes and adapt to economic conditions. Each enterprise should therefore set an individual strategy for success, which should reflect continuous changes in the economic environment as well as technological development.

Ambient intelligence, among other things, integrates sensor technology with information systems that are capable of collecting and evaluating data in order to prevent errors and maintain product quality. It is important to mention that data analysis does not only concern production processes, but all areas of economic and social life. Currently, it can be used to identify new market gaps, opportunities, financial and insurance services, human resources, health and other areas of social and economic life. The challenge is to use the enterprise's analytical capabilities to monitor the ecological footprint and improve the enterprise's environmental performance.

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## Primary Paper Section: A

## Secondary Paper Section: AE

# USE OF NEURAL NETWORKS FOR PREDICTING DEVELOPMENT OF USA EXPORT TO CHINA TAKING INTO ACCOUNT TIME SERIES SEASONALITY

<sup>a</sup>PAVEL ROUSEK, <sup>b</sup>JAN MAREČEK

*Institute of Technology and Business, School of Expertness and Valuation, Okružní 517/10, 37001 České Budějovice, Czech Republic*

*email: <sup>a</sup>rousek@mail.vstecb.cz, <sup>b</sup>19723@mail.vstecb.cz*

**Abstract:** The objective of the contribution is to propose a methodology of taking into consideration the seasonal fluctuations in time series equalization using artificial neural networks on the example of the United States of America export to the People's Republic of China. For the research, the data from the period between January 1985 and August 2018 are used. For the prediction, two types of neural networks and two variants of input data sets are used. In the second variant, the seasonal fluctuation is represented by a categorical variable. It resulted that all retained structures are applicable, but the retained MLP networks of the B alternative achieve better results. It has been proven that with the use of artificial neural networks, it is possible to predict the export development efficiently and with a high degree of accuracy, especially in the short term and considering specific seasonal fluctuations.

**Keywords:** artificial neural networks; time series; export development; prediction; multilayer perceptron networks; radial basis function networks; seasonal fluctuations; United States; China.

## 1 Introduction

Artificial neural networks (ANNs) are compared with mixed conclusions in terms of the superiority in forecasting performance. However, the most researches indicate that deep-learning models automatically select highly abstracted features during the optimization process, and their representational power is better than that of traditional models. There is no output in the literature to compare neural networks with regression time series directly to export development. The objective of the contribution is to compare the performance and accuracy of equalizing time series by means of artificial neural networks on the example of the USA export to the PRC using two variants of the input data (A and B). Using the A variant, it is possible to predict the future development, while the B variant enables to predict the seasonal fluctuations. The objective is to show the possible uses and advantages of neural networks in practice.

The article offers the unique comparison of two variant ANNs, using the example of US exports to China. These are the two most important economies in the world today. The purpose is to see if ANNs are a better predictive tool when planning export. The resulting appreciation can help exporters to predict business development more effectively. This is appropriate at least to increase competitiveness.

## 2 Literature review

Until 1990, the USA exported the goods mainly to Western European countries (Zhang et al., 2017). Since 2013, China has been the third largest export market for the USA, after Canada and Mexico. However, the USA can trade with these two countries on land, without the necessity to use sea or air transport. In this respect, it can be said that China is the main overseas export market, also due to the fact that both the USA and China are the largest world economies that have maintained business relations with each other for a long time. According to Bernard and Jensen (2004), export is the most suitable way to ensure the economic growth of the state. According to the results of their research, export in exporting companies accounts for more than 40% of their productivity growth, which is very favorable in general.

Leightner (2018) reports that a USD 1 increase in China's foreign exchange reserves resulted in the change in export in both states. The statistical method used creates a reduced estimate that capture the influence of neglected variables without the necessity of creating and estimating complex structural models. Moreover, he confirmed that there was accumulation of China's foreign exchange reserves at the amount of USD 621 million. This fact corresponds with the Chinese export change by

USD 151 million and the USA export by USD 628 million. By contrast, in November 2016 China spent USD 69 bn from its foreign exchange reserves to support Yuan value, which corresponds with the China export increase by USD 4.77 bn and the USA export increase by USD 2.42 bn. According to Bahmani-Oskooee et al. (2013), there is a significant imbalance in the USA export to China between the individual industries. Chen (2014) reports that between 1997 and 2012, China became a world importer of goods.

According to Czech Statistical Office (2018), the USA export to China in 2017 amounted to USD 129.9 bn, which is a 12.4% increase (USD 14.3 bn) compared to 2016. In 2017, the USA export to China accounted for 8.4% of the total USA export. In that year, the USA export mostly comprised aircraft, machinery, cereals, seed grain, fruits. In the agriculture sector, the USA export to China in 2017 amounted to USD 20 bn. Such high exports ensure work for a large number of American citizens and also supports investment and overall economic growth. The USA exports more than 20% of its overall agricultural production (Fields et al., 2018). This makes the USA the world most important food and agricultural products exporter (Fields et al., 2018). There have been many studies concerning the demand for export and the impact of the USA export support programmes on various agricultural commodities in target destinations. Those studies dealt with measuring the efficiency of the USA support programmes of exporting meat and poultry products, fruits and vegetables, nuts, and tobacco (Onunkwo and Epperson, 2000). According to Koh et al. (2016), there is a permanent deficit in trade in goods and the trade surplus in the service sector is one of the basic characteristics of the USA international trade. As the USA is one of the world largest exporters of agricultural commodities, a surplus in agrarian trade is another constant phenomenon (Peppas and Yu, 2007).

The creativity of American companies and strong pressure American companies put on enforcement and regard of intellectual property rights' shows most in the export of services that are protected by property rights, thanks to which the USA export amounts to approx. USD 130 bn. It is the second largest services export item after travel services. Other important services export items include transport and financial services (Ministry of Foreign Affairs, 2018). The USA services export to China in 2017 amounted to USD 57.6 bn, which is 4.9% (USD 2.7 bn) more than in 2016. The main services export from the USA to China include travelling, intellectual property (trade mark, computer software), and transport (Kalafsky and Graves, 2018). Geng et al. (2017) report that it is in the interest of both countries that their mutual financial flows are as close as possible and both economies thus could grow from export at the same pace. In their opinion, this is the only key to maintain business relations between these two nations.

The USA comparative advantage to China consists in producing high technologies and top-quality agricultural products. California, home to many technology companies, exports mobile phones electronics to China. Due to the location of the company Boeing, Washington is the USA largest exporter to China in terms of aviation. For comparison, China's comparative advantage consists mostly in sophisticated industrial products (Urumov, 2015). Mostly due to the introduction of new mining technologies, the USA has become an important producer of petroleum and natural gas and its results are evident both in terms of the USA and the whole world (Jirušek and Vlček, 2017).

### 2.1 Using artificial neural networks models

To estimate the development of export, artificial neural networks (ANNs) can be used (Rowland and Vrbka, 2016). According to Vochozka, Horák and Šuleř (2019), neural networks have been widely used in more and more areas. However, according to

Fioretti (2014), their application in the economic sector is still in the early stage. Serrano Cinca (1996) dealt with using ANN in economics in 1996. The advantage of ANN consists mainly in their capability of working with big data and precision of their results (Vrbka and Rowland, 2017). According to Tealab (2018), the models of neural networks can be used for the approximation of the functions with high precision; they contain a hidden layer of neurons, which uses non-linear stimulation for predicting financial trends. A relevant import and export topic was addressed by Tsai and Huang (2017), who, among other goals, used ANNs for predicting utilization of selected Asian ports for import and export to and from the rest of the world. Alam (2019) dealt with the issue of import and export for Saudi Arabia. This was another example of using ANNs for predicting the development in this area of the state's economy.

Import and export rate, together with other factors, can influence the economic growth of the state. Sokolov-Mladenovic et al. (2016) used ANNs for predicting the GDP growth on the basis of the country's export and import rate. In this case, it was a connection of ANNs, back propagation learning, forward neural network, and extreme learning machine. Their research confirmed the reliability of predicting by means of this prediction model. Another very important way of using ANNs in the economic sector is the prediction of share price development using this method. In 2016, Qiu et al. (2016) tried to improve the prediction of share price development on the Japanese market by means of genetic algorithms (GA). By means of GA, they managed to increase the accuracy of the prediction and improve the ANN performance. Kotur and Zarkovic (2016) point out another advantage of ANNs, which is the prediction of certain commodities price in real time. After training, ANNs are able to modify the results of the predictions immediately after recording additional input data, both in the short and long term. De La Hoz and Lopez Polo (2017) investigated the application of ANNs for classification of individual companies into companies which are able to export and companies which are not. Their resulting ANNs have 85.7% prediction precision. According to them, company competitiveness grows with its export potential.

### 3 Data and methods

The underlying data was taken from the World Bank. For the purposes of the analysis, the data on the USA export to the Public Republic of China will be used. The time period for which the data are available: the monthly balance starting from 1st January 1985 to August 2018. It thus contains 404 input information. The unit is billions, US dollars. The data descriptive characteristics (minimum, maximum, average and standard deviation) are given in Table 1.

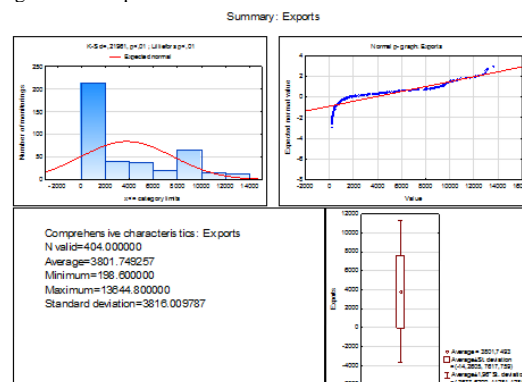
Tab. 1: Characteristics of data set

| Characteristics                 | Month (Input variable) | Exports (Output – target) |
|---------------------------------|------------------------|---------------------------|
| Minimum (Training)              | 31,048.00              | 198.60                    |
| Maximum (Training)              | 43,313.00              | 13,644.80                 |
| Average (Training)              | 37,316.95              | 3,904.48                  |
| Standard deviation (Training)   | 3,549.13               | 3,818.51                  |
| Minimum (Testing)               | 31,138.00              | 198.80                    |
| Maximum (Testing)               | 42,948.00              | 12,598.60                 |
| Average (Testing)               | 36,651.48              | 3,503.40                  |
| Standard deviation (Testing)    | 3,758.45               | 4,015.30                  |
| Minimum (Validation)            | 31,199.00              | 212.70                    |
| Maximum (Validation)            | 42,979.00              | 13,147.80                 |
| Average (Validation)            | 37,060.87              | 3,613.85                  |
| Standard deviation (Validation) | 5,186.49               | 3,289.34                  |
| Minimum (Overall)               | 31,048.00              | 198.60                    |
| Maximum (Overall)               | 43,313.00              | 13,644.80                 |
| Average (Overall)               | 37,180.08              | 3,801.75                  |
| Standard deviation (Overall)    | 3,554.16               | 3,816.01                  |

Source: Own processing

What is interesting is the development of the USA export to the PRC over time. Figure 1 shows a graph of its statistical characteristics, including the histogram of the input data.

Figure 1: Graphs of basic statistical characteristics – summary



Source: Own processing.

For data and related information processing, DELL's Statistica software (version 12), will be used.

ANNs will be used for regression problem. ANN is one of the computational models used in artificial intelligence. Its pattern is the behaviour of the corresponding biological structures. ANN is a structure designed for distributed parallel data processing. It consists of artificial (or also formal) neurons, whose biological model is a neuron. Neurons are interconnected and transmit signals to each other and transform them with certain transmission functions. Neuron has any number of inputs, but only one output. The general neural network model is described as follows:

$$Y = S(\sum_{i=1}^N (w_i x_i) + \theta) \quad (1)$$

where  $x_i$  are neuron inputs,  $w_i$  are synaptic weights,  $\theta$  is threshold,  $S(x)$  is the neuron transfer function (activation function),  $Y$  is a neuron output.

Out of curiosity, correlation coefficient has to be calculated, that is, the dependence of the export from the USA to the PRC on time. The significance level will be set of 0.95. Export directly depend on time because export has a clear trend over time.

Subsequently, regression analysis will be carried out using artificial neural networks. Multilayer perceptron networks (MLP) and radial basis function networks (RBF) will be generated. These are the two most widely used types of neural networks that software offers. MLP can be calculated by the formula:

$$y_k^n = f(w_{0,k}^n + \sum_{i=1}^m y_i^{n-1} * w_{i,k}^n) \quad (2)$$

The output of the  $k$ -th neuron located in the  $n$ -th hidden or output layer.  $f(x)$  is the neuron transfer function,  $w_{0,k}^n$  is the bias of the neuron and  $m$  is the number of weights of the neuron. RBF can be calculated by the formula:

$$f_k(x) = \sum_{j=1}^k w_j \varphi(|x - c_j|) \quad (3)$$

where  $c_j$  is point defining the center of  $f_k(x)$  function,  $\varphi$  specifies a particular type or radial base function.

Two sets of ANN will be generated. In the first variant (variant A) an independent variable will be time. A dependent variable is the USA export to the PRC. In the B variant, continuous independent variable will be time. Seasonal fluctuations will be represented by categorical variable in the form of the month in which the value was measured. We will thus work with a possible monthly seasonality of the time series. In this variant,

the dependent variable will be the USA export to the PRC. We will divide the time series into three data sets – training data set, testing data set and validation data set. The first group (training data set) will contain 70% of the input data. Artificial neural structures will be generated just based on the training data set. The remaining two data sets will contain 15% of the input data. Both mentioned data sets will be used for verification and evaluation of the generated artificial neural networks or final model reliability. We set the delay of the time series to 1. In total 10,000 artificial neural networks will be generated. Five artificial neural networks with the best characteristics will be retained in each input data variant. The method of least squares will be used. Generating of artificial neural networks will be finished when there is no improvement, i.e. when the sum of the squares isn't lower. We will retain the artificial neural structures whose sum of the residual square compared to the actual development of the USA export to the PRC is as low as possible (zero in ideal case). As for the hidden layer, it will contain at least 2 neurons (50 at most). For the RBF, the hidden layer will contain at least 21 neurons (30 at most). For the MLP, the following distribution functions in the hidden layer and output layer will be considered: Linear, Logistic, Atanh, Exponential, Sinus.

Other settings will be left default (based on the ANS tool in Statistica software – automated neural structures).

Finally, the results of the linear regression method and regression carried out using artificial neural networks will be compared. The comparison will not be performed through residual analysis (minimum and maximum values, residuals dispersion, etc.), but at the level of expert view and experience of an evaluator (economist).

## 4 Results

### 4.1 Neural structures (variant A)

Based on the methodology, 10,000 ANNs were generated, out of which 5 with the best parameters were retained. Table 2 shows the overview of the ANNs with the best results.

Tab. 2: Overview of retained artificial neural networks

| Network    | Train. error | Test. error | Valid. error | Train. algorithm | Error function | Activation of hidden layer | Output activation function |
|------------|--------------|-------------|--------------|------------------|----------------|----------------------------|----------------------------|
| RBF 1-28-1 | 216691       | 185586      | 121765       | RBFT             | Sum.quart      | Gaussian                   | Identity                   |
| RBF 1-30-1 | 168459       | 212000      | 134165       | RBFT             | Sum.quart.     | Gaussian                   | Identity                   |
| RBF 1-29-1 | 175555       | 174306      | 152127       | RBFT             | Sum.quart.     | Gaussian                   | Identity                   |
| RBF 1-25-1 | 195090       | 246466      | 117514       | RBFT             | Sum.quart.     | Gaussian                   | Identity                   |
| RBF 1-22-1 | 227256       | 190358      | 142195       | RBFT             | Sum.quart.     | Gaussian                   | Identity                   |

Source: Own processing

Table 2 shows that all retained ANNs with the best results are the radial basis function networks. The input layer contains only one variable (time). The hidden layer of the neural networks contains 22-30 neurons. The output layer can logically contain only one layer. This variable represents the USA export to the PRC. The training algorithm used for all networks was RBFT. Another interesting fact is identical functions in all retained networks, in the activation, output activation, and an error function. The hidden layer was activated by means of Gaussian curve, and the output activation function was Identity.

Another item to focus on in creating ANNs is training, testing, and validation performance. In this respect, the performance of the network shall ideally be the same in all data sets (here it shall be reminded that the distribution of the data into the data sets was random), and the error shall be as small as possible.

The performance of the individual data sets is in the form of correlation coefficient. The values of the individual data sets by specific neural networks are given in Table 3.

Tab. 3: Correlation coefficient of individual data sets

| Network      | Exports              |                     |                        |
|--------------|----------------------|---------------------|------------------------|
|              | Training performance | Testing performance | Validation performance |
| 1.RBF 1-28-1 | 0.984921             | 0.988430            | 0.991039               |
| 2.RBF 1-30-1 | 0.988297             | 0.988281            | 0.989729               |
| 3.RBF 1-29-1 | 0.987801             | 0.989585            | 0.988935               |
| 4.RBF 1-25-1 | 0.986437             | 0.986660            | 0.991009               |
| 5.RBF 1-22-1 | 0.984181             | 0.988111            | 0.989333               |

Source: Own processing

It follows from Table 3 that the performance of all retained neural structures is approximately the same. The slight differences detected do not have any impact on the performance of the individual networks. The correlation coefficients of all training data sets range between 0.985 and 0.988 and higher. The value of the testing data sets correlation coefficient is not higher than 0.989. The correlation coefficient of all neural networks data sets is at most at the same level as the testing data set (namely 0.989). In order to choose the most appropriate neural structure, a more detailed analysis of the statistic results will be carried out. For this purpose, Table 4 showing the basic statistical characteristics of the individual data sets for all retained ANNs will be used.

Tab. 4: Statistics of individual data sets by retained artificial neural structures

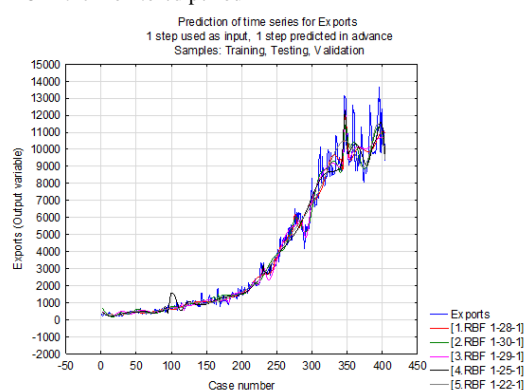
| Statistics                           | 1.RBF 1-28-1 | 2.RBF 1-30-1 | 3.RBF 1-29-1 | 4.RBF 1-25-1 | 5.RBF 1-22-1 |
|--------------------------------------|--------------|--------------|--------------|--------------|--------------|
| Min. prediction (Training)           | 259.08       | 164.74       | 203.89       | 203.99       | 235.57       |
| Max. prediction (Training)           | 11,934.48    | 11,480.75    | 12,282.35    | 12,244.18    | 11,475.85    |
| Min. prediction (Testing)            | 257.66       | 251.68       | 247.16       | 255.62       | 242.91       |
| Max. prediction (Testing)            | 10,517.86    | 11,204.47    | 10,544.19    | 10,745.98    | 11,420.62    |
| Min. prediction (Validation)         | 258.04       | 338.23       | 327.32       | 309.83       | 277.61       |
| Max. prediction (Validation)         | 11,594.45    | 11,264.07    | 11,894.33    | 11,960.48    | 11,467.61    |
| Min. residuals (Training)            | -1,954.55    | -1,365.96    | -1,960.51    | -1,926.50    | -1,907.18    |
| Max. residuals (Training)            | 3,029.74     | 2,382.78     | 2,985.05     | 2,392.28     | 2,575.82     |
| Min. residuals (Testing)             | -1,171.46    | -747.33      | -948.16      | -1,253.67    | -973.47      |
| Max. residuals (Testing)             | 2,749.85     | 2,980.28     | 2,470.92     | 3,120.52     | 2,768.27     |
| Min. residuals (Validation)          | -1,801.24    | -1,575.69    | -1,840.77    | -1,545.58    | -1,382.05    |
| Max. residuals (Validation)          | 1,553.35     | 2,098.92     | 1,347.50     | 1,187.32     | 2,642.57     |
| Min. standard residuals (Training)   | -4.20        | -3.33        | -4.68        | -4.36        | -4.00        |
| Max. standard residuals (Training)   | 6.51         | 5.81         | 7.12         | 5.42         | 5.40         |
| Min. standard residuals (Testing)    | -2.72        | -1.62        | -2.27        | -2.53        | -2.23        |
| Max. standard residuals (Testing)    | 6.38         | 6.47         | 5.92         | 6.29         | 6.34         |
| Min. standard residuals (Validation) | -5.16        | -4.30        | -4.72        | -4.51        | -3.67        |
| Max. standard residuals (Validation) | 4.45         | 5.73         | 3.45         | 3.46         | 7.01         |

Source: Own processing

In the ideal case the individual neural networks statistics are horizontally identical (minimum, maximum, residuals, etc.). In the case of equalized time series, the differences are minimal. However, the characteristics of the residuals show bigger differences. That is the reason why it is not possible to determine unambiguously, which of the retained neural networks shows the best results.

Figure 2 shows a line graph representing the actual development of the USA export to the PRC (blue curve) and the development of the predictions made by means of the individual generated and retained ANNs. The graph clearly shows that all the predictions of the retained neural networks predict the development of export in the individual intervals with a slight difference. However, in this contribution, we do not focus on the similarity of the individual ANNs' predictions, but their similarity to the actual development of the USA export to the based on the actual statistical data. Even in this respect, it can be stated that all the retained neural networks appear to be interesting at first sight. All the curves of the graph representing the ANNs are similar to the "blue" curve representing the development of the USA export to the PRC. Another positive result is the retained ANNs' ability to perceive the extremes of this curve (except for the cases at the end of the interval of the monitored period).

Figure 2: Development of USA export to PRC predicted using neural networks in comparison with the actual USA export to PRC in the monitored period



Source: Own processing

#### 4.2 Neural structures (variant B) – seasonal fluctuations

Based on the second part of the methodology of predicting seasonal fluctuations using ANN, another set of 10,000 neural networks was generated, out of which 5 with the best parameters were retained. The overview of the retained networks is shown in Table 5.

Tab. 5: Retained neural networks

| Network     | Train. error | Test. error | Valid. error | Train. algorithms       | Error function | Activation of hidden layer | Output activation function |
|-------------|--------------|-------------|--------------|-------------------------|----------------|----------------------------|----------------------------|
| MLP 13-27-1 | 103534       | 96823       | 114538       | BFGS (Quasi-Newton) 101 | Sum.sq.        | Logistic                   | Logistic                   |
| MLP 13-25-1 | 103577       | 95125       | 113243       | BFGS (Quasi-Newton) 92  | Sum.sq.        | Logistic                   | Exponential                |
| MLP 13-10-1 | 103649       | 97540       | 113884       | BFGS (Quasi-Newton) 58  | Sum.sq.        | Tanh                       | Logistic                   |
| MLP 13-4-1  | 109877       | 89753       | 113680       | BFGS (Quasi-Newton) 50  | Sum.sq.        | Logistic                   | Exponential                |
| MLP 13-33-1 | 103425       | 95558       | 113343       | BFGS (Quasi-Newton) 127 | Sum.sq.        | Logistic                   | Exponential                |

Source: Own processing

In the second variant (variant B), only multilayer perceptron networks were retained. The hidden layers contain two variables – time (continuous variable) and the month of measurement (as a categorical variable). Time is represented by one neuron in the input layer, month by twelve neurons. The neural networks in the hidden layer contain 4-33 neurons. The output layer logically contains one neuron and one output variable, that is, the USA

export to the PRC. For all networks, Quasi-Newton training algorithm was applied in various alternatives. Neural structures use logistics function and function of hyperbolic tangent function for activation of the hidden layer. Similarly, for the activation of the output neuron layers, two functions are used – exponential and logistics (for more details, see Table 5). As an error function, all the retained neural networks used the sum of the least squares.

The performance in the form of the individual data sets correlation coefficient by specific neural networks are given in Table 6.

Tab. 6: Correlation coefficients of individual data sets

| Network       | Exports              |                     |                        |
|---------------|----------------------|---------------------|------------------------|
|               | Training performance | Testing performance | Validation performance |
| 1.MLP 13-27-1 | 0.992821             | 0.994509            | 0.991357               |
| 2.MLP 13-25-1 | 0.992818             | 0.994677            | 0.991424               |
| 3.MLP 13-10-1 | 0.992814             | 0.994450            | 0.991414               |
| 4.MLP 13-4-1  | 0.992381             | 0.994666            | 0.991482               |
| 5.MLP 13-33-1 | 0.992829             | 0.994599            | 0.991406               |

Source: Own processing.

It results from the table that the performance of all the retained neural structures is approximately the same. The slight differences detected do not have any influence on the performance of the individual networks. The value of all the training data sets correlation coefficient is more than 0.992 for all neural networks, and more than 0.994 in the case of testing data sets. The correlation coefficient of the validation data sets is above 0.991. To choose the most suitable neural structure, a detailed analysis of the results obtained must be carried out. Table 7 shows the basic statistical characteristics of the individual data sets for all neural structures.

Tab. 7: Statistics of individual data sets by retained neural structures

| Statistics                         | 1.MLP 13-27-1 | 2.MLP 13-25-1 | 3.MLP 13-10-1 | 4.MLP 13-4-1 | 5.MLP 13-33-1 |
|------------------------------------|---------------|---------------|---------------|--------------|---------------|
| Min. prediction (Training)         | 228.69        | 242.48        | 264.23        | 313.86       | 211.23        |
| Max. prediction (Training)         | 13,159.82     | 13,045.01     | 13,088.70     | 13,189.25    | 13,013.82     |
| Min. prediction (Testing)          | 260.56        | 257.35        | 299.48        | 312.40       | 232.12        |
| Max. prediction (Testing)          | 12,954.08     | 12,986.06     | 12,901.94     | 12,885.57    | 12,947.81     |
| Min. prediction (Validation)       | 264.83        | 280.65        | 324.25        | 330.96       | 282.77        |
| Max. prediction (Validation)       | 11,603.57     | 11,772.44     | 11,677.18     | 11,396.74    | 11,771.35     |
| Min. residuals (Training)          | -2,221.94     | -2,282.59     | -2,242.37     | -2,210.44    | -2,245.79     |
| Max. residuals (Training)          | 1,759.21      | 1,936.72      | 1,659.70      | 1,828.85     | 1,860.92      |
| Min. residuals (Testing)           | -1,402.62     | -1,448.76     | -1,398.97     | -1,372.53    | -1,414.98     |
| Max. residuals (Testing)           | 935.45        | 967.88        | 891.31        | 906.74       | 880.73        |
| Min. residuals (Validation)        | -1,657.22     | -1,761.22     | -1,657.48     | -1,386.87    | -1,769.12     |
| Max. residuals (Validation)        | 1,544.23      | 1,375.36      | 1,470.62      | 1,751.06     | 1,376.45      |
| Min. standard residuals (Training) | -6.91         | -7.09         | -6.97         | -6.67        | -6.98         |
| Max. standard residuals (Training) | 5.47          | 6.02          | 5.16          | 5.52         | 5.79          |
| Min. standard residuals            | -4.51         | -4.70         | -4.48         | -4.58        | -4.58         |

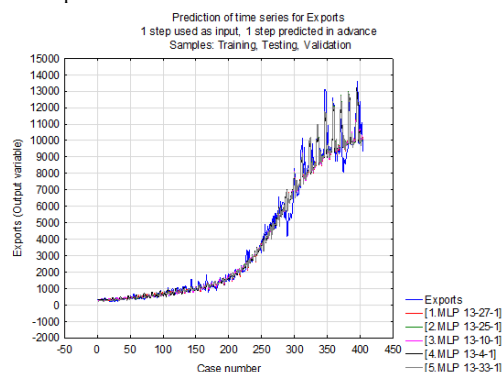
| (Testing)                            |       |       |       |       |       |
|--------------------------------------|-------|-------|-------|-------|-------|
| Max. standard residuals (Testing)    | 3.01  | 3.14  | 2.85  | 3.03  | 2.85  |
| Min. standard residuals (Validation) | -4.90 | -5.23 | -4.91 | -4.11 | -5.25 |
| Max. standard residuals (Validation) | 4.56  | 4.09  | 4.36  | 5.19  | 4.09  |

Source: Own processing.

In the ideal case, the individual statistics of neural networks are horizontally the same in all data sets (minimum, maximum, residuals, etc.). In the case of equalized time series, the differences are only small. There are minimal differences also in the case of the characteristics of the residuals. However, it is not able to determine unambiguously, which of the retained neural networks shows the best results.

Figure 3 is a line graph showing the actual development of the USA export to the PRC and the development of predictions by means of the individual generated and retained networks. It can be seen from the graph that all the neural networks predictions of the export development in the individual intervals are slightly different. However, what is important is not the similarity of the individual networks predictions, but the similarity (or degree of consistency) with the actual export development. All the retained neural networks predict not only the basic trend of the USA export to the PRC but also local minimums and maximum.

Figure 3: Line graph – development of USA export to PRC predicted by neural networks compared with actual export in monitored period



Source: Own processing.

Figure 3 clearly shows that all the retained multilayer perceptron networks can be applied.

## 5 Comparison of variants A and B neural structures – discussion

All generated and retained artificial neural structures in both variants were able to equalize the time series in question – the USA export to the PRC. The comparison of the correlation coefficients (see Tables 3 and 6) clearly shows a higher performance of the B variant, that is the retained MLP networks (with additional categorical variable). This shows also in evaluating the basic predictions statistics of the equalized time series in Tables 4 and 7. The retained MLP networks, or their equalized time series, show smaller differences in the training, testing, and validation data sets than the RBF networks (without additional variable). For confirmation, see Figures 2 and 3. It is evident that only the variant B MLP networks can capture the time series in its actual course. All the retained multilayer perceptron neural networks are able to capture all the course of the USA export to the PRC. All five multilayer perceptron networks are able to identify and retain the local fluctuations of the time series, that is, to capture its seasonal course.

## 6 Conclusion

The objective of the contribution was to propose a methodology of taking into account the seasonal fluctuations in equalizing time series using artificial neural networks on the example of the USA export to the People's Republic of China with two variants of the input data.

Generally, each prediction is given by a certain probability degree of its fulfillment. In the case of predicting future development of any variable, we try to estimate its future development on the basis of the data available from past periods. A longer time data series from the past provides a basis for ANNs capable of more accurate prediction, including unexpected events. Even if most influencing factors of the target variable are included, the reality is always simplified and we always work with a certain degree of probability. This probability degree determines the degree of certainty that a certain scenario will be fulfilled. Both variants of the input data (variants A and B) of the ANNs represent a significant simplification of the problem being solved. In variant A, we worked only with two variables: time as an input variable, export (USA to PRC) as an output variable. Variant B included also a month in which the export data was obtained in order to determine and subsequently predict seasonal fluctuations in export. Although it appeared before the experiment that there is no reason to include categorical variable to capture the seasonal fluctuations from the USA to the PRC, the opposite was true. The additional variable included in the calculation in the variant B (in the form of the month of the measurement the export value) brought more order and precision in the equalized time series.

The USA export to the PRC can be determined on the basis of statistical methods, causal methods, and intuitive methods. In this case, two ANNs with different input data were compared. It is important to work with the information on the future development of the economic, political or legal environment. If we are able to predict their development, it can be included in the monitored variable. Here, the evaluator is important: an economist, who, on the basis of their knowledge and skills, is able to correct the price determined using statistical methods and specified based on the causal links. However, in this case, it appears it is only possible to test the prediction using the variant B, which brings quite a high degree of accuracy (all the retained neural networks).

The objective of the contribution was achieved.

An interesting fact is that in the case of the A variant, the retained structures were only the radial basis neural networks, while in the case of the B variant, these were only the multilayer perceptron neural networks. There could be an interesting experiment, if only one type of neural networks were generated for a given situation – a type different from the results already obtained (that is, MLP networks for the variant A and RBF networks for the variant B).

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**Primary Paper Section: A**

**Secondary Paper Section: AH**

## DETERMINING THE MARKET VALUE OF THE ENTERPRISE USING THE MODIFIED METHOD OF CAPITALIZED NET INCOMES AND METFESSEL ALLOCATION OF INPUT DATA

<sup>a</sup>ZUZANA ROWLAND, <sup>b</sup>VERONIKA MACHOVÁ, <sup>c</sup>JAKUB HORÁK, <sup>d</sup>JAN HEJDA

*Institute of Technology and Business, School of Expertness and Valuation, Okružní 517/10, 37001 České Budějovice, Czech Republic*

*email: <sup>a</sup>rowland@mail.vstecb.cz, <sup>b</sup>machova@mail.vstecb.cz, <sup>c</sup>horak@mail.vstecb.cz, <sup>d</sup>hejda@fm.vse.cz*

**Abstract:** the aim of this article is to modify methods of capitalized net incomes in order to determine the market value of the enterprise; the market value is subsequently applied to a specific model case of a healthcare facility. Upon carrying out the analysis of historical economic data, the calculation of the permanently removable net income is modified. The modifications in question represent the determination of the expected annual investment efforts for a smooth running of the enterprise and a modification of labour costs according to the information portal of average earnings in a specific sector. The input data for determining the permanently removable net income are modified according to Metfessel allocation.

**Keywords:** method of capitalized net incomes, expected annual investment efforts, labour costs, market value, alternative costs of the equity

### 1 Introduction

Each evaluated enterprise has its own specifications which should be considered by the appraiser in order to correctly determine its value. This aspect requires an entirely individual approach of the appraiser when determining a value of any object to be evaluated.

What represent a specific group of enterprises to be evaluated in the Czech Republic are healthcare facilities. The specifications of these healthcare facilities in the Czech Republic are represented by combined incomes. Their clients, which mostly consists of patients, whose number represents one of the items of their combined incomes in a form of lump sum payments from health insurance from the economic point of view of healthcare facilities in the Czech Republic.

The next item of combined incomes of healthcare facilities in the Czech Republic is an income exceeding capital payments associated with defined and often extra medical operations. Last but not the least, revenues from selling medical devices constitutes an integral part of incomes. Capital payments include some of the medical operations for which the patient cannot be invoiced. These are regular check-ups, administrative operations, consultation with family members, but also removing foreign objects from the nose or the ear canal etc. Extra medical operations can either be reimbursed via commercial insurance companies that offer these services, or patients themselves pay for them. Some medical devices can also be reimbursed by health insurance companies to the full amount or as a contribution to a part of all costs of a specific medical device. However, some medical devices must only be paid by the patient. As for medical facility, a mutual relationship between the patient and physician must be considered; i.e. the physician should be deeply interested in the patient and his health.

The aim of our article is to modify methods of capitalized net incomes in order to determine the market value of a specific healthcare facility; such a modified method is then applied to model healthcare facility XYZ. The final calculation is modified so as to determine the expected annual financial efforts and labour costs. The market value of the enterprise is set to 31.1.2017. To enable a comparison, Vrbka et al. (2019) analysed the value determination in market rental for a similar type of healthcare facility.

### 2 Literary research

The aim of the appraiser is to assess the market value. In case the market is instable, different appraisers may achieve various

results. However, this situation is excluded if the market is stable (Shapiro et al., 2013).

Astakhov et al. (201) state that when evaluating a company, its size is considered as one of the value-creating factors. However, the authors argue that it may not be true.

First of all, the term 'market value' must be clearly defined and also its specifications in relation to other value-creating factors should be introduced. According to Krabec (2009), classics of political economics sought the value as absolute and universally valid quantity. This 'inner value' is included in any possessions and the market value thereby must, at least within a long time period, be aimed at it. Neo-classical economic theories suppose that values are determined by preferences of participants on the market. From the economic viewpoint, the value theory may be understood in terms of the price as a synonym of value (Jakoubek and Brabenec, 2012).

The International Valuation Standards (IVS) (2017) define the market value as an estimated amount for which the property should be exchanged between a consensual purchaser and a consensual seller independently from the transaction and after the relevant marketing has been carried out to the date of the evaluation; each party acts well-informed, reasonably and without distress.

Guan et al. (2009) define the market value as a complex function comprised of a wide range of factors including enterprise's capital structures, structures of the storage economy, corporate governance etc. Furthermore, he mentions that it is also an amount of investments in the research and development in new technological processes that exerts a considerable influence on the enterprise's market value.

Kumar and Shetty (2018) sought for a closer connection between the enterprises' market value and the number of environmental programmes for environmental improvement that had been consensually implemented by these enterprises. The authors concluded that the effort of companies to protect or improve the environment significantly increases its market value. Sandner and Blok (2011) argue that it is also trademarks and patents of companies that have a positive influence on companies' market value. Chen et al. (2008) used artificial neural structures (ANS) to examine the influence of the patent on the market value of pharmaceutical companies in the USA and achieved negative results. On the contrary, the neural network found out that what has a positive influence on the value of pharmaceutical companies is their technological independence.

Having fulfilled prescribed requirements, all enterprises in the Czech Republic are obliged to pay income tax. The income tax is governed by Act No. 586/1992 Sb. of 20<sup>th</sup> November 1992. The tax base is the amount by which the payer's incomes exceed expenses that were provably incurred of their reception, generation and maintenance within the taxation period, unless stipulated otherwise (Česko, 1992).

According to the payer's identification it is possible to classify the incomes of healthcare facilities into incomes collected from subjects representing the receiver of healthcare (including without limitations health and commercial insurance companies) and incomes directly collected from the receivers of healthcare. Incomes from health insurance companies may be further divided according to the dependence on the performed operation into lump-sum payments and performance payments. The amount of the lump-sum payment is in the Czech Republic annually governed by a regulation of the Ministry of Health. The amount of the lump-sum income is calculated from the number of insured persons of the respective health insurance company multiplied by the basic lump-sum rate set for one registered insured person of the respective health insurance company per

calendar month (Česko, 2018). Payments for separate performances are governed by a specific regulation. This regulation stipulates the way individual points are allocated to separate medical operations including the duration of each individual performance (Česko, 1998). The next sources of income of healthcare facilities are direct payments of patients for extra medical operations that are not covered by insurance companies and also incomes from sales of medical devices.

In order to evaluate the healthcare facility, it is necessary to evaluate all items that are declared to be operationally necessary assets of the healthcare facility. The operationally necessary assets are not only a long-term tangible property, but also operationally necessary current assets which the company uses to generate operational incomes (Řezňáková et al., 2010).

Klieštík et al., (2018) argues that the enterprise value can also be influenced by a tax shield. The value of the tax shield is usually related to the capital structure of the enterprise and its value.

The next part of the text refers to individual methods for evaluating the company. The evaluation may be based on the market, assets or income analysis (Vochozka, 2017). French and Gabrielli (2018) argue that evaluation methods and procedures employed on the market were insufficiently developed in the International Valuation Standards Council (IVSC). Even though evaluation approaches and methods and their sub-divisions have been currently devised, it is necessary to re-examine the importance of determining an effective technique for the evaluation using market methods. Šimek (2011) dealt with determining the market value in an enterprise which had declared bankrupt, which is a very common phenomenon during the economic crisis.

The principle of the property value of the enterprise (substantial value) is simple and easy to understand. The property value of the enterprise is defined as a total of individually evaluated property items from which a total of individually evaluated liabilities is subtracted (Brabenec, 2010). The size of the property value is given by the structure and the amount of property items of the enterprise (Mařík et al., 2018).

Various income-generating methods are the method of capitalized net incomes, method of discounted cash flow (DCF), method of comparing market values and combined method (Kislingerová, 2001). Furthermore, the method of capitalized net incomes will be closely analysed as one of the methods for enterprise evaluation. Kislingerová argues (2001) that the major promoter of employing the method of capitalized net incomes to determine the enterprise value was German theorist Konrad Mellerowicz. The profit capitalization is mostly based on the previous enterprise's performance. To apply this method requires fulfilling the prerequisites as follows: 1) intimate knowledge of company previous results (3-5 years); 2) applying going-concern principle; 3) the company must invest in the amount of the depreciation (amortization).

A German term for the method of capitalized net incomes is Ertragswertmethode (IDW S, 2007). Lyshchikova et al., (2016) examined the economic content, dominant characteristics, structure and the characteristics of the potential of regional resources as a cornerstone of the capitalization of the regional economy. Reuse (2007) argues that in order to evaluate banking institutions in Germany, the method of capitalized net incomes presents the only applicable method which may determine the value of this type of institutions.

Lisi (2019) combined the methods of capitalized net incomes with the hedonic model. She introduced the standard hedonic price function instead of the market value in the method of capitalized net incomes.

As for data time series what needs to be considered is that they are under the influence of the temporal factor. In such a case the data are processed by some of the statistical methods for determining the average data (Valášková et al., 2018). Yip et al.,

(2012) declare that by means of weighted average data it is possible to reduce the average error of the resulting prediction under specific conditions. However, this can rarely be employed and only on condition that economic empirical data sets are to be dealt with.

For that purpose Neitola and Rahkonen (2010) created an algorithm by which a large number of data may be generalized. This algorithm is applicable to any kind of analysed data.

The next applicable type of average in economic data is a moving average. By means of the moving average it is possible to smooth out price series of shares. Raudys and Pabarskaite (2018) devised their own optimized moving average to smooth out time series of supplies.

Arithmetic and geometric mean belongs to basic statistical quantities. These basic statistical quantities are established on a linear and logarithmic combination. Breuer et al., (2014) explored whether either arithmetic or geometric mean is more applicable to assess the discount rate for the enterprise evaluation by means of bootstrap toolkit. According to his results, arithmetic mean is the best tool to determine the discount rate for the enterprise evaluation.

The evaluation of the enterprise has been analysed using different methods by a lot of authors. Wilimovska and Krzysztozek (2013) used ANS for making a prediction of a future enterprise value.

Jiang and Cui (2013) observed a specific annual periodicity in the amounts of incomes from dataset of companies from the identical sector. Having used the algorithm that describes this annual periodicity, they devised a method of making a prediction of the income at the end of a specific period by interpreting reliable data. By means of input data from the beginning of the period, the result is adapted to the current situation on the market.

An entirely different point of view of the enterprise evaluation is presented by Berzkalne and Zelgave (2014). They argue that the enterprise value can also be determined on the grounds of its 'intellectual property'; i.e. the 'know how' of the enterprise and its employees.

Krabec (2014) declares that different evaluation standards such as the Institution of Public Auditors (IDW), the International Valuation Standards (IVS) or the European Valuation Standards (EVS) provide the appraiser with a reliable manual on rules that protect him from the unnecessary risk of an inadequate assessment.

In regard to evaluation standards, there are two broad categories of values (market and no-market). The market value presents a neutral approach to market subjects. On the other hand, no-market value requires knowledge of the supplying party and demanding party, their subjective preferences regarding future business plans (Krabec, 2007).

### 3 Materials and methods

Healthcare facility XYZ provided its historical economic data for purposes of this article. It is economic data from 2012-2016 that were analysed. First of all, an analysis of all provided historical economic data will be carried out. The analysis will decide whether model healthcare facility XYZ is in the phase of business growth or in another phase of stabilization with respect to its life cycle. What will also be analysed is whether model healthcare facility XYZ will be able to apply 'going concern' principle. As a result, a convenient method of determining the market value of the enterprise will be employed to evaluate model healthcare facility XYZ. In order to determine the market value of healthcare facility XYZ, the method of capitalized net incomes will be applied. The evaluation will be carried out using operation No.1.

Operation No. 1: determining the market value of the enterprise using the method of capitalized net incomes

$$HP = \frac{T\check{C}V}{i_k} \quad (1)$$

Where: HP – enterprise value,  
TČV – permanently removable net income,  
 $i_k$  – calculated interest rate.

At first, permanently removable net incomes must be determined according to historical economic data on the rate of incomes, expenses, labour costs and tax liability of model healthcare facility XYZ.

The difference between incomes and expenses will provide the economic result, which enables the calculation of the tax liability. The rate of the income tax of legal entities to the date of the evaluation is set to 19% in the Czech Republic. The difference between the economic result and tax liability will provide the economic result after the taxation. This result allows the calculation of permanently removable net incomes.

When calculating the permanent removable net income, several modifications must be carried out. The first modification consists in determining the expected annual financial costs of the smooth operation of the whole facility. For that reason, model healthcare facility was provided with a list of all operationally necessary assets. The correction of labour costs will be the second modification of the calculation. These modifications will be more carefully analysed in separate chapters. Vochozka (2016) used ANS to determine the enterprise's costs.

In order to correctly determine the overall permanently removable net income, a data correction from individual years will be made by allocating weights to separate years. The weight allocation to values of individual years will be carried out according to Metfessel allocation. Since the market value of the enterprise is determined to the date which on the imaginary timeline follows the date to which the last input data are available, the input data will have to be manipulated via individual weights. In regard to the nature of evaluated model healthcare facility XYZ, the weights from the previous years will be negligible; on the other hand, the closer the data are to the date of evaluation, the greater weights will be chosen.

The last step to determine the market value via the method of capitalized net incomes is determining the calculated interest rate. In the event of model healthcare facility XYZ the calculated interest rate presents alternative costs of the equity ( $r_e$ ). This ratio and the possibilities of its application are in-detail analysed by Vochozka and Rousek (2011). In order to determine the alternative costs of the equity, a build-up method will be applied. The input data for calculation  $r_e$  come from the data of the Czech National Bank (ČNB) and the data published on Aswatha Damodarana websites of a professor of finance at Stern School of Business in New York. The calculation of the alternative costs of the equity itself results from identifying possible risks for model healthcare facility XYZ and the follow-up total of several component risk surcharges and the rate of risk-free incomes of long-term government bonds. The calculation of the alternative costs of the equity will be carried out according to operation No. 2.

$$r_e = r_f + r_{pod} + r_{spec} \quad (2)$$

Where:  $r_e$  – alternative costs of the equity,  
 $r_f$  – risk-free income,  
 $r_{pod}$  – risk surcharge for the business risk  
 $r_{spec}$  – Specific risk surcharge

Determining expected annual investment efforts. The first of the mentioned modifications when calculating the permanently removable net income is to determine the expected investment efforts of the smooth operation of model healthcare facility XYZ. The expected investment efforts are to build up annual

financial reserves for future investments in new operationally necessary assets when life cycle of the current equipment has ended. According to the list of the operationally necessary assets, an estimated purchase price of the new operationally necessary assets will be assessed.

The operationally necessary assets of healthcare facility XYZ equal to 26 items. These are: office furniture, an office chair, a chair for a patient, a fridge, an examination couch, an optotype, a physician's mercury tonometer, a physician's watch tonometer, a PC, a printer, a monitor, a shredder, a CD recorder, a telephone, an air cleaner, camera monitoring system, electronic security signalling, a conference chair, vertical venetian blinds, shadow roller blinds, a register, a cabinet with a sink, an electric heater, a lamp, a backup power supply and aquamat.

All these items will be supplied with their estimated life cycle in regard to their basic nature. The ratio of their expected purchase price and estimated life cycle will determine the expected investment costs of all the items from the operationally necessary assets. The total of the expected investments in renewing all items of the operationally necessary assets will determine the overall expected annual investment efforts to renewing the operationally necessary assets of model healthcare facility XYZ.

#### Wage correction

The second of these modifications in determining continuously removable net income will be the correction of labour costs. First, an analysis of the current level of labour costs will be made and it will be decided whether the reported labour costs include the labour costs of all XYZ employees, ie whether these costs are achievable by the new investor / business owner. For this purpose, the reported wage costs will be compared with the median gross wages according to the information system on average earnings (ISPV) published annually by the Ministry of Labor and Social Affairs.

Table 1 contains information on the median gross wage at full time from the years 2012-2016 from the category of employees 2212 Doctors specialists according to ISPV.

Tab. 1: the median gross wage in the category 2212 Doctors specialists from the years 2012-2016

| Year | Median gross wage (full time) |
|------|-------------------------------|
| 2012 | 41,759 Kč                     |
| 2013 | 40,040 Kč                     |
| 2014 | 41,709 Kč                     |
| 2015 | 47,066 Kč                     |
| 2016 | 48,134 Kč                     |

Source: ISPV

Table 1 shows that the median gross wage in category 2212 Physicians Specialists has steadily increased over the years. By multiplying the median gross wage according to the ISPV by the number of months in the year (12), we obtain the adjusted amount of annual wage costs of the model healthcare facility XYZ. If the reported wage costs do not include wage costs for all employees, the data on the median gross wage according to ISPV will be used for the calculation.

#### 4 Results

Based on an analysis of the historical economic data of the model healthcare facility XYZ from 2012-2016, it was found that the model healthcare facility XYZ has already exceeded the growth stage in terms of the company's life cycle and is now in the stabilization phase. Along with this, it can also be stated that the model healthcare facility fulfills the "going concern" prerequisites. Based on these facts, the method of capitalization of net incomes was chosen for the valuation of the model healthcare facility XYZ.

Permanently removable net incomes were also determined on the basis of historical economic data of the XYZ model healthcare

facility from previous years. The first modification for the calculation of permanently removable net incomes was the determination of the expected annual investment efforts for the smooth running of the model XYZ healthcare facility. Table 2 shows the inventory of all operationally necessary assets with the expected future purchase price of the new item, the service life in years and the calculated expected annual investment efforts.

Tab. 2: List of operationally necessary assets of model healthcare facility XYZ with expected future purchase price of a new item, the service life in years and expected annual investment efforts

| Item (number of pieces)               | Expected purchase price of a new piece (CZK) | Expected service life (in years) | Expected annual investment efforts (CZK) |
|---------------------------------------|--|----------------------------------|--|
| Office furniture (5 pcs)              | 22,600                                       | 15                               | 1,506.67                                 |
| Office chairs (2pcs)                  | 11,300                                       | 4                                | 2825                                     |
| Chairs for the patient (2pcs)         | 4,520  | 10                               | 452                                      |
| Fridge (1pc)                          | 6,215  | 6                                | 1,035.83                                 |
| Examination couch (2pcs)              | 14,690                                       | 10                               | 1,469                                    |
| Optotype                              | 3,390  | 15                               | 226                                      |
| Physician's mercury tonometer(2pcs)   | 3,390  | 10                               | 339                                      |
| Physician's watch tonometer(1pc)      | 1,695  | 10                               | 169.5                                    |
| PC (2pcs)                             | 27,120                                       | 4                                | 6,780                                    |
| Printer (3pcs)                        | 30,510                                       | 6                                | 5,085                                    |
| Monitor (2pcs)                        | 11,300                                       | 4                                | 2,825                                    |
| Shredder (1pc)                        | 5,650  | 6                                | 41.67                                    |
| CD recorder (1pc)                     | 2,260  | 4                                | 565                                      |
| Telephone (2pcs)                      | 2,260  | 6                                | 376.67                                   |
| Air Cleaner (2pcs)                    | 6,780  | 6                                | 1,130                                    |
| camera monitoring system (1pc)        | 16,950                                       | 15                               | 1,130                                    |
| electronic security signalling (1 pc) | 28,250                                       | 15                               | 1,883.33                                 |
| Conference chairs (13 pcs)            | 9,040  | 15                               | 602.67                                   |
| vertical venetial blinds              | 33,900                                       | 20                               | 1,695                                    |
| shadow roller blinds (1 pc)           | 2,260  | 20                               | 113                                      |
| Register (3 pcs)                      | 6,780  | 10                               | 678                                      |
| Cabinet with a sink (1 pc)            | 4,520  | 15                               | 301.33                                   |
| Electric heater (2 pcs)               | 1,130  | 6                                | 188.33                                   |
| Lamp (2 pcs)                          | 1,130  | 5                                | 226                                      |
| Backup power (2 pcs)                  | 5,650  | 5                                | 1,130                                    |
| Aquamat (1 pc)                        | 1,130  | 10                               | 113                                      |
| Total                                 | 262,160                                      |                                  | 33,787                                   |

Source: Own

Table 2 shows that the total expected annual investment efforts for the smooth operation of the model XYZ healthcare facility is CZK 33,787. This total expected annual investment efforts will be taken into account in all years of provided economic data used to calculate net removable income.

When comparing the wage costs according to historical economic data of the model healthcare facility XYZ, it was found that the amount of reported wage costs is lower than the median gross wage with full time GP according to ISPV.

Therefore, a second modification of the calculation of continuously removable net income was adopted. The second modification of the calculation of continuously removable net income was the correction of labour costs according to data from the ISPV.

Furthermore, the analysis of historical economic data of the XYZ model healthcare facility showed that the reported wage costs did not take into account the wage of a practicing physician who had been practicing in the XYZ healthcare facility at full time from 2012-2014 and then part time (80%) in 2015 and 2016, but only the nurse's labour costs. These circumstances were also duly taken into account and the resulting calculation of labour costs for the XYZ model healthcare facility was adjusted accordingly for 2015 and 2016. Both the first and second modifications to the calculation of profit after tax are reflected in Table 3.

Tab. 3: Calculation of economic results after tax after the application of the first and second modification (in CZK)

| Year                           | 2012      | 2013      | 2014      | 2015      | 2016      |
|--------------------------------|-----------|-----------|-----------|-----------|-----------|
| Revenues                       | 1,739,655 | 1,820,509 | 1,595,020 | 1,499,263 | 1,491,085 |
| Expenditure                    | 845,555   | 854,972   | 808,284   | 847,213   | 977,262   |
| Wages                          | 385,984   | 403,153   | 438,129   | 490,846   | 542,099   |
| Median GW according to ISPV    | 47,066    | 47,066    | 47,066    | 47,066    | 48,134    |
| 80% of GW                      | -         | -         | -         | 37,653    | 38,507    |
| 100% of GW per year            | 564,792   | 564,792   | 564,792   | 451,834   | 462,082   |
| Investment intensity           | 33,787    | 33,787    | 33,787    | 33,787    | 33,787    |
| economic result                | 295,521   | 366,958   | 188,157   | 166,430   | 17,954    |
| Tax                            | 56,149    | 69,722    | 35,750    | 31,622    | 3,411     |
| economic result after taxation | 239,372   | 297,236   | 152,407   | 134,808   | 14,543    |

Source: Own

Based on the modifications made, the economic results after taxation of the model healthcare facility XYZ for the years 2012-2016 were determined. The expected investment intensity and median gross wage according to ISPV were taken into account as wage costs. For 2015 and 2016, the median gross wages according to ISPV were adjusted to 80% according to the amount of the GP's workload.

The next step was to assign the individual weights to the economic results after taxation based on the Metfessel allocation. The resulting correction for the calculation of continuously removable net income is shown in Table 4.

Tab. 4: Data modification according to Metfessel allocation

| Year  | Economic result after taxation (CZK) | Assigned weight | Adjusted economic result after taxation (CZK) |
|-------|--------------------------------------|-----------------|---|
| 2012  | 239,372.00                           | 5               | 1,196,862                                     |
| 2013  | 297,236                              | 5               | 1,486,180                                     |
| 2014  | 152,407                              | 10              | 1,524,073                                     |
| 2015  | 134,808                              | 20              | 2,696,161                                     |
| 2016  | 14,543                               | 60              | 872,556                                       |
| Total | 838,366                              | 100             | 7,775,833                                     |

Source: Own

Subsequently, the post-tax economic result was adjusted for use in the capitalized net income method. The total adjusted economic result was divided by the sum of all the weights used according to the Metfessel allocation. The sum of all weights is 100 (5 + 5 + 10 + 20 + 60 = 100). The permanently removable net incomes was then set at CZK 77,758 (7,775,833 / 100 = CZK 77,758.33) after rounding.

Subsequently, the cost of equity was determined according to Operation No. 2. According to CNB data, which stores data on the amount of long-term government bond yields, the arithmetic mean of ten-year government bond yields was determined as of the last day of each calendar month for the period from 1st

January 2014 until the stated valuation date (31st January 2017). The resulting arithmetic mean was 0.85% (CNB, 2019).

Another risk considered was the risk premium for business risk. The risk premium for business risk refers to the basic risk premium determined on the basis of the business activity of the assessed enterprise. The premium for business risk does not take into account the specificities of the enterprise under assessment. In this case, this risk merely reflects the riskiness of the industry in relation to other sectors of the economy. The level of risk premium for business risk was taken from Aswatha Damodaran's website for the Hospitals / Healthcare Facilities for European economies for 2016, which was the latest available data on the market value date of the model XYZ healthcare facility. The risk premium was chosen at 4.13% (Damodaran, 2019).

As the nature of the XYZ healthcare facility also requires that in the event of the loss of a key practitioner, the XYZ healthcare facility is completely paralyzed, it was also necessary to establish a risk premium for this specific risk. In this model case, the risk premium for the specific risk was set at 2.0%.

The resulting amount of alternative equity costs is calculated as follows (Operation No. 2):

$$\begin{aligned} r_e &= 0.85\% + 4.13\% + 2.0\% \\ r_e &= 6.98\% \end{aligned} \quad (3)$$

On the basis of the available resources, the alternative cost of equity was set at 6.98% using Operation No. 2.

Finally, the market value of the XYZ model healthcare facility was determined using the capitalized net income method (Operation No. 1). The values entering the calculation represent the results of the proposed modifications in the calculation of permanently removable net income.

$$\begin{aligned} HP &= \frac{77,758 \text{ Kč}}{6.98\%} \\ HP &= 1,114,016 \text{ Kč} \end{aligned} \quad (4)$$

The market value of the model healthcare facility XYZ was determined by our modified method as of 31 January 2017 based on data from 2012-2016 to CZK 1,114,016.

## 5 Conclusion

In our paper a modified method of capitalized net incomes was applied in determining the market value of an enterprise. In the calculation of permanently removable net income, two modifications were made in the historical economic data of the 2012-2016 model healthcare facility XYZ. Using the proposed modifications, the economic results after taxation was reduced in the input data from all years for determining the market value of the model healthcare facility XYZ. The evidence also shows that increased expenditures in 2015 and 2016 were partly offset by lower wage costs due to only 80% engagement of the practitioner. All these factors have been taken into account when determining the market value of the XYZ model. The goal of the paper was fulfilled. It should be noted that the structure of calculations of individual economic indicators is applicable in the Czech Republic. In case of application of calculation modifications, it is necessary to follow the specifics of calculation of economic indicators of healthcare facilities of a particular country. It can be stated that in the future, when assessing the market value of an enterprise using the capitalized net income method, the valuator should not neglect the investment intensity of a smoothly running business. Increased attention should also be paid to reported labour costs. These shortcomings can be eliminated by the proposed modification of the calculation.

After modifying the input data, the market value of the model healthcare facility XYZ was determined to be CZK 1,114,016 using the method used.

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**Primary Paper Section: A**

**Secondary Paper Section: AH**

# PREDICTING BANKRUPTCY OF POLISH MANUFACTURING ENTERPRISES – AN ALTERNATIVE MODEL BASED ON FINANCIAL RATIOS

\*SABINA AUGUSTYN

*Cracow University of Economics, Rakowicka 27, 31-510  
Cracow, Poland  
email: "sabina.augustyn@uek.krakow.pl"*

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**Abstract:** The activity of many enterprises in the market economy is associated with the risk of bankruptcy. Bankruptcy can cause many consequences for the company itself and its environment as well, which is why many researchers keep trying to develop models for forecasting bankruptcy on the basis on various data available. This article refers to a bankruptcy forecasting model based on discriminant function analysis for industrial processing enterprises (manufacturing companies) in Poland. The model is based on the variables defined as changes in the values of financial ratios of these enterprises. A discussion of the results obtained and their comparison with the results of previous analyzes will be carried out.

**Keywords:** bankruptcy prediction, discriminant analysis, financial ratios, financial analysis.

## 1 Introduction

Bankruptcy is a phenomenon relatively common in modern economies. Bankruptcy can have major consequences for the enterprise itself and for its partners and economic environment as well. Therefore, over the years, many researchers have attempted to develop models for bankruptcy prediction. An interesting overview of the bankruptcy predicting models and methods can be found in [Aziz and Dar, 2006]. One of the oldest and still most commonly used methods of bankruptcy forecasting is the linear discriminant function. The bankruptcy prediction models are usually based on financial indicators or variables and their parameters, like mean, standard deviation, variance, logarithm, etc. [du Jardin P 2009, p.43]

One of the most important research papers on predicting the bankruptcy of companies in Poland is the project [Pociecha et. al., 2014]. An attempt was made there to build bankruptcy forecasting models for enterprises belonging to the industrial processing sector in Poland, based on data from 2005-2009. The values of 35 financial ratios were used as predictor variables in the above-mentioned analysis.

In this paper, the same database is used to construct bankruptcy prediction models, but some new variables will be introduced for this purpose. The author is aware that the data may be seen as outdated, but the choice of such database was completely purposeful. This is one of the largest datasets that were used in Poland to forecast bankruptcy an definitely the largest one when dealing with Polish manufacturing companies. The use of the new method to analyze the same dataset will bring the opportunity of a detailed comparison of the results obtained.

Predictor variables defined as yearly changes in the values of financial ratios will be used to build bankruptcy forecasting models. The author believes that information regarding not only the absolute value of financial indicators, but their relative changes may be useful in the process of predicting bankruptcy.

Based on the conducted research, the author will perform a comparative analysis of the results obtained and assess the possibility of using the proposed method in further research using the up-to-date financial data from various sectors of the economy.

## 2 Method

Linear discriminant analysis is a method based on the idea of using a linear function as a tool for classifying objects into one of two categories. It was first introduced in [Fisher, 1936]. The idea of discriminant analysis is to find a linear combination

(transformation) of variables that best separate objects belonging to different populations.

Initially, this method was used in nature sciences, but in [Altman, 1968] the idea of predicting bankruptcy using linear discriminant function was introduced. Altman distinguished groups of bankrupt and non-bankrupt companies and used their selected financial indicators to assign a given enterprise to one of two categories. This model was called the "Z-Score model" and was based on 5 financial indicators. It allowed to estimate the probability of the company's bankruptcy within two years.

The Z-score model was based on the following financial variables:

- working capital/total assets;
- retained earnings/total assets;
- earnings before interest and taxes/total assets;
- market value of equity/book value of total liabilities;
- sales/total assets.

Over the years, many MDA models have been introduced, for example Pinches and Mingo [1973], [Beerman 1976], [Altman 1993], [Appenzaller 1998], [Morris 1998], [Altman 2000].

## 3 Dataset

The analysis is based on data for industrial processing enterprises (manufacturing companies) in Poland, available in EMIS Intelligence Poland database. The collected data were characterized and developed for the purposes of the research presented in [Pociecha et al., 2014].

### 3.1 Preliminary data

The study included companies that went bankrupt within the period of 2007 and 2010. Since the assumption was made that the attempt to predict bankruptcy will be made based on the data one year and two years ahead bankruptcy, therefore financial data for these enterprises for the years 2005 and 2009 was collected from the EMIS database. The information related to 31 variables describing the financial situation of the companies being analyzed. A single record in the database contained information on the value of all variables for a single enterprise in a given year. These records are later referred to as bankrupt or non-bankrupt and are treated as separate companies.

### 3.2 Missing data

The data set was scanned in search of missing data. Missing values were detected for both individual records of the companies and the financial variables being subject to analysis.

For the further research purposes, only the records that in a given year presented information on the value of at least 25 variables (80.65%) out of 31 defined were considered. The number of missing values was also determined separately in relation to all the variables divided into categories: total, bankrupt, non-bankrupt. Since the share of missing data in each category did not exceed 11%, the missing values were replaced with median values of corresponding variables.

### 3.3 Outliers

The next step in the analysis was to identify 35 financial indicators that were later used as variables in bankruptcy prediction models. 15 variables came directly from the EMIS database (out of 31 collected), while the next 20 were calculated

based on the data collected, with respect to the theoretical background of the fundamental analysis.<sup>1</sup>

The set of 35 financial indicators obtained was examined in search of outliers (extreme values). The Tukey's interquartile range method of detecting outliers has been implemented. Each observation outside the range  $<Q_1 - 5(Q_3 - Q_1); Q_3 + 5(Q_3 - Q_1)>$ <sup>2</sup> has been replaced by the value of its nearest limit of the above-mentioned range. The range limits were computed separately for non-bankrupt companies, one year prior to actual bankruptcy and two years prior to bankruptcy.

### 3.4 Data set size

As a result, the database contained 7329 records related to 133 bankrupts and 1719 non-bankrupts. Because the records contained information about companies one and two years before going bankrupt, the database finally contained information about 182 bankrupts (2.5% of all companies) and 7147 non-bankrupts (97.5% of the total number of companies). The bankrupts population consisted of 59 enterprises for which information came from the year preceding bankruptcy and 123 enterprises for which information came from two years before filing for bankruptcy.

### 3.5 Distributions of financial ratios

The values of the parameters of the empirical distributions of financial ratios changed over time within each group of companies (1/ non-bankrupts, 2/ bankrupts a year prior to filing for bankruptcy 3/ bankrupts two years prior to actual bankruptcy). Moreover, the empirical distributions of financial ratios in each group of companies usually do not follow normal distribution.

### 3.6 Predictor variables

All the above-mentioned steps have been developed and carried out for the purposes of the analysis presented in [Pociecha et al., 2014]. And as for the present study, relative changes in the value of financial ratios in a given period compared to the previous period were determined. This action was carried out separately for each of the selected groups, i.e. for bankrupts and non-bankrupts. For example, if a value (-0.06) was determined for a given indicator in year 2008, it means that the value of a given indicator in 2008 was 8% lower than in the preceding year (i.e. 2007). The values determined this way were used as variables to build discriminant function models.

## 4 Assumptions

### 4.1 Variants of analysis

Three research variants were created:

- W1 – one-year horizon of forecasting based on data from 2005 to 2009 (for companies that went bankrupt between 2006 and 2010);
- W2 – two-year horizon of forecasting based on data from 2005 to 2008 (for companies that went bankrupt between 2007 and 2010);
- W3 – two-year horizon of forecasting based on data from 2007 only.

### 4.2 Selection method

When selecting the companies for research purposes two approaches were used for the study: the pair-matched sampling and the method of random sampling with replacement.

In the case of the pair-matched method for all enterprises that went bankrupt in the selected period, non-bankrupts were

selected based on the same type of business activity and a similar size of the company. In addition, in the case of variants W1 and W2, the same year from which the financial data came was also taken into account. As a result, three balanced samples of enterprises were obtained.

In the case of random selection with replacement among bankrupts and non-bankrupts, a random sample was drawn of the same size for each of the test variants. These subsets were balanced, but did not include information on the type of activity, the reporting period or the size of the company.

### 4.3 Data split

The analysis is based on the concept of splitting the sample into two subsets: training (test) dataset and validation (holdout) dataset. This process is called cross-validation. Training sets are used to build models and estimate their parameters, while using the validation sets leads to the ability of determining forecasting properties of the models. There are different approaches to the sample distribution, see e.g. [Korol, Prusak, 2018].

In this analysis data were divided into training set and validation set in a ratio of 6:4 and 7:3.

## 5 Results

As a result of the analysis, 12 models were built on the basis of the following assumptions:

- 4 models per variant (W1, W2, W3);
- 6 models per sampling scheme (pair-matched, random sampling with replacement);
- 6 models per sample split (6: 4; 7: 3).

The models were evaluated on the basis of the percentage of correctly qualified cases (companies classified correctly as bankrupts or non-bankrupts). The best results are presented in the table below.

Table 1: List of discriminant function models based on changes in the value of financial indicators

| Variant | Selection    | Split | % of correct classif. |
|---------|--------------|-------|-----------------------|
| W1      | sampling     | 6:4   | 94,12                 |
| W1      | sampling     | 7:3   | 87,07                 |
| W3      | sampling     | 6:4   | 83,26                 |
| W1      | pair-matched | 6:4   | 82,97                 |
| W3      | sampling     | 7:3   | 82,34                 |
| W1      | pair-matched | 7:3   | 81,05                 |
| W2      | sampling     | 6:4   | 77,34                 |
| W2      | pair-matched | 6:4   | 74,52                 |
| W3      | pair-matched | 7:3   | 69,23                 |
| W3      | pair-matched | 6:4   | 68,12                 |
| W2      | sampling     | 7:3   | 67,05                 |
| W2      | pair-matched | 7:3   | 66,29                 |

Source: Own calculations

As the analysis shows, the model that correctly classifies the largest part of the companies was the model based on the W1 variant, i.e. data collected a year ahead the bankruptcy was declared, and the sampling with replacement scheme. The ratio of training to validation set was 6:4. On the other hand, the model that showed the smallest ability to correctly classify companies was the model based on the W2 variant (i.e. based on data collected two years before filing for bankruptcy), and also built on the basis of a pair-matched sample and with the proportion of training and testing sets of 7:3.

Based on the results obtained, it can be stated that for the considered forecasting variants, the best results were obtained for option 1, i.e. in the case of forecasting one year before filing for bankruptcy. Of the 6 best models, as many as 4 were those based on the W1 variant. In addition, it can be seen that among the best models there no models based on the W2 variant, which

<sup>1</sup> The detailed information on the process of computing variables to be found in [Pociecha et al., 2014, pp.64-67]

<sup>2</sup> Where:  $Q_1$  – lower quartile,  $Q_3$  – upper quartile.

may suggest that longer forecasting horizons are not appropriate in this type of analyses.

In terms of choosing the sampling method, the random selection with replacing is definitely ahead. And in this case, out of the 6 best models, 4 were built based on this sampling plan. It can therefore be assumed that the pair-matched selection of the companies may not work properly in the case of constructing bankruptcy forecasting models, and hence the similarity criterion in terms of business activities and company size is not of great importance in the process of constructing bankruptcy prediction models.

When it comes to the use of the cross-validation method and the splitting the sample, there is no reason to unequivocally state that the proportion of the sample training and testing subsets affects the results of the prediction.

## 6 Discussion

The results collected here (based on the changes in the values of financial ratios) were compared with the results obtained in the process of building linear discriminant models based directly on the values of financial indicators, which were described in [Pociecha et al., 2014]. This comparison was made to determine the usefulness of the proposed approach to building discriminant functions based on the changes of the values of the same financial indicators. This list is presented below:

Table 2. The comparison of the results obtained for two types of predictor variables

| Financial ratios |           |       |                              | Changes of financial ratios |           |       |                              |
|------------------|-----------|-------|------------------------------|-----------------------------|-----------|-------|------------------------------|
| Variant          | Selection | Split | % of correct classifications | Variant                     | Selection | Split | % of correct classifications |
| W1               | SA        | 6:4   | 95,83                        | W1                          | SA        | 6:4   | 94,12                        |
| W1               | SA        | 7:3   | 86,11                        | W1                          | SA        | 7:3   | 87,07                        |
| W1               | PM        | 6:4   | 85,42                        | W3                          | SA        | 6:4   | 83,26                        |
| W3               | SA        | 7:3   | 84,21                        | W1                          | PM        | 6:4   | 82,97                        |
| W1               | PM        | 7:3   | 83,33                        | W3                          | SA        | 7:3   | 82,34                        |
| W3               | SA        | 6:4   | 76                           | W1                          | PM        | 7:3   | 81,05                        |
| W2               | SA        | 6:4   | 74,49                        | W2                          | SA        | 6:4   | 77,34                        |
| W2               | SA        | 7:3   | 71,62                        | W2                          | PM        | 6:4   | 74,52                        |
| W3               | PM        | 6:4   | 70                           | W3                          | PM        | 7:3   | 69,23                        |
| W2               | PM        | 6:4   | 69,39                        | W3                          | PM        | 6:4   | 68,12                        |
| W3               | PM        | 7:3   | 68,42                        | W2                          | SA        | 7:3   | 67,05                        |
| W2               | PM        | 7:3   | 62,16                        | W2                          | PM        | 7:3   | 66,29                        |

Note: SA – sampling with replacement; PM – pair-matched sample selection

Source: Own calculations and [Pociecha et al, 2014]

Based on the data presented in Table 2, it can be seen that the results of both analyzes give quite similar results. The best model was built when absolute values of financial indicators were used - 95.83% of companies were classified correctly. In the case of using variables based on relative changes in the value of financial indicators, it can be seen that the best of the developed models correctly classified 94.12% of all enterprises and it is exactly the same model, presented above.

It is worth mentioning, however, that the worst of the estimated models were classified by the surveyed enterprises in 62.16% (model based on indicators) and 66.29% (model based on changes in indicators values).

For both methods, it can also be concluded that the best way to select a sample will be random sampling with replacement, and the use of pair-matched samples in both cases gives worse results. As for the proportions of the size of teaching and validation subsets, there are no clear signals to indicate the

advantage of any of the described approaches. This can also be a subject of a further analysis.

## 7 Conclusions

On the basis of the conducted analysis, it may be stated that constructing models of bankruptcy prediction based on a linear discriminant function can be an effective way of forecasting financial distress for many enterprises.

The above-presented results indicate that the absolute values of selected financial indicators can be used to build appropriate bankruptcy forecasting models. Relative changes in the values of the indicators can also be used as predictor variables in such analyses.

The analysis also showed that forecasting process gives the best results in the case of predicting bankruptcy one year in advance, while forecasting two years in advance does not give comparable results if the evaluation process is made on the basis of the share of correctly classified companies (both bankrupts and non-bankrupts).

Another observation made on the basis of research results is that selecting a sample should be based on random sampling with replacement rather than on purposive selection, that is the selection of non-bankrupt companies with similar size and type of activity as in the case of previously drawn bankrupts.

It is also worth emphasizing that it is not possible to clearly indicate the best proportion of the sample being divided into a training and testing subset. The results obtained for the split type of 6:4 and 7:3 did not show a significant advantage of any of these solutions.

The results presented above will make the basis for further research in this subject. The next step will be using of modified values of financial indicators to build other forecasting models, e.g. neural networks, in order to better confirm or deny the results obtained using discriminant linear models. This step will be based on the data set presented in this paper.

Another step will be to use variables based on changes in the value of financial indicators to analyze the latest available data and to examine companies without considering the category of their activity.

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## ENVIRONMENTAL SELF-CONTROL IN THE SYSTEM OF ENVIRONMENTAL MANAGEMENT: LEGISLATIVE AND DOCTRINAL APPROACHES

<sup>a</sup>TETIANA SHARAIEVSKA, <sup>b</sup>ANZHELA SLEPCHENKO

*Taras Shevchenko National University of Kyiv, Volodymyrska str., 60, Kyiv, Ukraine*

*email: <sup>a</sup>tetiana\_sharaievska@ukr.net, <sup>b</sup>anhelika2003@ukr.net*

**Abstract:** The article is devoted to the problems of legal regulation in the field of environmental self-control in Ukraine, which is traditionally considered one of the forms of environmental control by the Ukrainian environmental law doctrine. It is supported by the scientific position that environmental self-control is a function of environmental management and an element of the environmental management system in general. The urgency of improving the efficiency of law in this area is due to the authors' contention, according to which environmental monitoring is one of the most promising guarantees for ensuring environmental safety of the environment and human beings by preventing and minimizing the negative impact of environmental activities on the part of business entities. The authors focus on problematic issues in the field of environmental self-control, which resulted in the conclusion that fragmentation and imperfection of such legislation are in place. The review of normative legal acts in the field of environmental self-control adopted in other countries with related legal systems in Ukraine, as well as an overview of the European Union legal acts in the field of research are provided. Practical value of research results obtained in the article is reflected in a systematic analysis of the regulation of relations in the field of environmental self-control implementation at the present stage. Specific proposals were made to the current legislation of Ukraine and the necessity of obligatory inclusion of environmental self-control to environmental management system as of its necessary element was determined.

**Keywords:** Environmental Legislation, Environmental Management, Environmental Self-Control, European Union Environmental Law.

### 1 Introduction

#### 1.1 Statement of the Problem

Environmental self-control is a control carried out within the limits of capacity that is available to a particular business entity. Actually this type of control may be regarded as environmental self-control or internal environmental control of enterprise. In this case, the controlling entity and the entity whose activities are controlled coincide. The distinctive features of the environmental self-control in comparison with other types of control is its potentially high efficiency, possible specialization with regard to specifics of production.

Legal scholars note that the environmental self-control should be aimed at achieving the objectives of business entity, serve as a result of management activities on planning, organization and monitoring of environmental activity of enterprise as a whole and its separate branches. It is carried out inside the enterprise in contrast to such forms of external environmental control, as state, self-governing, regional, departmental or public ones. It is a business owner who must feel and realize the inevitability of moral and legal responsibility to society for industrial impact on the environment.

The purpose of the environmental self-control is verification and enforcement of environmental legislation and other requirements, implementation of environmental plans and programs within the particular enterprise (production, workshop, district, etc.), compliance with emission standards and pollutant emissions into the environment, uninterrupted operation of sewage treatment plants, compliance of products with environmental requirements, etc. In this part, production control has a plenty of common features with other forms of environmental control, which, in general, relates to environmental legal doctrine to the preventive and protective functions of environmental management.

The environmental self-control of various dimensions should be carried out by enterprises, institutions, organizations irrespective of ownership and type of business, as well as individual entrepreneurs who use natural resources in their activities, pollute the environment or create negative impact on life or health of citizens. First of all, such enterprises include industrial, fuel and energy enterprises, agricultural commodity producers, food industry enterprises, transport enterprises and

organizations, mining companies, water users-enterprises and others. In addition to the mentioned enterprises implementation of the environmental self-control would be also appropriate for other entities, although not carrying out environmentally dangerous activities, but using natural resources such as objects of nature reserve fund, forest enterprises, hunting business, etc.

The importance of implementing such an environmental 'self-control' is reasoned by the fact that nowadays bulk of environmentally dangerous activity falls on the industry, primary unit of which is an industrial enterprise. Data from the annual national reports on environment, as well as numerous other sources, databases, registers indicate that enterprises carry out a variety of significant harmful effects on the environment as a whole, on its individual components, as well as on life and health of people in course of their economic activities.

The need for implementation of the environmental self-control is contingent on fact that the bodies of state and departmental environmental control are not able to provide full permanent and continuous control over the environmentally hazardous activities of each enterprise and use of natural resources by them. The scholars suggest that the state should provide control over the most dangerous contaminants, control in emergencies, and selective control of the enterprises' activities, while mostly the burden of current control activities should be imposed on the business entities themselves.

The content and organizational forms of the environmental self-control may have specifics and a separate legal basis, in particular, depending on type of natural resources used by an enterprise, via which sources and in what way the environment is polluted (discharges, emissions, waste placement). It allows to differentiate such types of control, as industrial natural resources, anthropository control (control in the field of environmental safety) and environmental monitoring (in the field of environmental protection).

The specific forms and directions of controlling enterprise units' activity depend on forms of ownership, type of business, as well as on the ways of their negative impact on the environment and life and health of citizens. Thus, considering its forms, methods, objects, the environmental self-control at an industrial plant or nuclear power plant will be significantly different from control at a fishing enterprise, on a site of a natural reserve fund or in a hunting enterprise. It is possible to develop such a classification and differentiate subtypes of the environmental self-control within each of mentioned classes. For example, natural resource management control is divided by its resource orientation to land, water, forest, faunal, atmospheric, mining ones, etc. Depending on methods of controlling entities' activity, chemical and toxicological, physico-chemical, radioecological, geological, environmental and sanitary production control may be outlined.

Thus, for the purposes of this article environmental self-control shall be interpreted as environmental control at the local level is to be carried out at the expense of the resources and means of business entities whose activities have a negative impact on the environment in order to comply with the requirements of environmental legislation, the implementation of measures on environmental protection, environmental security and rational use and restoration of natural resources.

#### 1.2 Overview of Literature

Legal aspects of environmental control as one of the functions of environmental management are an integral part of the Ukrainian environmental law doctrine. Issues of legal regulation of environmental control, including industrial one, were analyzed and considered by numerous scholars in their scientific reports, articles, manuals, textbooks, monographs, dissertations.

One of the first national representatives of environmental law doctrine, who made a significant contribution to development of the environmental management theory (tectoecology) and carried out the classification of environmental control on its species, was V.I. Andreitsev (1996). Thus, its subjects, in addition to the state (general and specialized) and the public (local, regional and interregional) ones, the scholar separately allocated the environmental self-control, which, in turn, was divided into intercommercial and internal commercial environmental control. Such a primary classification of environmental control in general has been preserved in the environmental law doctrine of Ukraine till today.

H.I. Baliuk shared approach of V.I. Andreitsev in her textbook on environmental law (2006) and considered the environmental self-control as a separate type of environmental control in accordance with the generally accepted classification of environmental control.

At one time, A.P. Hetman (1999) analyzed environmental monitoring procedure and identified subjects of the environmental self-control direct implementation at an enterprise. In this paper, the author notes that the choice of the environmental self-control types, forms and methods is one of the basic tasks of organizational and preparatory stage of environmental control.

N.R. Malysheva (2008) examined the legal issues of the environmental self-control through the prism of environmental management. The scholar states that environmental management, which exists on any object whose activity is related to the use of natural resources or may have an impact on the environment, is also manifested in the implementation of environmental control.

A special study of legal problems of the system of environmental management and the environmental self-control implementation in Ukraine in its composition was further reviewed in the dissertation work of Ya.O. Chekavska (2016). This study contains legal analysis of correlation between such related concepts as environmental management, industrial environmental management, object environmental management. The author substantiates the possibility of using all of these terms in parallel, as well as replacing them with the generic term 'environmental management', which, in its opinion, reflects the real nature of legal relations in the field of industrial environmental management (control) and object environmental management.

N.D. Krasilich (2008) focused on issues of necessity to conduct the environmental self-control due to the specifics of enterprises foremost using natural resources in their industrial activities or pollute the environment with waste from their production. In this regard, it was determined that specific content of the environmental self-control depends on what exactly natural resources may be harmed to the activities of a particular enterprise.

These scientific thoughts stimulated further research on the peculiarities of the environmental self-control legal regulation in various areas of natural resources management.

Thus, V. Rybachek (2008) analyzed the implementation of state, public and industrial environmental control in the field of atmospheric air protection. It was noted that business entities carrying out pollutant emissions to the atmosphere are obliged to conduct continuous listing and monitoring of pollutants and adhere to the norms of the maximum permissible emissions, which increases the importance and necessity to carry out the environmental self-control at such enterprises (objects) permanently.

The peculiarities of legal regulation of the environmental control implementation in the spheres of industry, use and protection of mineral resources. V.V. Strel'nyk (2017) and O.A. Hrytsan (2017). Thus, Strel'nyk V.V. suggested that industrial

environmental self-control will contribute to the formation of environmental policy and environmental management system in accordance with the standards of the ISO 14000 series at the level of each enterprise. O.A. Hrytsan formulated a series of proposals in his work aimed at improving the legislative regulation of control activities in the field of subsoil use.

The problems of legal regulation of management and service legal relations in the field of use and protection of land, including industrial land control, are analyzed in the dissertation of D.V. Busuiok (2018). The author substantiates the necessity of adopting a special Law of Ukraine 'On Control over Use and Protection of Land'. This Law is proposed to consolidate various types of environmental control, including the environmental self-control, and elaborate provisions on it and measures for its implementation. The author also determined the need to regulate the relationship regarding land self-control between owners of land plots and relevant public authorities in a special contract on industrial control.

One of the most recent works in the doctrine of environmental law is the monograph by A.S. Yevstihnieiev (2018), which addresses the legal issues of environmental control in the field of environmental safety of special use of natural resources. The author's contribution to the development of theory on the environmental self-control legal regulation is development of grounds on necessity to introduce effective legal procedures for the implementation of various types of environmental control, including industrial one.

In most of the revised works environmental self-control is mainly analyzed through prism of the environmental law system that is more than acceptable. Meanwhile, on the other hand, the implementation of a permanent operational environmental self-control is an integral element of economic relations, if it is carried out by enterprises - business entities. Consequently, the object of environmental control in this case is business activity itself, which may have a negative impact on the environment, or is associated with the use of nature.

It brings us to the conclusion that conduct of such control is simultaneously the subject of business law as of branch of Ukrainian law. The issue of legal nature of environmental self-control in enterprises of different forms of ownership, i.e. state, communal or private, remains unresolved.

Despite complexity of the analyzed legal phenomenon, the general approach in most scientific works is its interpretation as of one of the types of environmental control that is carried out directly by the business entity, i.e. as of an environmental control of the local level. Currently environmental self-control has become a separate area of legal relations, the participants of which is the enterprise itself as a legal entity that is responsible for providing environmental safety in course of its activities, as well as public administration in the field of environment, analytical and other laboratories.

The abovementioned preconditioned the topic of this paper, the aims of which is the definition and characterization of the environmental self-control legal features, its peculiarities, scope, requirements and legal regulation of its implementation. We will separately admit the urgency and necessity of the comparative legal analysis of the environmental self-control implementation on the example of states with similar legal systems (Republic of Belarus, Republic of Kazakhstan and the Republic of Uzbekistan), as well as of the European Union.

When writing this article, the authors used the traditional legal doctrinal methods. The methodological basis of the study comprises general scientific and special cognitive methods. In addition, formal-logical and logical-semantic methods and a method of system analysis were used. Using the method of interpretation of legal norms contributed to substantiating proposals for improving the provisions of the current Ukrainian legislation in the field under study.

## 2 The Main Characteristics of Legal Regulation in the Field of Environmental Self-Control in Ukraine

The legal framework of the environmental self-control in Ukraine includes: the Law of Ukraine 'On Environmental Protection'<sup>1</sup> dated June 25, 1991; Code of Civil Protection of Ukraine<sup>2</sup> dated October 2, 2012; the Law of Ukraine 'On Fundamentals (Strategy) of the State Environmental Policy of Ukraine for the Period until 2030'<sup>3</sup> dated February 28, 2019; the Commercial Code of Ukraine<sup>4</sup> on January 16, 2003; the Law of Ukraine 'On Protection of Atmospheric Air'<sup>5</sup> dated June 21, 2001; the Law of Ukraine 'On Objects of Increased Danger'<sup>6</sup> dated January 18, 2001; the Law of Ukraine 'On Waste'<sup>7</sup> dated March 5, 1998; the Mining Law of Ukraine<sup>8</sup> dated October 6, 1999; the Law of Ukraine 'On Ensuring Sanitary and Epidemiological Welfare'<sup>9</sup> dated February 24, 1994; the Code of Ukraine about Subsoil<sup>10</sup> from 27 July 1994 and other legal acts.

The basic legal norms for implementation of environmental control in Ukraine as of an integral part of environmental management system are enshrined in the Law of Ukraine 'On Environmental Protection'<sup>11</sup>, which has been the primary, system-forming act of environmental legal act in Ukraine since 1991. Art. 16 of this Law establishes that control is one of the functions of management in the field of environmental protection, but there are no special requirements for direct action on the environmental self-control.

Separately, in this list the Law of Ukraine 'On Environmental Impact Assessment'<sup>12</sup>, adopted on May 23, 2017, may be highlighted. This Law establishes the legal and organizational principles of environmental impact assessment, aimed at preventing harm to the environment, environmental security, environmental protection, rational use and reproduction of natural resources in the process of decision-making on the conduct of economic activity, which may have a significant impact on the environment during the activity of a particular business entity. This Law provides requirement of implementing environmental control in industrial enterprises (objects) whose activities may affect the environment and which should be subject to environmental impact assessment.

The Law of Ukraine 'On Fundamentals (Strategy) of the State Environmental Policy of Ukraine for the Period until 2030'<sup>13</sup> (hereinafter - the Strategy) dated February 28, 2019, that enters into force from January 1, 2020. The Strategy explicitly states that one of the root causes of environmental problems in Ukraine is the ineffective system of public administration in the field of environmental protection and regulation of the use of natural resources. At the same time, it is emphasized that introduction of international standards of environmental management systems at

enterprises and companies will contribute to development of the environmental management system and implementation of international environmental initiatives in Ukraine (Section I).

The strategic goals and objectives of state environmental policy, defined by the Strategy for the next 10 years, include, in particular, the promotion of the introduction of environmental management systems at the enterprises, as well as improving the environmental characteristics of products, including on the basis of international certification and labeling systems; introduction of environmental management systems, development of voluntary environmental certification, product labeling, environmental audit (Section III).

This Strategy directly acknowledges the inability of the state environmental management to ensure environmental control at the level to be ensured by special bodies of general and special competence in the field of environment. It entails necessity of search for and implementation of other approaches and effective alternatives in this area. One of them should be the environmental self-control for business entities activities of which directly or indirectly affect the environment or associated with the use of natural resources.

At the same time, it should be noted that the Law of Ukraine 'On Fundamentals (Strategy) of the State Environmental Policy of Ukraine for the Period until 2030'<sup>14</sup> has a prognostic character and does not have a direct regulatory influence on the public relations, including environmental ones. As it is known from previous experience, failure to fulfill implementation of various environmental strategies, doctrines, plans fully or partially does not entail legal responsibility for public officials or any negative consequences for state authorities. In this regard, there is an urgent issue regarding adoption of a special law, which at the state level would regulate the issue of introduction and implementation of environmental self-control by all business entities.

As we have already noted, in certain areas of activity, the objects, forms and methods of the environmental self-control may have some specifics and are regulated by relevant sectoral legislation, for example, natural resources law and environmental safety legislation.

In particular, Art. 29 of the Law of Ukraine 'On Protection of Atmospheric Air'<sup>15</sup> stipulates that industrial control over the protection of atmospheric air should be carried out by enterprises, institutions, organizations and individual entrepreneurs in the process of their economic and other activities, if they have harmful effect on the state of atmospheric air. It should be noted that industrial control is recognized as one of the essential means to ensure compliance with requirements for protection of atmospheric air by enterprises, institutions, organizations and individual entrepreneurs. At the same time, as some scholars admit, the lack of legal regulation in this area lies in the fact that this Law contains non-specific, general provisions, does not refer to any specific sub-legal acts, which may adversely affect the obligation to perform norms of the Law.

The legislation of Ukraine also provides rules of the environmental self-control in the sphere of use and protection of mineral resources. Art. 56 of the Code of Ukraine about Subsoil<sup>16</sup> establishes the basic requirements in the field of mineral resources protection, which, in our opinion, are legal preconditions for establishment of a system of production control at the relevant enterprises. Real observance of all the specified requirements by mentioned users is possible only in case of proper functioning of the environmental self-control at

<sup>1</sup> Law of Ukraine 'On Environmental Protection' dated June 25, 1991 available on: <https://zakon.rada.gov.ua/laws/show/1264-12> (accessed 23.12.2019)

<sup>2</sup> Code of Civil Protection of Ukraine dated October 2, 2012 available on: <https://zakon.rada.gov.ua/laws/show/5403-17> (accessed 23.12.2019)

<sup>3</sup> Law of Ukraine 'On Fundamentals (Strategy) of the State Environmental Policy of Ukraine for the Period until 2030' dated February 28, 2019 available on: <https://zakon.rada.gov.ua/laws/show/2697-19> (accessed 23.12.2019)

<sup>4</sup> Commercial Code of Ukraine dated January 16, 2003 available on: <https://zakon.rada.gov.ua/laws/show/436-15> (accessed 23.12.2019)

<sup>5</sup> Law of Ukraine 'On Protection of Atmospheric Air' dated June 21, 2001 available on: <https://zakon.rada.gov.ua/laws/show/2707-12> (accessed 23.12.2019)

<sup>6</sup> Law of Ukraine 'On Objects of Increased Danger' dated January 18, 2001 available on: <https://zakon.rada.gov.ua/laws/show/2245-14> (accessed 23.12.2019)

<sup>7</sup> Law of Ukraine 'On Waste' dated March 5, 1998 available on: <https://zakon.rada.gov.ua/laws/show/187/98-%D0%B2%D1%80> (accessed 23.12.2019)

<sup>8</sup> Mining Law of Ukraine dated October 6, 1999 available on: <https://zakon.rada.gov.ua/laws/show/1127-14> (accessed 23.12.2019)

<sup>9</sup> Law of Ukraine 'On Ensuring Sanitary and Epidemiological Welfare' dated February 24, 1994 available on: <https://zakon.rada.gov.ua/laws/show/4004-12> (accessed 23.12.2019)

<sup>10</sup> Code of Ukraine about Subsoil dated July 27, 1994 available on: <https://zakon.rada.gov.ua/laws/show/132/94-%D0%B2%D1%80> (accessed 23.12.2019)

<sup>11</sup> Law of Ukraine 'On Environmental Protection' dated June 25, 1991 available on: <https://zakon.rada.gov.ua/laws/show/1264-12> (accessed 23.12.2019)

<sup>12</sup> Law of Ukraine 'On Environmental Impact Assessment' dated on May 23, 2017 available on: <https://zakon.rada.gov.ua/laws/show/2059-19> (accessed 23.12.2019)

<sup>13</sup> Law of Ukraine 'On Fundamentals (Strategy) of the State Environmental Policy of Ukraine for the Period until 2030' dated February 28, 2019 available on: <https://zakon.rada.gov.ua/laws/show/2697-19> (accessed 23.12.2019)

<sup>14</sup> Law of Ukraine 'On Fundamentals (Strategy) of the State Environmental Policy of Ukraine for the Period until 2030' dated February 28, 2019 available on: <https://zakon.rada.gov.ua/laws/show/2697-19> (accessed 23.12.2019)

<sup>15</sup> Law of Ukraine 'On Protection of Atmospheric Air' dated June 21, 2001 available on: <https://zakon.rada.gov.ua/laws/show/2707-12> (accessed 23.12.2019)

<sup>16</sup> Code of Ukraine about Subsoil from 27 July 1994 available on: <https://zakon.rada.gov.ua/laws/show/132/94-%D0%B2%D1%80> (accessed 23.12.2019)

enterprises. The implementation of the environmental self-control in this area is explicitly provided in the Typical Agreements on the Use of Mineral Resources, which are concluded with the users in accordance with the Procedure for Granting Special Permits on Use of Mineral Resources, approved by the Resolution of the Cabinet of Ministers of Ukraine dated May 30, 2011 No. 615<sup>17</sup>. In accordance with the above mentioned Agreements, in course of carrying out works the user undertakes to conduct various types of production control, as well as control over the execution and quality of works carried out by the contractor.

Unlike the Code of Ukraine about Subsoil<sup>18</sup>, the Mining Law of Ukraine<sup>19</sup>, which deals with the sphere of activity of mining enterprises, institutions, organizations, mining objects engaged in exploration, development, extraction and processing of minerals and mining (Art. 2), regulates the issue the implementation of the environmental self-control in more detail. Workers of mining enterprise are obliged to carry out certain functions of production environmental control, for example, to maintain constant control over the conditions of atmospheric air at these enterprises (Art. 41), prevent violations of norms on control over the state of the aerospace environment in particularly dangerous underground mines (Art.42), etc.

The basic norms regarding the environmental self-control in the field of drinking water supply are laid down in the Law of Ukraine 'On Drinking Water and Drinking Water Supply'<sup>20</sup> dated January 10, 2002. Art. 44 of this Law provides that production control over drinking water and drinking water supply is carried out by drinking water supply companies. In addition, in the event of threat of technological or natural emergency that is related to the harmful effects on sources or systems of drinking water supply, special production control is carried out on indicators of drinking water quality, which are additionally determined by the central executive body in the field of health care in each particular case. More detailed environmental monitoring in this area is regulated by the order of the Ministry of Health of Ukraine dated May 12, 2010 No. 400 'On Approval of State Sanitary Norms and Rules 'Hygienic Requirements for Drinking Water Intended for Human Consumption'<sup>21</sup>, which contains specific section IV 'Production Control over Safety and Quality of Drinking Water Intended for Human Consumption'.

The Law of Ukraine 'On Waste'<sup>22</sup> establishes the basis for the environmental self-control implementation in the field of waste management, which is also one of the environmentally hazardous activities. It should be noted that the legislative definition of 'waste management' includes not only specific waste operations, but also control over these operations and supervision over the places of their removal (Art. 1). This Law consolidates the legal obligation of business entities to monitor the status of places or facilities for placement of their own waste (Art. 17), and also establishes that waste producers carry out primary production control in the field of waste management.

The legal principles of the environmental self-control are also established by the Law of Ukraine 'On By-Products of Animal Origin not Intended for Human Consumption'<sup>23</sup> dated April 7, 2015, the scope of which extends to activities of natural and

legal persons in the area of handling of by-products of animal origin, products of cultivation, processing of animal by-products. According to Art. 23 of this Law, market operators should conduct internal inspections of their capacities (objects) based on the principles of the risk analysis system at critical control points, when conducting activities such as processing, processing of animal by-products; conversion of by-products into biogas or compost.

At present, the environmental self-control at an enterprise may become an integral part of the environmental management system (or industrial safety management) introduced in Ukraine by adopting a number of state standards harmonized with international standards ISO 9000. For example, the State Standard of Ukraine ISO 14004: 2016 'Environmental management systems. General Guidelines on implementation'<sup>24</sup>, approved by the order of the Technical Committee for Standardization dated March 13, 2006 No. 71. This system of environmental management and environmental safety provides for introduction of the environmental management at an enterprise (object), elements of which is the formation of environmental policy, coordination and organization, valuation, licensing, environmental planning, development of perspective plans and programs, the environmental self-control and others.

Environmental control at hand is closely intertwined with other elements of the environmental management system - the functions of environmental management in the enterprise, such as environmental analysis, monitoring, accounting, audit, planning, but to a certain extent and "dissolves" from them. In practice, it's sometimes difficult to separate one function of environmental management from others. As a result, in our opinion, the preventive and controlling role of environmental control in practice can be reduced.

### 3 The Legal Basis for the Environmental Self-Control Implementation in the EU States as a Landmark for Ukraine

The environmental legislation of the European Union constitutes significant scientific interest for us, in the first place - by virtue of the Association Agreement between Ukraine, on the one hand, and the European Union, the European Atomic Energy Community and their member states on the other hand<sup>25</sup> (ratified by the Law of Ukraine dated September 16, 2014<sup>26</sup>).

In particular, Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control) (revised) provides for environmental inspections<sup>27</sup> (Article 23). In particular, it is established that Member States shall ensure that all plants are covered by a plan of environmental inspections at the national, regional or local levels, and that they regularly review the plan and, where appropriate, update it (paragraph 3).

The criteria for systematic risk assessment for the environment are defined: 1) the potential and actual negative impact of plants on human health and the environment, taking into account levels and emissions, local environmental sensitivity to the risk of accidents; 2) registration of compliance with the conditions stipulated in the permit; 3) the participation of the operating organization in the EMAS Scheme for the implementation of Regulation (EC) No 1221/2009<sup>28</sup>.

<sup>17</sup> Resolution of the Cabinet of Ministers of Ukraine 'On procedure for Granting Special Permits on Use of Mineral Resources' dated May 30, 2011 No. 615 available on: <https://zakon.rada.gov.ua/laws/show/615-2011-%D0%BF> (accessed 23.12.2019)

<sup>18</sup> Code of Ukraine about Subsoil from 27 July 1994 available on: <https://zakon.rada.gov.ua/laws/show/132/94-%D0%B2%D1%80> (accessed 23.12.2019)

<sup>19</sup> Mining Law of Ukraine dated October 6, 1999 available on: <https://zakon.rada.gov.ua/laws/show/1127-14> (accessed 23.12.2019)

<sup>20</sup> Law of Ukraine 'On Drinking Water and Drinking Water Supply' dated January 10, 2002 available on: <https://zakon.rada.gov.ua/laws/show/2918-14> (accessed 23.12.2019)

<sup>21</sup> Order of the Ministry of Health of Ukraine 'On Approval of State Sanitary Norms and Rules 'Hygienic Requirements for Drinking Water Intended for Human Consumption' dated May 12, 2010 No. 400 available on: <https://zakon.rada.gov.ua/laws/show/z0452-10> (accessed 23.12.2019)

<sup>22</sup> Law of Ukraine 'On Waste' dated March 5, 1998 available on: <https://zakon.rada.gov.ua/laws/show/187/98-%D0%B2%D1%80> (accessed 23.12.2019)

<sup>23</sup> Law of Ukraine 'On By-Products of Animal Origin not Intended for Human Consumption' dated April 7, 2015 available on: <https://zakon.rada.gov.ua/laws/show/287-19> (accessed 23.12.2019)

<sup>24</sup> State Standard of Ukraine ISO 14004: 2016 'Environmental management systems. General Guidelines on implementation', approved by the order of the Technical Committee for Standardization dated March 13, 2006 No. 71 available on: [http://ecolog-ua.com/sites/default/files/dstu\\_iso\\_14004-2016.pdf](http://ecolog-ua.com/sites/default/files/dstu_iso_14004-2016.pdf) (accessed 23.12.2019)

<sup>25</sup> Association Agreement between Ukraine, on the one hand, and the European Union, the European Atomic Energy Community and their member states on the other hand dated 27.06.2014 available on: [https://zakon.rada.gov.ua/laws/show/984\\_011](https://zakon.rada.gov.ua/laws/show/984_011) (accessed 23.12.2019)

<sup>26</sup> Law of Ukraine 'On the ratification of the Association Agreement between Ukraine, on the one hand, and the European Union, the European Atomic Energy Community and their member states on the other hand' dated September 16, 2014 available on: <https://zakon.rada.gov.ua/laws/show/1678-18#n2> (accessed 23.12.2019)

<sup>27</sup> Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) available on: <https://eur-lex.europa.eu/eli/dir/2010/75/oj> (accessed 23.12.2019)

<sup>28</sup> Regulation (EC) No 1221/2009 of the European Parliament and of the Council of 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS), repealing Regulation (EC) No 761/2001 and

The scope of this European legal act extends to all enterprises and organizations that carry out hazardous emissions to the natural environment and requires carrying out at least one environmental inspection per year at the most threatened enterprises. Thus, in our opinion, the legislative introduction of such practices in Ukraine may be a factor in increasing the environmental self-control at enterprises.

In Council Directive 96/82/EC of 9 December 1996 on the control of major-accident hazards involving dangerous substances<sup>29</sup>, as amended by Directive 2003/105/EC and Regulation (EC) No. 1882/2003 along with state environmental monitoring, it is envisaged to carry out production environmental monitoring. Thus, according to Art. 18 (2) of this Directive, where appropriate, each inspection by the competent authority must be supplemented by an inspection of the management of the relevant institution within an appropriate period after the first inspection.

Attention is drawn to the provisions of Regulation (EC) No 1221/2009 of the European Parliament and of the Council of 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS), repealing Regulation (EC) No 761/2001 and Commission Decisions 2001/681/EC and 2006/193/EC<sup>30</sup>.

The main objective of the EMAS development was to assess and improve the environmental performance of industrial enterprises, and create conditions for obtaining environmental information by interested parties. The main components of the environmental management and audit system (EMAS) include the development of enterprise environmental policy and its implementation; assessment of the enterprise conditions and efficiency of further functioning of the environmental management system; formation of specific tasks of environmental policy of the enterprise; conduct of environmental audit in order to continuously assess the environmental performance of the enterprise. Consequently, the EMAS system was first established to facilitate the improvement of environmental activities of business entities in all sectors of the economy, which causes an increase in both state (external) environmental control and internal control.

An interesting example of real impact by the EMAS is an establishment of church environmental management systems for various types of church institutions in Europe. About 300 church institutions have already work in this system successfully and selflessly. The project 'Management for Sustainable Development' at the European level is called 'Sustainable Churches'. The purpose of this project is to bring the church's institutions to the level of certification according to the European Parliament EMAS directive<sup>31</sup>.

One of the elements of church environmental management is environmental control, in particular, the primary internal environmental inspection is compulsory carried out by the staff and the project team. Creation of environmental management system takes place precisely on the basis of initial verification of environment and environmental policy in the church institution. An obligatory environmental program is being developed, which specifies the specific objectives, measures planned, identifies the responsible persons, develops a plan of measures for the protection of the environment.

Thus, as a result of signing the Association Agreement with the European Union, provisions of the environmental legislation of the European Community, including the regulation of relations in the analyzed sphere, became relevant for our country. It is important that the provisions of the analyzed EU legal acts are mandatory for Ukraine, as stipulated in Annex XXX of Chapter 6 'Environment'<sup>32</sup> to the aforementioned Association Agreement. Ukraine undertakes to bring its environmental legislation into line with the legislation of the European Union gradually but within the prescribed timeframe. This stipulates the further implementation of the analyzed Directives of the European Union, which, of course, should contribute to improving the legal regulation of the environmental self-control field in Ukraine.

#### 4 Legislation in the Sphere of Environmental Self-Control in Some States with Related Legal Systems

Considering urgency of the problems in improving the environmental self-control legal regulation in Ukraine, it is advisable to study the experience of some countries which, although not the EU members, but have legal systems close to Ukraine, and in which relations in the environmental self-control field are regulated in detail at the level of law.

Thus, in the Law of the Republic of Belarus 'On Environmental Protection'<sup>33</sup> dated November 26, 1992, Art. 94 the environmental self-control legal foundations in the field of environmental protection are fixed, which, in the future, find their detail in the by-laws of normative-legal acts. Art. 1 of the Law establishes a general definition of environmental control, which refers to a system of measures aimed at preventing, detecting and terminating violations of the Belarusian legislation on environmental protection, ensuring compliance with environmental protection requirements by legal entities and citizens engaged in economic and other activities.

The environmental self-control implementation issues are regulated in the special Chapter 15 of the Law devoted to environmental control, which defines its institutional, organizational, procedural and other principles. A fundamental element in the environmental self-control legal regulation is the imposition of a legal obligation for its implementation on individuals whose activities affect the environment. According to Art. 94-96 legal entities and individual entrepreneurs in carrying out activities that have a detrimental effect on the environment are obliged to ensure the environmental self-control implementation. For this purpose, it is mandatory to create a special environmental service within the company or appoint a respective specialist with specific knowledge.

The Guidelines for Implementation of Industrial Control in the Field of Environment and Natural Resources, approved by Decree of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus dated 11 October 2013 No. 52<sup>34</sup> stipulate that companies are required to specify the list of objects subject to the environmental self-control, which can be natural resources, methods and technological processes, sources of waste products, emissions and discharges of pollutants and their sources, especially protection or territory, landscapes, habitats, and finished products (Section 6).

Another important legal act in the system of the environmental self-control legislation in the Republic of Belarus is the Model

Commission Decisions 2001/681/EC and 2006/193/EC available on: <https://eur-lex.europa.eu/eli/reg/2009/1221/oj> (accessed 23.12.2019)

<sup>29</sup> Council Directive 96/82/EC of 9 December 1996 on the control of major-accident hazards involving dangerous substances available on: <https://eur-lex.europa.eu/eli/dir/1996/82/2008-12-11> (accessed 23.12.2019)

<sup>30</sup> Regulation (EC) No 1221/2009 of the European Parliament and of the Council of 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS), repealing Regulation (EC) No 761/2001 and Commission Decisions 2001/681/EC and 2006/193/EC available on: <https://eur-lex.europa.eu/eli/reg/2009/1221/oj> (accessed 23.12.2019)

<sup>31</sup> Foht M.: Church Environmental Management: Evidence of Faith in Creation, that Economically Viable, In: The Church and the Environment: European Experience and Ukrainian Perspectives, Uzhhorod, Publisher Graphics, 2007, 100 p.

<sup>32</sup> Annex XXX of Chapter 6 'Environment' to the Association Agreement between Ukraine, on the one hand, and the European Union, the European Atomic Energy Community and their member states on the other hand available on: [https://www.kmu.gov.ua/storage/app/media/ugoda-pro-asociaciyu/30\\_Annex.pdf](https://www.kmu.gov.ua/storage/app/media/ugoda-pro-asociaciyu/30_Annex.pdf) (accessed 23.12.2019)

<sup>33</sup> Law of the Republic of Belarus 'On Environmental Protection' dated November 26, 1992 available on: <http://pravo.by/document/?guid=3871&p0=v19201982> (accessed 23.12.2019)

<sup>34</sup> The Guidelines for Implementation of Industrial Control in the Field of Environment and Natural Resources, approved by Decree of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus dated October 11, 2013 No. 52 available on: [http://pravo.by/upload/docs/op/W21328090\\_1385499600.pdf](http://pravo.by/upload/docs/op/W21328090_1385499600.pdf) (accessed 23.12.2019)

Regulation on the Service of Environmental Protection, approved by the decision of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus dated May 5, 2016, No. 15<sup>35</sup>. This Regulation refers the environmental self-control implementation to the main tasks of the Environmental Protection Service, which is directly under the ferule of the head of an enterprise (para. 6, 8). The Model Regulation provides a list of the rights and obligations of the Service, in particular, its employees have the right to obtain any necessary information, written explanations from employees who have violated the requirements of environmental legislation, the right to indicate the need to eliminate violations of environmental requirements and use natural resources, as well as the right to make proposals to the head of a legal entity to bring the perpetrators to justice, to suspend (prohibit) the activities of shops (sections), equipment production, operation of vehicles in the event of a threat of environmental damage.

In the Republic of Uzbekistan, the environmental self-control legal basis is provided in the Law of the Republic of Uzbekistan 'On Environmental Control'<sup>36</sup> dated November 12, 2013. This Law establishes a general definition of environmental control as a system of measures aimed at preventing, detecting and eliminating violations of environmental legislation (Art. 3), establishes the main tasks, principles, types, objects and a list of subjects of environmental control (Art. 4, 5, 7-9). The environmental self-control is defined as one of the types of environmental control, and the subjects of its implementation are economic entities (Art. 19). The law consolidates only the most general aspects of the environmental self-control implementation without detailing the procedures, methods, forms and legal implications of such controls. In particular, it has been established that the environmental self-control forms include verification of compliance by the relevant entities with the requirements in the field of environmental protection and rational use of natural resources, implementation of environmental programs, as well as environmental monitoring (Art. 20). The Law gives business entities the right to create a special environmental service in accordance with the Model Regulation on such service (Art. 19). In the same dispositive way, the Law regulates the issue of processing the environmental self-control results, which may take place by drawing up an act or certificate based on the results of the inspection, information or report on the results of monitoring, or in other ways (Art. 21). Form of the environmental self-control realization is a submission of proposals to the authorized person to carry out the environmental monitoring of the person to the head of the business entity in order to take measures to detect violations of environmental legislation (Art. 22). A characteristic feature of this Law is that the environmental self-control implementation in it refers not to the obligations, but to the rights of business entities (Art. 14).

More imperative in its content, the rules on the implementation of industrial environmental monitoring in the Republic of Uzbekistan are enshrined in acts of subordinate level, namely the Model Regulation on the Procedure for the Implementation of Industrial Environmental Control (Annex 2 to the Decree of the Cabinet of Ministers of the Republic of Uzbekistan dated October 8, 2015, No. 286<sup>37</sup>). In particular, it establishes that the implementation of industrial environmental monitoring is a prerequisite for use of natural resources and is carried out by the environmental service of an enterprise, which may consist of either a department or administration, or one employee (paragraphs 2, 3). Forms of industrial environmental monitoring are monitoring itself, inspection, environmental audit (para. 10-13). The right to set the duration, periodicity and other

conditions of inspection as the environmental self-control forms, this Regulation provides to the entity itself, and also allows public environmental inspectors to be invited (para. 17-20). If violations of environmental legislation are detected, an act or certificate is to be drawn up with recommendations directed to the head of the entity, as well as a report (para. 21-22). Legitimate guarantees of independence and impartiality of the environmental self-control subjects are important for the environmental self-control effective implementation. In this regard, the Model Regulation prohibits interference with the implementation of environmental monitoring; the influence in any form on authorized persons carrying out environmental monitoring and obstructing their activities (Art. 23). At the same time, norms that would envisage the legal consequences of such interference, the responsibility of individuals who tried to influence the implementation of industrial environmental control, are absent both in the Law of the Republic of Uzbekistan 'On Environmental Control'<sup>38</sup> and the Model Regulation<sup>39</sup>.

At the same time, in the Republic of Kazakhstan procedure for the environmental self-control implementation is regulated by the Environmental Code of the Republic of Kazakhstan<sup>40</sup> dated January 9, 2007, which clearly states that natural and legal persons who carry out special use of natural resources are obliged to carry out the environmental self-control (Art. 1). This Code also establishes the environmental self-control purpose, its procedure, rights and responsibilities of the environmental user in the environmental self-control implementation, in particular, requirements for organization of internal inspections regarding compliance with environmental legislation. In addition, the natural resources user is obliged to develop the environmental self-control special program, which should contain well-defined information specified in this Code, including the procedure for elimination of violations of environmental legislation, and internal instruments for responding to non-compliance with the law (Art. 131). Art. 134 of the Environmental Code is devoted to organization of regular internal inspections by resources user. The rights and obligations of an employee who performs such checks are clearly defined. In particular, such person is obliged to consider the report on the previous inspection, to inspect each object, where emissions are made to the environment, and to write a written report to the head, where necessary, if necessary, include requirements for implementation of measures for correction of detected non-conformities, terms and the procedure for their elimination.

The experience of the mentioned states in the field of study may serve as a good example in the process of improving the environmental legislation of Ukraine. This applies to issues related to the introduction of the obligation to conduct the environmental self-control for all enterprises that use natural resources and pollute the environment, as well as to regulate the forms, methods and legal consequences of the results of such control. At the same time, it is important to take into account the features and necessity of the environmental self-control implementation at enterprises, whose activities can lead to the emergence of environmental hazards for the environment and human life and health.

## 5 Conclusion

In recent years, the Ukrainian state has been deliberately pursuing a policy aimed at deregulating business activity and minimizing administrative pressure on the economy, first and foremost, for small and medium businesses. In these conditions, answer to the question regarding completeness and effectiveness

<sup>35</sup> Model Regulation on the Service of Environmental Protection, approved by the decision of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus dated May 5, 2016 No. 15 available on: <http://extwprleg1.fao.org/docs/pdf/blr163269.pdf> (accessed 23.12.2019)

<sup>36</sup> Law of the Republic of Uzbekistan 'On Environmental Control' dated November 12, 2013 available on: <https://www.lex.uz/acts/2304949> (accessed 23.12.2019)

<sup>37</sup> Decree of the Cabinet of Ministers of the Republic of Uzbekistan 'On Model Regulations on the Procedure for the Implementation of Industrial Environmental Control' dated October 8, 2015 No. 286 available on: <https://www.lex.uz/docs/2784432> (accessed 23.12.2019)

<sup>38</sup> Law of the Republic of Uzbekistan 'On Environmental Control' dated November 12, 2013 available on: <https://www.lex.uz/acts/2304949> (accessed 23.12.2019)

<sup>39</sup> Model Regulation on the Service of Environmental Protection, approved by the decision of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus dated May 5, 2016 No. 15 available on: <http://extwprleg1.fao.org/docs/pdf/blr163269.pdf> (accessed 23.12.2019)

<sup>40</sup> Environmental Code of the Republic of Kazakhstan dated January 9, 2007 available on: [http://continent-online.com/Document/?doc\\_id=30085593#pos=4;-139](http://continent-online.com/Document/?doc_id=30085593#pos=4;-139) (accessed 23.12.2019)

of the legal regulation of environmental self-control becomes important for the sustainable development of society and the state, ensuring environmental safety and environmental rights of citizens.

Deregulation in the field of management should have its limits and not extend to the areas of nature protection and environmental security. After all, according to Art. 16 of the Constitution of Ukraine<sup>41</sup>, Ukraine as a state is committed to ensure environmental safety and balance in the territory of Ukraine. One of the means of ensuring environmental safety is the implementation of environmental self-control. Like all legal relations in society, such control should be the subject to state legal regulation, despite the fact that it is actually carried out within the scope of business activity. There is a public interest in introducing at the level of the law the necessity of the environmental self-control and the adoption of all necessary by-law normative acts.

Thus, it should be recognized that the legal regulation of implementation of environmental self-control in Ukraine is not satisfactory and subject to improvement. The review of normative legal acts shows that the Ukrainian legislator only partially regulates the issues of environmental self-control without establishing at the legislative level a clear definition of this concept, its forms and methods of implementation, obligatory character, and the proper procedure for its implementation. There is no special law in the Ukrainian legislation on environmental self-control that would directly regulate the relations in this sphere.

In addition, the Ukrainian legislation does not define the notion of environmental self-control, its binding nature and criteria for its distinction from other related elements in the system of environmental management, namely environmental monitoring, accounting, information; a list of subjects of environmental self-control and their competence, in particular, their possibility to enforce the means of administrative coercion or measures of legal responsibility, primarily disciplinary ones, to violators; procedures for the implementation of environmental self-control and possible legal consequences of non-compliance.

The current legislation also lacks provisions on legal liability for absence of environmental control system in the enterprise. Failure to conduct or improper conduct of environmental self-control should be qualified by the courts and state authorities as an environmental offense. For example, wrongful actions in this area could include improper management of environmental self-control; improper documentation, etc. Offenses in the field of environmental self-control should be grounds for criminal, administrative, civil or disciplinary liability of responsible violators. Nevertheless, neither the Criminal Code of Ukraine<sup>42</sup> nor the Code of Administrative Offenses of Ukraine<sup>43</sup> contain any separate provisions regarding offenses on non-implementation of environmental self-control.

In this regard, we propose to amend the Law of Ukraine 'On Environmental Protection'<sup>44</sup> via supplementing it with a separate article "Environmental Self-Control". In our opinion, in order to improve the effectiveness of such control, it is necessary to consolidate its concept, forms and obligation for all enterprises that have a negative impact on the environment and use natural resources.

The next step is the adoption of the Environmental Code of Ukraine, where the issue of environmental self-control should be regulated in a separate section. In addition to the issues

mentioned above, it would be appropriate to determine the objectives of the environmental self-control, requirements for entities that are required to carry out such control, their duties and responsibilities, a list of information that should be contained in the program of environmental self-control, etc.

Obligations for subjects carrying out business and other activities that have a negative impact on the environment should also be obligated by law to document information and store data obtained on the basis of the results of environmental self-control, to provide information on management and results of environmental self-control over authorized bodies of executive power of Ukraine.

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## CAUSES AND IMPLICATIONS OF THE APPLICATIONS OF THE INDIVIDUALISATION PRINCIPLE IN HUMAN RESOURCES MANAGEMENT

<sup>a</sup>JANA BLŠTÁKOVÁ, <sup>b</sup>ZUZANA JONIAKOVÁ, <sup>c</sup>ZUZANA SKORKOVÁ, <sup>d</sup>ILDIKÓ NÉMETHOVÁ, <sup>e</sup>RICHARD BEDNÁR

*University of Economics in Bratislava, Faculty of business management, Dolnozemska cesta 1, Bratislava 852 35, Slovakia*  
 email: <sup>a</sup>jana.blstakova@euba.sk, <sup>b</sup>zuzana.joniakova@euba.sk,  
<sup>c</sup>zuzana.skorkova@euba.sk, <sup>d</sup>ildiko.nemethova@euba.sk,  
<sup>e</sup>richard.bednar@euba.sk

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**Abstract:** This paper incorporates the results of research on the applications of the individualisation principle in human resources management. The main task of human resources management is to utilise such tools that reflect the interaction between the employee lifecycle and career stages. This paper attempts to find out whether businesses considering human resources as crucial to their management act in compliance with the trends of individualisation. Simultaneously, it aims to focus on the impact of individualisation on the rate of turnover, employee satisfaction and incapacity for work, i.e., the selected quality indicators of human resources management in business.

**Keywords:** human resource management, individualization, HR trends, business, lifecycle

### 1 Introduction

The quality of human resources in business is one of the basic factors determining success. Therefore, many businesses consider human resources as a key factor in their own business models. Changes in the environment increase the demands on human resources, their flexibility and ability to adapt to new conditions and their creativity. These changes are accompanied by two seemingly contradictory processes within businesses. On the one hand, they require enhanced employee performance, on the other hand, they foster the sense of satisfaction in order to retain key employees and create a stable employment potential. This relationship is referred to as performance and social approach conflict in human resources management and it is an objectively competitive relationship. Businesses are faced with the task of seeking tools to overcome this conflict. Moreover, this is happening at a time when the world of work is in constant motion. A holistic approach is needed to be applied in human resources management to ensure the retention of sustainable human resources in situations of constant organisational changes (Pluta, Rudawska, 2016). However, in order to minimise the threat of high levels of stress and burnout, employees need and expect a safe space for self-regeneration in addition to meaningful work and family activities. This also requires a highly individualised approach to managing people and respecting their needs. This paper deals with an individual approach to human resources management. Such an approach focuses on the stages of the employee lifecycle, i.e. onboarding, career development, career growth, maturity, overseas career and career decline. The main task of human resources management is to utilise such tools that reflect the interaction between the employee lifecycle and career stages. The main tools supporting the individualisation of human resources management include workplace flexibility, total compensation and diversity programmes. This paper attempts to find out whether businesses regarding human resources as crucial to their management act in compliance with the trends of individualisation. Simultaneously, it focuses on the impact of individualisation on the rate of turnover, employee satisfaction and incapacity for work, i.e., the selected quality indicators of human resources management in business.

### 2 Human Resources Management Focused on the Stages of the Employee Lifecycle

A high degree of individualisation in human resources management is utilised by the so-called employee lifecycle management. It aims to provide real support to individual

employees, which incorporates a holistic approach while respecting the particular situations of individual employees. Each individual experiences different stages of his or her own personal lifecycle and develops his or her own career path. Career development may not be entirely dependent on the employee's age, it does not need to be chronological. The task of human resources management is to deploy tools for individual employees that will correspond to a given interaction between the employee lifecycle and career stages. Reward alignment with the employee lifecycle is perceived as a considerable part of sustainable, future-oriented human resources management (Wilms, Groh, 2012).

Table 1: An example of the interaction between employee lifecycle and career stages

|           |                   | Career cycle |                    |               |          |                 |                |
|-----------|-------------------|--------------|--------------------|---------------|----------|-----------------|----------------|
|           |                   | Onboarding   | Career Development | Career Growth | Maturity | Overseas Career | Career Decline |
| Lifecycle | „Single“          | X            | X                  |               |          |                 |                |
|           | Partnership       |              |                    | X             |          |                 |                |
|           | Parenting         |              |                    | X             | X        |                 |                |
|           | Care              |              |                    |               |          | X               | X              |
|           | Restart           |              |                    |               |          | X               |                |
|           | Disease           |              |                    |               |          |                 | X              |
|           | Social Commitment |              |                    |               | X        | X               | X              |

source: [https://www.ukbw.de/fileadmin/media/dokumente/NEWS/Rump\\_Lebensphasenorientierte\\_Personalpolitik\\_07-12-16.pdf](https://www.ukbw.de/fileadmin/media/dokumente/NEWS/Rump_Lebensphasenorientierte_Personalpolitik_07-12-16.pdf)

Certain tools used in human resources lifecycle management are universally relevant, while some are specific. Most tools belong to the field of working time adjustments (flexible working regimes, teleworking, the possibility of taking a sabbatical, etc.). The concept of working time is based on the length of the employee's working life and its flexibility includes 5 dimensions, namely time sovereignty, time synchronisation, time allocation and redistribution, time competence and time preferences that are dealt with in the implementation of specific solutions (Rump, 2016). According to a study by the German Institute for Employment (IBE) entitled Strategy for the Future: Human Resources Lifecycle Management from 2016, businesses implementing this concept achieve significantly better results in selected indicators compared to those that are not focused on employee lifecycles (see Table).

Table 2: Effects of Human Resources Lifecycle Management in Business

| Indicator                                       | Improvements compared to businesses not focused on lifecycles |
|---|---|
| Employee-to-business                            | 14%   |
| Increase in labour productivity                 | 17%   |
| Customer loyalty                                | 12%   |
| Decline in absence                              | 3 days  |
| Decline in incapacity for work                  | 12%   |
| Fluctuation decline                             | 16%   |
| Attractiveness of employer on the labour market | 26%   |
| Image   | 38%   |

source: [https://www.ukbw.de/fileadmin/media/dokumente/NEWS/Rump\\_Lebensphasenorientierte\\_Personalpolitik\\_07-12-16.pdf](https://www.ukbw.de/fileadmin/media/dokumente/NEWS/Rump_Lebensphasenorientierte_Personalpolitik_07-12-16.pdf), 16.7.2019

Human resources lifecycle management is perceived as a tool to help businesses successfully manage the inevitable demographic transformations of the future (Wilms, Groh, 2012).

## 2 Tools to support the individualisation of human resources management

Workplace flexibility represents a potential way to create conditions for employees to have a satisfactory working life throughout their careers up to the retirement age (Bal, Jansen, 2016). By creating the conditions for flexible working hours, businesses demonstrate their trust in employees (Shagvaliyeva and Yazdanifard 2014). The positive effects of flexibility have been demonstrated in several studies. The findings of Shanmugam and Agarwal (2019) state that the use of flexible work options significantly reduce work-life conflict, decrease turnover and increase job satisfaction, with organisational and supervisory perceptions playing a significant moderating role. Lafuente and Berbegal-Mirabent (2019) consider flexible and balanced contract practices as being critical to enhancing productivity.

Total compensation includes all types of rewards, indirect, direct, internal and external (Manus - Graham, 2003). Chen and Hsieh (2006) note that total remuneration includes everything that employees perceive as fair compensation, earned in exchange for effort and time spent at work. According to Peccei et al. (2013) by adopting the principle of total remuneration, a business signals to its employees that it is interested in recognising their efforts and satisfying their emotional needs. By moving away from the one-size-fits-all approach, it seeks to support and develop employees' positive attitudes towards the business, increasing their commitment to the tasks and engaging them in various activities. The research results of Baker et al. (2014) show that if employees receive remuneration in the form of autonomy, recognition, education and development opportunities, they will make further efforts to achieve the goals and accomplish the assigned tasks. This kind of remuneration creates enthusiasm for learning new skills, increases employee activity and interest in meeting goals, which expands the range of opportunities and subsequently increases their sense of success. The concept of total remuneration can act in businesses as a source of competitive advantage, allowing them to respond more flexibly to internal changes and align employee performance with business goals (Peluso, 2017), because engaging and combining different forms of pay is a source of overlapping and mutually reinforcing effects on employee performance (Innocenti et al., 2011).

Diversity management has already become a much-debated topic. The most common attributes monitored within diversity management include gender, racial, ethnic diversity and age. Diversity management is perceived by the authors as the existence of programmes and policies that support the participation of a wide range of social groups at all levels of the business (Singal and Gerde, 2015). Several studies confirm its positive impact. Kundu and Mor (2017) claim that employees, regardless of their personal characteristics, recognise diversity and the tools for managing it. At the same time, research reveals partial but substantial differences among employee perceptions of diversity management tools in the workplace depending on their own diversity profiles. Research has also confirmed that the enforcement of gender diversity management policies has a positive impact on business performance. Kinyanjui (2013) has also confirmed that the main benefit of diversity management in the workplace is the increase in productivity and the maintenance of competitiveness, the creation of better working bonds between individuals and teams and the enhancement of social responsibility. The authors also point out that failure to pay attention to diversity management leads to organisational conflicts.

## 3 Work Methodology

This paper incorporates the results of research on the applications of the individualisation principle in human

resources management. The paper contains the results of the study of the relationship between the applications of the individualisation principle and the quality of human resources management in businesses that declare human resources as a key component in the creation of added value in their business models. The main aim of the paper is to find out whether companies that consider human resources as crucial in their business models approach their management in accordance with the trends of individualisation and define the impact of individualisation on selected quality indicators of human resources management in business. In order to meet the research objectives, the following research questions have been formulated:

### Research questions:

1. Are there any significant differences between the perception of human resources as a component of the business model and the orientation of businesses?
2. Do businesses that consider human resources as crucial approach their management in line with the trends of individualisation?
3. Do the applications of the individualisation principle in human resources management affect the rate of turnover, incapacity for work and the level of employee satisfaction?

In order to meet the research objectives and answer the research questions, a structured questionnaire was utilised as an additional method of research, using an analogy to the research questions. The research was carried out in the period of 2017–2018. The survey sample contained answers from 315 respondents. Due to the fact that the survey had some continuity and awareness among human resources leaders in Slovakia, and that it was also carried out through a combination of face-to-face meetings and electronic data collection tools, a high response rate (98.15%) was achieved.

The characteristic features of the composition of the research sample in terms of size based on the number of employees are shown in the table. Microenterprises and family businesses (32.7%) account for a third of the research sample and large enterprises (7.2%) are also represented. Research questions also analyse businesses with more than 50 employees. Most businesses in the research sample operate in the private sector (86.4%), other businesses operate in the public sector or represent mixed ownership businesses. More than a third (37.2%) of the businesses have their activities established predominantly worldwide, others operate nationally (31.4%) or regionally (25%). The regional scope is particularly noticeable for small businesses that are not subject to further investigation. Characteristic features of the research sample of the survey in businesses in Slovakia in 2017 in terms of business sectors.

The characteristic features of the research sample in relation to the economic activities of the business are shown in the table. In the research sample, the ratio of businesses active in production, manufacturing and trade (54.17%) and services industries (43.3%) is fairly balanced. Based on participation in international research and continuous research data from previous periods, a tendency of higher representation of businesses operating in the services sectors has been observed. The Spearman correlation, based on the order of variables, has been used to verify the hypotheses, as it can also capture other than linear relationships between variables. Chi-Square Tests and ANOVA or an analysis of variance, i.e. a parametric statistical method created for comparing groups, have been applied.

Table 3: Representation in sectors

| Sector                       | %      |
|------------------------------|--------|
| Retailing and Wholesale      | 15.72% |
| Finances and insurance       | 11.95% |
| IT/IC services               | 10.06% |
| Other manufacturing industry | 10.06% |
| Engineering production       | 8.81%  |

|   |       |
|---|-------|
| Housing and caterers  | 7.55% |
| Management, research and development, administrative services | 5.66% |
| Food and textile industry                                     | 5.03% |
| Civil engineering   | 3.77% |
| Production of transport equipment                             | 3.77% |
| Public administration   | 3.14% |
| Metalworking and Metallurgy                                   | 3.14% |
| Healthcare and social work                                    | 2.52% |
| Transport and Storage   | 1.89% |
| Production of electronics                                     | 1.89% |
| Chemical and pharmaceutical industry                          | 1.89% |
| Energy and water management                                   | 1.26% |
| Agriculture and forestry                                      | 1.26% |
| Education   | 0.63% |

source: own research

#### 4 Results and Discussion

Human resources and their quality are currently considered as being significant determinants of competitiveness and success in business. The authors aimed to examine whether there was a difference between the perception of human resources as a key component of the business model and the orientation of the business. As many as 59.6% of the businesses surveyed identified human resources as a key resource, such an approach is more pronounced in services and sales, but there was no significant difference between businesses operating in different areas.

Table 4: Business model - HRM

| Sector             |                    | % of HRM |         |
|--------------------|--------------------|----------|---------|
| Production         |                    | 15.72%   |         |
| Services           |                    | 11.95%   |         |
| Sale               |                    | 10.06%   |         |
| Other              |                    | 10.06%   |         |
| Chi-Square Tests   |                    |          |         |
|                    | Value              | df       | P-value |
| Pearson Chi-Square | 2.373 <sup>a</sup> | 3        | 0.499   |
| N of Valid Cases   | 317                |          |         |

Source: own research

To verify the differences in the perception of human resources as a key factor, a chi-square test was used at a significance level of 5%, a P value > 0.05 confirms that the difference is not significant.

The authors aimed to verify whether businesses that considered human resources as a key component of their business models applied the individualisation principle to their management. The applications of the individualisation principle in human resources management were verified through the implementation of the following conditions:

1. businesses have special programmes for selected groups of employees (older employees, minority groups, women returning from maternity leave, disabled employees, younger employees),
2. businesses apply the element of selectivity in the benefit and social programmes offered within the process of remuneration;
3. businesses make use of flexible working arrangements (such as working from home, flexible working time),
4. businesses monitor the satisfaction of their own employees.

Businesses that satisfied all the conditions were included among those that applied the individualisation principle in human resources management. The two-factor ANOVA analysis was used for the purposes of verification. The significance level of all tests was 5%.

Table 5: Dependent Variable: Individualisation

| Source          | Type III Sum of Squares | df  | Mean Square | F        | P-value |
|-----------------|-------------------------|-----|-------------|----------|---------|
| Corrected Model | 2.114 <sup>a</sup>      | 4   | 0.528       | 7.972    | 0       |
| Intercept       | 108.735                 | 1   | 108.735     | 1640.519 | 0       |
| Sector          | 1.654                   | 3   | 0.551       | 8.317    | 0       |
| Human resources | 0.378                   | 1   | 0.378       | 5.706    | 0.018   |
| Error           | 20.68                   | 312 | 0.066       |          |         |
| Total           | 151.385                 | 317 |             |          |         |
| Corrected Total | 22.793                  | 316 |             |          |         |

source: own research

Both the factor of human resources significance and the factor of the business sector have proven to be crucial to the applications of the individualisation principle. A cross-sector comparison was carried out based on Tukey's post-hoc test. The results showed that manufacturing, services and sales businesses apply the principle of individualisation more significantly than other businesses.

Table 6: Estimated levels of individualization by industry factor

| Sector                                |        |            |                         |             |
|---------------------------------------|--------|------------|-------------------------|-------------|
| Dependent Variable: Individualisation |        |            |                         |             |
| Sector                                | Indiv. | Std. Error | 95% Confidence Interval |             |
|                                       |        |            | Lower Bound             | Upper Bound |
| production                            | 0.673  | 0.029      | 0.615                   | 0.73        |
| services                              | 0.641  | 0.034      | 0.575                   | 0.707       |
| sale                                  | 0.672  | 0.024      | 0.625                   | 0.719       |
| others                                | 0.484  | 0.033      | 0.419                   | 0.549       |

source: own research

Table 7: Estimated levels of individualization by HRM factor

| HRM                                   |        |            |                         |             |
|---------------------------------------|--------|------------|-------------------------|-------------|
| Dependent Variable: Individualisation |        |            |                         |             |
| RLZ                                   | Indiv. | Std. Error | 95% Confidence Interval |             |
|                                       |        |            | Lower Bound             | Upper Bound |
| no                                    | 0.582  | 0.023      | 0.537                   | 0.627       |
| yes                                   | 0.653  | 0.019      | 0.615                   | 0.691       |

source: own research

Based on the results, it can be concluded that businesses that consider human resources as being crucial apply a significantly higher level of individualisation. The business sector is also significant for the applications of individualisation. Businesses in the category of others, which included agricultural enterprises, public administration organisations, health organisations, energy companies show a significantly lower level of individualisation in their approach to human resources management than manufacturing, trading and service enterprises.

Businesses take an individualised approach to managing their own employees in order to meet their expectations and needs and gain a stable employment potential. The authors' research aimed to verify that individualisation in human resources management affected employee satisfaction and led to employee stability in businesses. Using a point-biserial correlation at a significance level of 5%, the authors verified the relationship between employee satisfaction development, as measured by business satisfaction surveys, and the applications of the individualisation principle in human resources management. The correlation was significant, the Pearson coefficient reached 0.204. This means that the level of satisfaction has demonstrably increased in businesses that individually manage employees.

Table 8: Individualisation in HRM

|                |                  |                     | Indiv. | Employee satisfaction development |
|----------------|------------------|---------------------|--------|-----------------------------------|
| Point Biserial | Indiv.           | Pearson Correlation | 1      | 0.204                             |
|                |                  | P-value             |        | 0.005                             |
|                |                  | N                   | 317    | 160                               |
|                | 8c. Satisfaction | Pearson Correlation | 0.204  | 1                                 |
|                |                  | P-value             | 0.005  |                                   |
|                |                  | N                   | 160    | 160                               |

source: own research

As employee satisfaction is a prerequisite for their stabilisation, the authors aimed to analyse the relationship between individualised human resources management and indicators such as employee turnover and incapacity for work. The assumption that an individualised approach would affect the level of their values was verified by the Spearman correlation, at the significance level of 5%. However, none of the correlations tested were significant, with a turnover rate of 0.022 and an incapacity rate of 0.007. This means that the impact of individualised human resources management on employee stability has not been confirmed.

Table 9: Relation between ind. HRM and indicators a)

|                |                     |                         | Indiv. | Annual turnover |
|----------------|---------------------|-------------------------|--------|-----------------|
| Spearman's rho | Indiv.              | Correlation Coefficient | 1      | 0.022           |
|                |                     | P-value                 |        | 0.62            |
|                |                     | N                       | 317    | 203             |
|                | 8a. Annual turnover | Correlation Coefficient | 0.022  | 1               |
|                |                     | P-value                 | 0.62   |                 |
|                |                     | N                       | 203    | 203             |

Table 9: Relation between ind. HRM and indicators b)

|                |                    |                         | Indiv. | Number of days PN |
|----------------|--------------------|-------------------------|--------|-------------------|
| Spearman's rho | Indiv.             | Correlation Coefficient | 1      | -0.007            |
|                |                    | P-value                 |        | 0.457             |
|                |                    | N                       | 317    | 209               |
|                | 8b. Number of days | Correlation Coefficient | -0.007 | 1                 |
|                |                    | P-value                 | 0.457  |                   |
|                |                    | N                       | 209    | 209               |

source: own research

## 5 Conclusion

The authors aimed to examine whether businesses that consider human resources as a key component of their business models approach their management in line with the applications of the individualisation principle in human resources management. The theoretical sources show that the application of the principle is an effective and efficient response to the current challenges of human resources management in a demanding business environment. Research shows that nearly 60% of employers now consider human resources as crucially determining. Businesses with key human resources apply a significantly higher degree of individualisation in their management. Businesses in the category of others, such as the agricultural sector, public administration, health care, are lagging behind. In manufacturing companies, services and commercial enterprises, the level of individualised approaches to human resources management is seemingly higher. With regard to the implications of such an approach to human resources management, the results of the research have shown an impact on employee satisfaction as measured by satisfaction surveys. Businesses with individualised human resources management manifest enhanced applications of the individualisation principle, whereas direct impact on

employee stability, as measured by the rate of turnover and incapacity for work, has not been confirmed.

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**Primary Paper Section: A**

**Secondary Paper Section: AE**

## DO MONETARY AND FISCAL POLICY VARIABLES MATTER FOR THE ECONOMY IN POLAND?

<sup>a</sup>JOANNA STAWSKA

*University of Lodz, 39 Rewolucji 1905 r. street, 90-214 Lodz, Poland*  
*email: "joanna.stawska@uni.lodz.pl"*

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**Abstract:** Decisions taken by the economic authorities within the monetary and fiscal policy influence each other and thus affect the economy of a given country. The literature on the subject indicates that it is essential for the economy that the monetary and fiscal authorities cooperate with each other. However, such coordination of actions of economic authorities is not easy to achieve because the central bank seeks to ensure price stability, while the government strives to maintain high economic growth and a low unemployment rate. In addition, it should be emphasized that the decisions of economic authorities are made at various stages of the business cycle, which may also affect a degree of coordination of monetary and fiscal policy (policy mix). The aim of the article is to identify the relationship between economic variables in the monetary and fiscal policy and thus variables describing the economy in Poland in 2000 - 2018. Particular attention is paid to the following economic variables: GDP per capita, unemployment rate, General Government debt and deficit, investment rate, the main interest rate of the central bank or inflation. The article verifies the hypothesis that variables from the monetary and fiscal policy statistically significantly interact with each other and thus influence the economic variables in Poland. The research methods were based on statistical analyzes. The contribution of this article consists in presenting a role of monetary and fiscal policy in influencing the Polish economy in the years 2000 - 2018.

**Keywords:** economy, fiscal policy, monetary policy, policy mix

### 1 Introduction

The combination of monetary and fiscal policy functions in the economic literature as the notion of policy mix. Many authors indicate a significant impact of policy mix on the economy and this group includes, among others: M. Buti, A. Sapir (1998), R. Clarida, J. Gali, M. Gertler (2000), A.H. Hughes, P. Mooslechner, M. Schuerz (2001), R. Beetsma, X. Debrun (2004), L. Onorante (2004), Woroniecka-Leciejewicz (2011) and L. Krus, I. Woroniecka-Leciejewicz (2017). While analyzing the influence of monetary and fiscal policy on the economy it must be emphasized that the aim of monetary policy is an inflation target that is to maintain a stable level of prices, whereas fiscal policy aims at the highest possible economic growth and low unemployment. It appears that in the context of economic theory objectives of economic authorities may counteract each other. For instance, the central bank that decreases inflation, often simultaneously increases unemployment, which is a problem that the government tries to combat. In turn, increased government expenditure, which may generate a budget deficit, results in growth of global demand, which then causes demand inflation.

Monetary policy and fiscal policy play an important role in the economy. They also have an impact on a number of economic variables and influence each other. In the face of the recent financial crisis, which turned into a debt crisis, it was observed that fiscal and monetary authorities had been working together to revive economic activity. The aim of the article is to identify the relationship between economic variables in the monetary and fiscal policy and thus variables describing the economy in Poland in 2000 - 2018. The article verifies the hypothesis that variables from the monetary and fiscal policy statistically significantly interact with each other and thus influence the economic variables in Poland.

### 2 Literature Review

B. Kopeć (2015) examined whether impact of a specific policy translated into the macroeconomic situation, or whether some central bank or government actions were not reflected in the economy. The analysis comprised determination of a dominant option of economic policy understood in such a way that within business cycles a level of interest rate or budget deficit was changing more extensively. In order to set a dominant option of economic policy the author used a pendulum model, in which

economic policy was perceived as a synthetic indicator of effects of fiscal and monetary policy. Monetary policy was determined as a standardized indicator of a level of long-term interest rate, whereas fiscal policy as a standardized indicator of a deficit level. As a result, it was observed that what is of crucial importance in the course of economic policy is business cycle and its phase in which the economy is.

J. Jakóbiak (2013) stresses that within the area of internal compliance of policy mix special importance belongs to an issue of stability of individual elements of policy mix as well as the whole policy mix, which is additionally correlated with the reliability of actions of fiscal and monetary authorities. Moreover, monetary and fiscal policy are conducted within diverse time frames, which means that adjustments of monetary policy to volatile conditions occur in a continuous manner and economic entities react to monetary signals in a moderately delayed manner, whereas adjustments of fiscal policy are of jumping character and reactions of entities to fiscal impulses show bigger delays. It is assumed that fiscal delays mainly reduce the effectiveness of policy mix.

T.J. Sargent and N. Wallace (1981) developed the "theory of unpleasant monetarist arithmetic" based on the idea that at the time of occurrence of the fiscal dominance, the monetary authorities are no longer able to keep inflation under control, regardless of the used strategy. Hence the conclusion is that the central bank's decisions regarding the conduct of monetary policy are affected by fiscal policy, among other things hindering the process of stabilizing the price level in the economy, which is the main objective of the central bank. In the short term stabilization of the economy turns out to be a difficult task due to the differences in goals or preferences of the central bank and fiscal authorities. The optimal solution for both authorities is to agree on their actions and decisions.

Generally, the government seeks to achieve the planned economic growth and the central bank strives to hold inflation at some numerically specified level (so-called inflation targeting). The policy governed by fiscal authorities and priorities of the central bank greatly influence the decisions of the central bank concerning the conduct of monetary policy. In turn, the choice of a kind of fiscal policy depends on pursuing monetary policy and priorities of a government within the budgetary policy (Woroniecka-Leciejewicz, 2011). The monetary - fiscal interactions and their implications are examined using models based on the game theory (Bennett, Loayza, 2001, p. 66). K. Kuttner (2002) emphasizes that the coordination of fiscal and monetary policies strongly influences economy and at the same time they are interrelated. Analysis of the models based on game theory indicates that the coordination of these policies would be beneficial for the economy. The harmonization of these two policies limits sources of conflict, leads to the minimization of costs of maintaining price stability and contributes to the greater stability of the financial system. The use of these models allows to observe problems arising from the conflict of monetary and fiscal authorities.

For many economists, coordinated monetary policy and fiscal policy are one of the best policy mix options. A lack of such coordination was criticized, for instance, by Nordhaus (1994). The IS-LM analysis shows that the combinations of economic policies are less important than the total level of aggregate demand that can be influenced by a fiscal policy, a monetary policy and a combination thereof. Many studies attribute the significant role of the central bank, for example, US Federal Reserve in maintaining macroeconomic stability in the country to the insufficient flexibility of a fiscal policy as a stabilization tool. In the neo-Keynesian models a fiscal policy is assumed to produce a demand shock that should be offset by the monetary authorities (Kuttner, 2002).

Relevant conclusions in the context of this research were also presented by I. Woroniecka- Leciejewicz (2015) indicating that under the influence of changes in the central bank and government priorities, the optimal fiscal and monetary responses change and as a result the Nash equilibrium shifts (equilibrium as a choice of policy mix). When the fiscal authorities plan a higher growth rate, the optimal budgetary response becomes more expansive. Additionally, a change in the priorities of the monetary authorities like permitting a higher level of inflation, causes a shift in the optimum monetary strategies resulting in more expansive monetary policy.

I. Woroniecka- Leciejewicz conducted a study of decisive interactions and mutual conditions between monetary and fiscal authorities based on simulation research using fiscal-monetary game, in which strategies of fiscal and monetary policy are different in terms of restrictiveness or expansiveness. While analyzing the game it was assumed that an increase of interest rate *ceteris paribus* results in a decreased rate of economic growth and decreased inflation; additionally, increased budget deficit *ceteris paribus* results in increased inflation. Another assumption was that increased budget deficit *ceteris paribus* causes an increased GDP growth rate. Moreover, attention was focused on two cases: the first one when monetary authorities strive to minimize inflation and fiscal authorities try to maximize a GDP growth rate and the other case where monetary and fiscal authorities determine their own objectives that they want to achieve while determining a desired inflation target and planned dynamics of GDP. A logistics function used in the study to determine dependence between economic growth and inflation and instruments of fiscal and monetary policy enabled to note that possibilities of decreasing inflation by using increasingly restrictive monetary policy are limited, similar to possibilities of boosting economic growth by means of increasingly expansive fiscal policy. It was observed that impact of a fiscal instrument (i.e. budget deficit) on a GDP growth rate can be characterized by a growing logarithmic function, yet, to a certain range of fluctuations of instrument values. Both, increasingly expansive fiscal policy limits boost of economic growth, as well as increasingly restrictive fiscal policy has limited possibilities to influence dynamics of production. A similar situation occurs in a case of exerting influence of budget deficit on inflation. In turn, together with an increased interest rate decrease of GDP growth is observed from a maximum at extremely expansive monetary policy to the lowest one when an interest rate reaches an extremely high level. Similarly, together with an increased interest rate inflation reduction is observed from extremely high at highly expansive monetary policy to extremely low at highly restrictive one (Woroniecka-Leciejewicz, 2013, pp. 8, 29-38).

I. Woroniecka – Leciejewicz (2015) conducted also an analysis of effects of instruments of policy-mix on the economy using a dynamic macroeconomic model. In this study instruments of monetary policy – real interest rate and of fiscal policy – budget deficit in relation to GDP, influence the economy, as well as a pace of GDP growth and inflation. Moreover, a simulation was conducted for two variants of policy mix in a presented dynamic macroeconomic model, namely: an expansive and a restrictive one. In this model it was assumed that economic authorities strive to minimize deviations, respectively GDP growth and inflation, from desired values. Therefore, it was assumed that for every monetary strategy fiscal authorities choose an optimum fiscal strategy minimizing the square of the deviation of GDP growth from a desired value; in turn, monetary authorities choose optimum monetary strategy for every fiscal strategy minimizing the square of the deviation of inflation from a desired value i.e. inflation target. Conducted simulations present effects observed in time that are evoked by a change in macroeconomic policy stance to more expansive or restrictive. As a result, a new state of balance in product market and money market is noted and results of simulation enable to observe in which direction and to what extent the main variables changed i.e. production, investments, public finance and inflation.

Summing up the discussion on the impact of monetary and fiscal policy on the economy it must be added that policy mix has a

particular sense in the extraordinary conditions such as the financial crisis. Fiscal and monetary policies have influence on macroeconomic stability. The lack of appropriate policy mix was one of the reasons of the recent financial crisis and lead to many adverse effects on the economy. Both these policies are used by economic authorities in order to achieve its macroeconomic objectives. That is why this issue is so essential and should not be marginalized by authorities (Stawska, Grzesiak, 2014).

### 3 Analysis of Relationships Between Monetary and Fiscal Policy Variables

The discussion on the impact of monetary and fiscal policy on the Polish economy in the period between 2000-2018 started with the presentation of crucial, in the context of the paper objective, variables from the area of fiscal and monetary policy.

Table 1 contains data from monetary policy area in Poland between 2000-2018. The National Bank of Poland while realizing a strategy of direct inflation target observes inflation indicators in Poland. Table 1 shows Consumer Price Index – a month ending a period – December of the previous year = 1. Inflation in Poland in the analyzed period remains at a low level (creeping inflation) with the exception of year 2000 when inflation amounted to 8.5%, otherwise it is generally within the inflation target (2.5% +/- 1p.p.), with some exceptions (such as 2004 - inflation of 4.4% - when Poland joined the European Union). The years 2007 - 2008 are a period of intensifying disturbances on global financial markets, hence inflation in 2007 was 4.0% and exceeded the inflation target. Significant signs of price declines were observed in the second half of 2014. Deflation lasted until 2015, mainly due to the fall in oil prices (which reduced production costs and increased corporate profits). In the last three years of analysis (2016-2018) we observe low inflation.

Table 1: Selected monetary policy variables in Poland

| Years | INF_CPI | M3_index | IR_NOM | IR_REAL |
|-------|---------|----------|--------|---------|
| 2000  | 8.5     | 25,9     | 18.25  | 8.99    |
| 2001  | 3.6     | 29,2     | 14.43  | 10.45   |
| 2002  | 0.8     | 29,9     | 8.28   | 7.42    |
| 2003  | 1.7     | 30,6     | 5.88   | 4.11    |
| 2004  | 4.4     | 32,9     | 6.08   | 1.61    |
| 2005  | 0.7     | 37,2     | 5.15   | 4.42    |
| 2006  | 1.4     | 41,8     | 4.13   | 2.69    |
| 2007  | 4.0     | 48,5     | 4.63   | 0.61    |
| 2008  | 3.3     | 56,1     | 5.54   | 2.17    |
| 2009  | 3.5     | 63,5     | 3.88   | 0.37    |
| 2010  | 3.1     | 68,2     | 3.5    | 0.39    |
| 2011  | 4.6     | 74,5     | 4.13   | -0.45   |
| 2012  | 2.4     | 81,8     | 4.5    | 2.05    |
| 2013  | 0.7     | 86,8     | 3.21   | 2.49    |
| 2014  | -1      | 92,3     | 2      | 3.03    |
| 2015  | -0.5    | 100      | 1.5    | 2.01    |
| 2016  | 0.8     | 110,1    | 1.5    | 0.69    |
| 2017  | 2.1     | 117      | 1.5    | -0.59   |
| 2018  | 1.1     | 125      | 1.5    | 0.40    |

Source: Central Statistical Office database. Retrieved 22.09.2019 from <http://stat.gov.pl/wskazniki-makroekonomiczne/>.

The level of inflation is linked to money supply in the economy, hence, table 1 also presents money supply index in Poland between 2000-2018.

Money supply in Poland measured by the broadest aggregate - M3 (2015=100)- in the analyzed period is systematically increasing (Official Webpage of NBP). Now, in Poland, the central bank uses a policy of low interest rates (compared to historical data) which should favor the economy (though not always). Currently (November 2019) the main interest rates of NBP have been not changed since March 2015 (table 1).

In the context of coordination of monetary and fiscal policy variables of crucial importance concern public finance and they include: revenues and expenditures of public finance sector or

General Government deficit and debt. Table 2 shows the revenues and expenditures of the Polish public finance sector and the general government (GG) deficit/surplus and debt in relation to GDP, in the country between 2000 and 2018. The data show that public expenditures were moderate in those years, ranging from 36.4% to 40.9% of GDP. The only years when they rose above the level of 40% were 2007 – 2008 and 2018. The fact that in 2018 they accounted for 40.9% implies that the government refrained from significantly increasing the fiscal burden.

Table 2: Statistical data on public finances in Poland – selected fiscal policy variables

| Years | Revenues to GDP | Expenditures to GDP | GG_DEF | GG_DEB |
|-------|-----------------|---------------------|--------|--------|
| 2000  | 36.4            | 39.2                | -3     | 36.5   |
| 2001  | 37.4            | 42.3                | -4.8   | 37.3   |
| 2002  | 37.6            | 43.3                | -4.8   | 41.8   |
| 2003  | 37.8            | 43.2                | -6.1   | 46.6   |
| 2004  | 37.1            | 41.6                | -5.1   | 45     |
| 2005  | 38.6            | 41.6                | -4     | 46.4   |
| 2006  | 39.3            | 41.4                | -3.6   | 46.9   |
| 2007  | 40.8            | 40.7                | -1.9   | 44.2   |
| 2008  | 40.1            | 41.7                | -3.6   | 46.3   |
| 2009  | 39.3            | 43.0                | -7.3   | 49.4   |
| 2010  | 38.1            | 44.0                | -7.3   | 53.1   |
| 2011  | 38.7            | 42.3                | -4.8   | 54.1   |
| 2012  | 39.6            | 42.0                | -3.7   | 53.7   |
| 2013  | 39.3            | 42.2                | -4.1   | 55.7   |
| 2014  | 39.3            | 41.6                | -3.7   | 50.4   |
| 2015  | 38.2            | 40.6                | -2.7   | 51.3   |
| 2016  | 37.7            | 40.2                | -2.2   | 54.2   |
| 2017  | 39.0            | 39.7                | -1.5   | 50.6   |
| 2018  | 40.9            | 40.7                | -0.4   | 48.9   |

Source: Central Statistical Office database. Retrieved 22.09.2019 from <http://stat.gov.pl/wskazniki-makroekonomiczne/>.

The general government deficit in Poland proved particularly vulnerable to the crisis, rising to 7.3% of Polish GDP in 2009 and in 2010 (it is notable that the deficit is one of the main measures of fiscal policy). A crisis usually reduces tax revenues and causes budget expenditures to increase (in Poland, particularly high increases in expenditures were noted in 2009 and 2010), thus raising the amount of public debt (table 2).

Table 3 presents the results of correlations between variables in the field of monetary and fiscal policy. All the variables were transformed into first differences, yielding stationary series. We note a significant negative correlation between the unemployment rate and GDP per capita and between the unemployment rate and inflation. According to A. Okun who was the first economist who studied the empirical relationship between unemployment and economic growth using data on the United States – the correlation between them was negative. Thus, increases in unemployment tend to be correlated with lower than normal growth in real GDP (Okun, 1962). Analyzing in more detail the negative relationship between the

unemployment rate and inflation, we can cite the Philips curve, reformulated by E. Phelps and then criticized even by Friedman. Friedman's criticism can be read as an attempt to replace the known negative correlation between inflation and unemployment with the negative correlation between the unemployment rate and the trajectory of inflation, known as the "accelerationist" position (Friedman, 1968).

There were also significant and negative correlations between GG debt and inflation rate as well as between GG deficit and unemployment rate (GG deficit occurs in calculations with a minus sign - hence this should be taken into account in the interpretation of the negative correlation indicator). In relation to this first correlation (GG debt and inflation rate), one can indicate the Aizenman and Marion (2011) study, who calculate that the persistent inflation rate of 5% will significantly contribute to stabilizing US public finances. On the other hand, in the case of the second correlation, i.e. the relationship between GG deficit and the unemployment rate, the I.Ostoj study led to interesting conclusions, which indicated that as a result of the recent financial crisis (2008-2009), the reduction of public expenditure aimed at reducing the public finance imbalance in most countries in the EU, usually did not concern funds to combat unemployment (Ostoj, 2013).

A negative correlation also occurred in the analyzed period between the real NBP reference rate and GDP dynamics. Research on the monetary policy transmission mechanism in Poland indicates that the reaction of economic activity to a change in the short-term interest rate is the strongest and the fastest in the recovery phase of the economy, and the slowest and the weakest in the recession. The maximum reaction of the annual GDP dynamics occurs about half a year after the change in the interest rate - the GDP growth rate decreases between 0.1 percentage points and 0.3 percentage point (Chmielewski et. al., 2018).

In turn, we notice a significant, positive correlation between the inflation rate and GDP per capita. In the theory of economics and practice, the view is that high inflation and deflation adversely affect the dynamics of long-term economic growth. In turn, there are also views such as F.A. von Hayek and others about the beneficial, stimulating effect of slow inflation processes on the economic growth rate, however, only in the short term (Von Hayek, 2006).

A positive, significant correlation in the considered period also occurred between the M3 money supply and GDP per capita and between the investment rate and GDP per capita. According to M. Friedman, there is a relationship between the money supply and nominal income, however, this relationship is disturbed by the lags of reaction between variables. The increase in income is reflected primarily in production, only in the longer term in prices. The level of money supply influences production in the short term, while in the long-term - production is determined by real factors such as investments or savings (Bernanke, 2002).

Table 3: Pearson's correlation ratios between selected monetary and fiscal policy variables in Poland (2000-2018)

| Variable           | d_GDP_per capita_r | d_GDP_% | d_Unemp | d_INV | d_M3_r | d_INF | d_IR_r | d_DEF | d_DEB |
|--------------------|--------------------|---------|---------|-------|--------|-------|--------|-------|-------|
| d_GDP_per capita_r | 1.00               | 0.60    | -0.82   | 0.78  | 0.65   | 0.72  | -0.33  | 0.51  | -0.48 |
| d_GDP_%            |                    | 1.00    | -0.42   | 0.45  | 0.13   | 0.59  | -0.67  | 0.39  | -0.23 |
| d_Unemp            |                    |         | 1.00    | -0.74 | -0.66  | -0.51 | 0.02   | -0.53 | 0.52  |
| d_INV              |                    |         |         | 1.00  | 0.50   | 0.43  | -0.04  | 0.42  | -0.53 |
| d_M3_r             |                    |         |         |       | 1.00   | 0.32  | 0.15   | 0.24  | -0.20 |
| d_INF              |                    |         |         |       |        | 1.00  | -0.66  | 0.28  | -0.16 |
| d_IR_r             |                    |         |         |       |        |       | 1.00   | 0.05  | -0.20 |
| d_DEF              |                    |         |         |       |        |       |        | 1.00  | -0.45 |
| d_DEB              |                    |         |         |       |        |       |        |       | 1.00  |

Source: developed by the author with the GRETl software package

The next part of the article discusses regression results obtained for monetary and fiscal policy variables (the real GDP per capita, the rate of unemployment, the investment rate and real NBP reference rate in Poland). Regressions were carried out to highlight statistically significant dependencies, between selected variables from the monetary and fiscal policy. Prior to regression analysis, variables were tested for stationarity with the ADF test (Dickey-Fuller test), as well as for normality. Variables were transformed into first differences, yielding stationary series and variables with a near-normal distribution. To perform the analysis, data spanning the years 2000–2018 were sourced from the website of the Polish Central Statistical Office and Eurostat.

Table 4 shows the regression results for the dependent variable: the first differences of the real GDP per capita in Poland [d\_GDPpercapita\_r] and independent variables: the first differences of the unemployment rate in Poland [d\_UNEM], the first differences of the real investment rate in Poland [d\_INV\_r], the first differences of the NBP real reference rate [d\_IR\_r] and the first differences of the real GDP per capita lagged by one year [d\_GDPpercapita\_r\_1].

Table 4: Regression results for dependent variable (Y): d\_GDPper capita\_r and independent variables: (X<sub>1</sub>): d\_UNEM and (X<sub>2</sub>): d\_INV; (X<sub>3</sub>): d\_IR\_r and (X<sub>4</sub>): d\_GDPper capita\_r\_1

| Variable   | Coefficient | Standard error | t-Student | p-value   |
|--|-------------|----------------|-----------|-----------|
| Const.   | 529,365     | 127,448        | 4,154     | 0,0013*** |
| d_UNEM   | -139,774    | 54,1386        | -2,582    | 0,0240**  |
| d_INV_r  | 0,0155983   | 0,00631889     | 2,469     | 0,0296**  |
| d_IR_r   | -131,939    | 35,3799        | -3,729    | 0,0029*** |
| d_GDPpercapita_r_1   | 0,306713    | 0,118200       | 2,595     | 0,0234**  |
| Selected regression statistics and analysis of variance: N= 17 observations from 2002–2018 |             |                |           |           |
| SD of the dependent variable = 1080,373; Standard error of residuals 572,5141              |             |                |           |           |
| R-square = 0,863881  |             |                |           |           |
| F(4, 12) = 19,03954 p-value for F test 0,000039  |             |                |           |           |

\*\*\* means that p – value < 0.01; \*\* means that p – value < 0.05; \* means that p – value < 0.10

Source: developed by the author with the GRETL software package

In the years 2000–2018 the real GDP per capita responded statistically significantly to the unemployment rate in Poland [d\_UNEM], the real investment rate in Poland [d\_INV\_r], the NBP real reference rate [d\_IR\_r] and the real GDP per capita lagged by one year [d\_GDPpercapita\_r\_1]. The probabilities of the unemployment rate, the real investment rate, the NBP real reference rate and the real GDP per capita lagged by one year having a statistically significant influence on the real GDP per capita are 95%, 95%, 99% and 95% respectively (table 4). The negative value of the coefficient (-139,774) for the unemployment rate indicates that the relationship was consistent with the economic theory (table 4). The coefficient for the NBP real reference rate (-131,939) is negative - meaning that the Polish GDP per capita decreased following rises in the NBP real reference rate in 2000 – 2018. In turn, the coefficients for investment and GDP per capita delayed by one year are positive and amount to: (0,0155983, 0,306713) respectively. A positive indicator indicates that along with the rise of the investment and GDP per capita lagged by 1 year, GDP per capita increased in the discussed period.

The regression results lead to a conclusion the unemployment rate, the real investment rate, the NBP real reference rate and the real GDP per capita lagged by one year as variables related to monetary policy and fiscal policy statistically significantly determined the GDP per capita in Poland from 2000 to 2018. Based on these analyses we can confirm the hypothesis that variables from the monetary and fiscal policy statistically significantly interact with each other and thus influence the economic variables in Poland. Thus, we have achieved the purpose of this article and identified the relationship between economic variables in the monetary and fiscal policy and thus variables describing the economy in Poland in 2000 - 2018.

#### 4 Conclusions

Proper cooperation of monetary and fiscal authorities as two independent decision makers responsible for two main areas of economic policy remains a crucial condition of meeting its objectives. Special focus is put on the relevance of development of efficient coordination mechanisms in order to achieve stability of a level of prices and permanent economic growth (Marszałek, 2006).

However, there are numerous factors distorting the coordination of monetary and fiscal policy and thereby, influencing effectiveness of economic policy. Factors that have impact on

effects of policy mix on the economy include, for instance, diverse objectives and preferences of economic authorities, delays in implementation of fiscal and monetary policy as well as internal and external economic impulses such as financial crises. In this article particular attention was paid to the following economic variables: GDP per capita, unemployment rate, General Government debt and deficit, the main interest rate of the central bank or investment. It was also noted that decisions of economic authorities were strongly influenced by the financial crisis that contributed to a higher rate of unemployment, slower economic growth, decreased revenues and higher expenditures of the public finance sector, as well as to larger public deficit and debt. Furthermore, an attempt was made to identify the relationship between economic variables in the monetary and fiscal policy and thus variables describing the economy in Poland in 2000 - 2018. Finally, it was confirmed that variables from the monetary and fiscal policy statistically significantly interact with each other and thus influence the economic variables in Poland.

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**Primary Paper Section: A**

**Secondary Paper Section: AH**

## USE OF OBJECTIVIZED VALUE IN BUSINESS VALUATION

<sup>a</sup>VOJTĚCH STEHEL, <sup>b</sup>JAN HEJDA, <sup>c</sup>MAREK VOCHOZKA

*Institute of Technology and Business, School of Expertness and Valuation, Okružní 517/10, 37001 České Budějovice, Czech Republic*

*email: <sup>a</sup>stehel@mail.vstecb.cz, <sup>b</sup>hejda@fm.vse.cz, <sup>c</sup>vochozka@mail.vstecb.cz*

**Abstract:** The aim of our paper was to create a methodology for determining the value of small tangible fixed assets. For this, a flat-rate valuation method is used. The compilation of the instrument for determining the value of small tangible fixed assets is based on observation of the Czech market in this type of goods. The method is applied to the model association XYZ, which was in the research before its transformation into a limited liability company. The results presented in the form of an amortization scale can be applied to other types of valued assets, provided all requirements are met.

**Keywords:** Small tangible fixed assets, lump sum method, amortization scale, association, limited liability company, property valuation, property classification

### 1 Introduction

Recently, business valuation is an increasingly scientific discipline that affects not only business owners and managers, but also employees, state administration bodies, courts, tax authorities, experts and academics, etc. Individual transformations of a business (merger, division) impose the obligation of business valuation or share of the law, in fact. Furthermore, it is necessary to determine the value of a business when it is sold or transformed into joint ownership. The subject of evaluation may be even the individual parts of a business or certain shares in case of a public limited company.

Business valuation may be considered from several viewpoints. The determination of so-called objectivized market value is one of the essential strategies in case of the sale of a business. In connection with this, it is possible to use one of the return methods of market valuation or property (substitution) valuation (Vrbka et al., 2019). In valuation practice, in case of any of the above mentioned processes (sales, mergers, etc.), the valuator attempts to simulate a sales situation for a third independent rational thinker.

The business valuation process itself should take certain steps that are necessary to correctly determine the value, including the collection and analysis of business data, the preparation of its financial plan and the subsequent selection and application of the valuation method (Mařík et al., 2018).

The aim of the paper is to apply the theory of objective value which is viewed from the perspective of the third independent rationally thinking person and to demonstrate it on a specific example of business valuation.

### 2 Literary research

The concept of a 'value' is to be defined first. Krabec (2009) states that one of the prominent authors of value theory was Adam Smith in the second half of the 18th century, who argued that exchange and utility value did not depend on each other. Smith's theory that the only value-giving factor of manufactured goods is their intrinsic value (determined by the amount of labour spent on their production) was refuted by the Marginalist Revolution.

In modern history, many authors have dealt with the definition of the concept of value. Gummerus (2013) divides the resulting value of the good into the sum of the value of the creation processes and the value of the resulting goods. He proposes to create a model which determines a part of its value on the basis of the value for the end consumer when the value of a particular good is set.

Higgins and Scholer (2009) maintain that customer attitude to a particular product can have a positive or negative impact on its value. It is an approach to the product from the point of view of consumer psychology, where the value created in this way is a motivating force of purchase or resistance to a specific product. It is therefore a relationship where the rising demand for a product increases its price and vice versa.

A very interesting insight into the theory of value creation was provided by Kim et al. (2011), who determined the value of digital objects for the customer as well as factors influencing the attractiveness of these objects. The sale of digital items is very specific and nowadays it is increasingly on offer by the merchants and can significantly raise the revenues from their business activities. From the customer's point of view, the value of these digital objects is mainly set by their emotional and social level. The real paper of the digital object to the owner is a secondary value-creating factor for the customer. Anderson and Kilduff (2009) describe this behavior, i.e. the buyer's determining the value of an item, in relation to his or her social status in society.

The following part of the text will deal with the selected principles of business valuation. Majerčák and Majerčáková (2013) state that, over time, there have been developed four basic principles of business valuation. These are market value, subjective value, objectivized value and the so-called Cologne school.

According to International Valuation Standards (IVS) (2017), the market value is the estimated amount for which assets should be exchanged at the valuation date between a voluntary buyer and a voluntary seller in an independent transaction after appropriate marketing, when each party acts informed, reasonably, and without pressure.

Mařík (2004) explains the individual ideas of this definition. The estimated amount in this case is the sum expressed in money that has been received in an independent payment transaction for the same asset. A voluntary buyer and seller is a person who is internally motivated to purchase and to sell. An independent transaction between the parties assumes that there is no other factor between the parties that would affect the entire course of the transaction or the amount of financial consideration. The idea that both parties are informed and rational assumes that they are fully aware of the state of the subject of the transaction and make an effort to sensibly achieve the best but still reasonable prices for them. Moreover, it is important that the parties are informed about the value of the subject of the transaction at the date of the establishment of the transaction.

The further part of the theoretical introduction clarifies the concept of 'objectivized value'. According to IDW Standard S1 (2008), the objectivized value is a standardized and revisable return value determined from the perspective of a citizen owner (or group of owners), subject to unlimited taxation. The value is set on condition that the business maintains an unchanged concept, using realistic expectations within market opportunities, risks and other influences affecting business value.

According to Krabec (2009), the objectivized value is an abstract concept derived from the parties, i.e. offer and demand, in relation to the valued asset in the market. The objectivized value is not an estimate of the probable, ex post observable or equilibrium market price. The objectivized value is not and should not be an estimate of the likely equilibrium price, but a standardized variable based on the reviewability criteria.

According to Mařík and Maříková (2011), only generally accepted facts are taken into account when determining the objectivized value of a business at first. After that there are considered the facts that have an impact on valuation and are

generally known, even though they concern the future. Finally, the subjective aspects are also included into the valuation. Miakčová and Gavlaková (2013) deal with the valuation of companies using the Yield-Basis Method. They argue that the company's return on value is a key indicator for investors, owners and creditors. Determining the value of a business also contributes to further decisions on how to manage it, shape it and further increase its value.

The discounted cash flow model (DCF) can be used as a method of business valuation. Since this method is employed in the methodological part of the paper, this model is described in more detail. According to this method the calculation of business value is based on expected future cash flows (cash flow to equity – FCFE, cash flow to the company – FCFF). The continuing business value can be estimated using the Gordon formula for a simple extrapolation of free cash flow at the end of the forecast period, or a perpetual or parametric value driver formula (Jennergren, 2008). According to Mařík and Maříková (2006), Gordon's model for forecasting is also applicable in the Czech Republic.

Kumar (2016) states that there are three basic valuation models for the DCF model, i.e. dividend discount model (DDM), FCFE and FCFF. It is also possible to use its single-phase, two-phase or three-phase variant. In the two-stage variant, it is assumed that there is a stabilization period for the business, followed by a period of stable growth rate. The three-phase version of the model assumes the first phase of high growth rate followed by a transition to a slower growth rate and, finally, a stable sustainable growth rate at last.

There are other authors who have published their conclusions with regard to the appropriateness of the use of DCF model in comparison with other methods. Honková (2017) deals with the valuation of return on businesses using the DCF model and subsequently she reviews the suitability of using this method in practice. The values of the business are calculated according to the DCF model and subsequently compared with the original value of equity. The differences between these values are verified using selected statistical methods. It is concluded that the value of the business calculated using the DCF model is higher than the value of its equity. She finds the advantage of the DCF model in its ability to simulate the development of value in case of a company with high initial debt which is currently making a profit. The main advantage of the DCF model is its ability to take into account the influence of time in the company's life cycle.

Demirakos et al. (2010) examines the accuracy of the value prediction and compares the DCF model with PE models in terms of equity values. According to his results, the DCF model is able to predict more accurately the resulting real value of shares than PE models in the long run.

Stancu et al. (2017) compares the ability to predict the development of business value using several methods (adjusted net asset method, relative valuation model, market value added and residual income model) including DCF. He concludes that the hypotheses at the core of each of these methods are consistent except for the adjusted net asset method.

Sayed (2015) calculates the accuracy of the prediction of the value development using the DCF model to be approx. 70% compared to the actual future. By contrast, the accuracy of the prediction based on book value is only 51.1%. Therefore, the DCF model is more effective in this respect. He also concludes that this method is used less frequently in businesses, paradoxically.

Hašková (2018) compares the DCF model with the probabilistic approach and fuzzy approach to use the economic efficiency of long-term project estimation.

However, the DCF model can be applied to business valuation. After the financial and strategic analysis, it can be concluded that

the business fulfils the 'going concern' condition and will thus be viable during the prediction period (Amin et al., 2014). Since business valuation using the DCF model is based on certain simplifying assumptions, these assumptions must be respected. According to Kislinger (2001), these assumptions are as such: effective capital markets, the capital structure of a business is made up of equity and debt only, there is only income tax, and the company must invest permanently in depreciation in terms of the principle of 'going concern'.

When using the DCF model one of the first steps is the correct determination of 1st phase of the prognosis. Mařík et al. (2018) states that the standard length of the first phase is set in the Czech Republic between three and six years (most often five years). This length of the first phase usually amounts to about 20% of the total business value in the calculation. According to Copeland et al. (2002), however, it is possible to determine the length of the first phase as a period of ten years. In this case, the first phase of the calculation is around 40% of the total value of the business. In the course of fifteen years each of both phases has an equal share of the final business value, i.e. 50:50.

In order to use the DCF model, it is necessary to prepare as perfectly accurate financial plan of the awarded company as possible. Vochozka (2016) states a financial plan can be drawn up by using a variety of methods. The financial plan may be drawn up by using an intuitive method, a statistical method, a causal method or a combination of the three methods. However, he advocates a method of creating a financial plan in the use of artificial neural networks (ANS). According to his concept, the neural networks designed for drawing up financial plans should be able to make a financial plan with approx. 90% accuracy compared to the reality in the future.

In the past it was the intuitive method that was the most frequently used, but nowadays it is the casual method. At present, ANS is also coming to the forefront to make financial planning due to its increasing popularity (Vochozka, 2016).

### 3 Methods and materials

For the purpose of this paper, a business referred to as XYZ, which operates in the construction market and deals with plumbing, heating and gas supply infrastructure, has provided a list of all its assets together with its historical financial statements. First, it is necessary to carry out a financial and strategic analysis of XYZ in order to select the business valuation method and to confirm or deny the principle of 'going concern'. Subsequently it is necessary to divide the whole assets into operationally necessary and non-operationally necessary. After all these steps the financial plan of XYZ will be developed. Subsequently, the valuation of XYZ itself will be carried out using the selected valuation method.

The financial and strategic analysis of XYZ will be carried out with regard to the concept of the business and its conditions in the 2014-2016 period. There is no official methodology for the financial analysis, but the Ministry of Industry and Trade (MIT) is trying to introduce certain methodological elements that should be included in the financial analysis in each specific sector. Financial analysis includes several techniques which may be used. These techniques include quantitative testing methods that are based on the data processing in financial statements, which are used to derive the individual financial health indicators of the business. They include the absolute method which regards the items in the financial statement as the absolute indicators and ignores the other phenomena. It is possible to divide the indicators in the financial statements into stock and flow. Another such method is the relative method, which is based on the measuring of data from the financial statements. It means that one figure is viewed in the way that it bears influence on another figure (Vochozka, 2016).

Horizontal and vertical analysis belongs to absolute indicators. These methods are used to identify the developing trends in the society. Horizontal analysis is used to monitor the development

of the company over time and vertical analysis determines the structure of the financial statement related to some meaningful quantity.

The technique of ratio indicators has been selected for this paper. This is a technique in which one financial indicator or a group of them is divided by another financial indicator or a group of them, provided that there is a certain link between these individual indicators. These indicators include profitability, activity and liquidity and debt ratios (for example, Vrbka, Rowland, 2019).

The further step is to carry out the strategic analysis of the business. Strategic analysis is one of the steps in the process of business valuation, by means of which it is possible to define the overall revenue potential of the valued business. Strategic and financial analysis is processed with the aim of confirming or refuting the principle of 'going concern', in terms of XYZ business, which is meant to serve as one of the grounds for the subsequent selection of the evaluation method.

Since the company owner was not paid for his work reflecting the performance component of his activity in the XYZ company, but was only paid the financial remuneration that he received as a result of his property rights, it is necessary to calculate the wage simulation cost to the owner of the XYZ company from the point of view of a third rational person. The wage costs are considered for such a person who would probably have to be employed by an independent investor in order to make a financial plan that will result in the FCFEs that are needed to value the XYZ company using to the selected method.

The two-stage DCF model will be used for business valuation of the XYZ company. The length of phase 1 will be set for the period of four and a half years (August 2016 – 2020). The year 2021 will be the first year of phase 2. Formula 1 is a calculation of business value of the XYZ company using the two-stage DCF model of future development:

$$H = \sum_{t=1}^T \frac{FCFE_t}{(1 + n_{VK(z)i})^t} + \frac{FCFE_{T+1}}{n_{VK(z)T+i} - g} * \frac{1}{(1 + n_{VK(z)i})^T} \quad (1)$$

Where: H – business value,  
FCFE<sub>t</sub> – Free cash flow to equity in year t,  
N<sub>VK(z)i</sub> – equity costs at particular debt in year I,  
T – number of years in phase 1,  
g – pace of growth in phase 2.

One of the key parameters of DCF revenue method is a discount rate. The alternative costs of equity are the discount rate when using DCF equity valuation method.

It is possible to use the modular method to determine the costs of equity ( $r_e$ ), which is used in the discounting of cash flows FCFE – formula 2 (Vochozka and Rousek, 2011).

$$r_e = r_f + r_{pod} + r_{finstab} + r_{LA} \quad (2)$$

Where:  $r_e$  – costs of equity,  
 $r_f$  – risk-free return,  
 $r_{pod}$  – risk premium for business risk,  
 $r_{finstab}$  – risk premium for financial stability,  
 $r_{LA}$  – risk premium for the size of business.

The input values for the modular method to determine the alternative costs of equity are the data published by MTI and the Czech National Bank (CNB).

Subsequently, it is necessary to determine the growth constant g. The growth constant is applied in the second phase of the selected DCF model to determine the continuing value. The growth constant is a response to the question of the long-term

growth of the business. The historical data of the business, the data about the market and the sector of the business are respected upon its determination. In the long term, in order to maintain the 'going concern' principle, the lower limit of the rate of growth is the CNB's target inflation level, as it can be assumed that as the price of the XYZ company's inputs increases, XYZ must reflect the price increase in the production prices (Vimpari, Junnila, 2014; Speranda, 2012). The CNB and MTI data are the base for the determination of the growth constant as well.

#### 4 Determination of simulated returns

The comparison of the XYZ company's ROA and the ROA of the whole sector showed that the XYZ company's ROA is lower than the ROA of the whole sector. Therefore, the analysis of the efficiency of the use of the XYZ company's assets was carried out. A more detailed analysis of the assets showed that a certain return potential, in addition to its current use, is offered in the form of a more effective use of the training centre building situated in the premises of the XYZ company. From the perspective of a third independent rational person, it can be assumed that such a person would make an effort to use this asset in the most effective way by selling or renting it.

According to the definition of the "highest and best use", referring to the use of free land or real estate, which is physically possible, legal, financially feasible, and results in the highest value, in order to comply with this principle, the rate of return on the training centre building using the method of simulated returns at a fully effective use. According to the findings, the XYZ company uses this building for its purpose only partially during the year. By renting its premises for the remaining period of year, it is possible to achieve the maximum revenue potential of the building.

The price for renting this type of premises is usually determined based on the hourly rate for their use. In order to determine a potential return on this building using the method mentioned above, relevant information on prices for renting premises of a similar type will be sought. The information will be obtained from real estate advertising servers.

The data obtained will then be converted into the unit price for the rental from the offered premises. The calculation of median of the required prices will eliminate the extreme values on both sides of the scale.

As in the training centre building, there are a total of three classrooms and one conference room, which can also be used for the purposes of training, the floor space in all four rooms will be summed up and subsequently, the total amount of the hourly rent of all these premises will be calculated.

To determine the amount of the simulated return on these premises, the building occupancy considered will be 100 days by 8 hours a day. Subsequently, the estimated increased operating costs associated with the more effective use for the XYZ Company will be deducted. Based on this consideration, the amount of simulated return on this building for the XYZ Company will be determined.

To achieve the most accurate valuation of the whole XYZ Company using the method selected, its financial plan will be increased by a simulated return on this training centre building.

#### 5 Results

Based on the analysis of all XYZ company's assets, it was concluded that reported assets of the company are necessary for its operation. For the purposes of its valuation, it was necessary to take into consideration the return potential of the training centre building and the related increased operating costs. Since it has been found that the owner of the company was performing work for the company but there was no wage for these services, from the perspective of a third independent rational person, it is necessary to replace the person who performed this work with

another person who would receive a financial reward in the form of a wage for this work. Therefore, the newly created financial plan included the wage costs for the person performing this work. In order to value the XYZ company, the wage was determined using the method of simulated wage.

Based on the analysis of all the revenue possibilities of the training centre building (sale, long-term lease, short-term lease) and with regard to its location, equipment, and the principle of the “highest and best use”, it was decided to determine its return potential by means of short-term lease of the individual training rooms at the hourly rate. In the case of a short-term lease, higher administrative demands on the owner of the centre can be expected; however, those are often compensated by higher income. The return potential on the training centre was determined using the method of simulated returns.

In order to use the method of simulated returns on the training centre building, it was necessary to determine a unit price for renting premises of this type. The price was determined based on the prices of similar premises rentals found on real estate advertising servers. Table 1 shows an overview of the offers found including the hourly rentals, area, and conversion of the rental into a unit price.

Tab. 1: Hourly rentals found on advertising servers with calculated unit price

| Number of offer | Price per hour | Area (m <sup>2</sup> ) | Unit price (CZK/m <sup>2</sup> ) |
|-----------------|----------------|------------------------|----------------------------------|
| 1               | 300 CZK        | 38                     | 7.9                              |
| 2               | 380 CZK        | 110                    | 3.45                             |
| 3               | 325 CZK        | 55                     | 5.9                              |
| 4               | 945 CZK        | 92                     | 10.3                             |
| 5               | 430 CZK        | 65                     | 6.6                              |
| 6               | 160 CZK        | 43                     | 3.7                              |
| 7               | 360 CZK        | 39                     | 9.2                              |
| Median          |                |                        | 6.6                              |

Source: Authors

The determined median will be considered a usual rental from the premises in the training centre building owned by the XYZ company. The median was determined to 6.60 CZK/m<sup>2</sup>.

Furthermore, the total acreage of all training premises in the building were summed up. By calculating the product of the total acreage of the training premises and the usual unit price for hourly rental, it was possible to determine all premises hourly rental. The overview of all the premises and their area as well as the hourly rental is shown in Table 2.

Tab. 2: Overview of training premises in training centre building with the areas and determined hourly rental rates

| Premises        | Area (m <sup>2</sup> ) | Hourly rate |
|-----------------|------------------------|-------------|
| Classroom 1     | 37.1                   | 245 CZK     |
| Classroom 2     | 72.6                   | 479 CZK     |
| Classroom 3     | 54.4                   | 359 CZK     |
| Conference room | 96.6                   | 638 CZK     |
| In total        | 260.7                  | 1 721 CZK   |

Source: Authors

The collected annual rental from classrooms, with considered occupancy of 100 days  $\times$  8 h per year would be CZK 1,377,000 after rounding. To determine the final amount of the simulated returns on this training centre, it is necessary to deduct the estimated increased operating costs incurred by the XYZ company due to the more effective use. The estimated increased operating costs can be seen in Table 3.

Tab. 3: Estimated increased operating costs of training centre

| Type of costs                        | Amount      |
|--------------------------------------|-------------|
| Personnel costs                      | 500,000 CZK |
| Maintenance + reserve for investment | 300,000 CZK |
| Insurance                            | 30,000 CZK  |

|                         |             |
|-------------------------|-------------|
| Other operating costs   | 100,000 CZK |
| Overall operating costs | 930,000 CZK |

Source: Authors

After deducting the increased operating costs of the training centre from its annual return potential, the value of simulated returns is CZK 447,000. This value will be taken into account in drawing up the financial plan.

Furthermore, in order to preserve the perspective of a third independent rational person, the amount of simulated wage for a person employed to perform the work in the XYZ company was determined based on the data released by the Ministry of Labour and Social Affairs of the Czech Republic (MPSV CR) through the Average Earnings Information System (ISPV). Given the subject of business, the medians of gross wage were found for the position of Craftsmen, skilled workers on construction sites (except electricians), which best correspond to the nature of the work performed in the XYZ company and would thus be remunerated in a similar amount. Table 4 shows the medians of the wages according to the Ministry of Labour and Social Affairs of the Czech Republic (ISPV) for the reference period (2016-2019).

Tab. 4: Development of gross wage for the position of Craftsmen, skilled workers on construction sites (except electricians) based on data of Ministry of Labour and Social Affairs of Czech Republic

| Year | Gross wage – median |
|------|---------------------|
| 2016 | 19,392 CZK          |
| 2017 | 21,091 CZK          |
| 2018 | 23,687 CZK          |
| 2019 | 25,641 CZK          |

Source: ISPV, 2019

The wage must be further increased by further costs of the employee, that is for social and health insurance, which is given in proportion to the gross wage of the employee. In sum, these two payments account for 34% of monthly gross wage (social insurance – 25%, health insurance – 9%).

Given that the subsequently drawn financial plan of the company is based on the data of a concrete sample company, the input data were adapted for anonymization purposes and the aforementioned simulated values (simulated return on rental, simulated wage costs) were integrated into the newly created financial plan.

Based on the data, the financial plan for the XYZ company was drawn up. The financial plan of a XYZ company is shown in Table 5.

Tab. 5: Business financial plan (in thousands CZK)

| Year | Operating economic result | Financial result | Wage – employee | Return on training centre | Adjusted operating economic result before tax | Tax | Adjusted economic result after taxation | Depreciation | Investments | Loans payments | Drawdown of loans | FCFE |
|------|---------------------------|------------------|-----------------|---------------------------|---|-----|---|--------------|-------------|----------------|-------------------|------|
| 2016 | 838                       | -91              | 196             | 182                       | 733   | 139 | 593                                     | 241          | 120         | 0              | 0                 | 714  |
| 2017 | 750                       | -122             | 339             | 447                       | 736   | 140 | 596                                     | 482          | 241         | 0              | 0                 | 837  |
| 2018 | 772                       | -126             | 381             | 456                       | 722   | 137 | 585                                     | 496          | 248         | 0              | 0                 | 833  |
| 2019 | 795                       | -129             | 412             | 465                       | 719   | 137 | 582                                     | 511          | 255         | 0              | 0                 | 838  |
| 2020 | 819                       | -133             | 421             | 474                       | 740   | 141 | 599                                     | 526          | 263         | 0              | 0                 | 862  |
| 2021 | 844                       | -137             | 429             | 484                       | 762   | 145 | 617                                     | 542          | 271         | 0              | 0                 | 888  |

Source: Authors

For the calculation of alternative costs of equity for the XYZ company, build-up model was used based on the data released

by the Ministry of Trade and Industry. Given the subject of the XYZ company business, there were used specific data (risk margin for business risk –  $r_{pod}$ , risk margin for financial stability –  $r_{finstab}$ , risk margin for the size of enterprise –  $r_{LA}$ ) for the classification of economic activities CZ NACE 43 – Specialized construction activities, which also includes the business activity 43220 – Plumbing, water, waste, gas, heat and air-conditioning installation in the first half of 2016 (MTI, 2017). Furthermore, for the calculation of alternative costs of equity, it is necessary to know the value of risk-free return ( $r_f$ ). It is based on a 10-year bond yield, which, according to CNB, was 0.37% at the end of July 2016 (CNB, 2019). The alternative costs of equity can be calculated using the following formula 2.

$$r_e = 0.37\% + 6.90\% + 2.30\% + 1.94\% = 11.51\% \quad (3)$$

The same value of the discount rate calculated using the formula above will be used for all future periods. For the valuation of the XYZ company, the discount rate of 11.5% will be used.

The last step preceding the valuation of business using the selected method is to determine the value of the growth constant  $g$ . According to the Macroeconomic Forecast of the Ministry of Finance of the Czech Republic from July 2016, the estimated GDP growth for the years 2016-2019 was 2.3-2.6% (Ministry of Finance of the Czech Republic, 2016). Similar GDP growth was expected also from the side of CNB, whose estimated growth for 2017 was 2.3% with subsequent pick-up to 3% (CNB, 2016).

Strategic analysis of the XYZ company revealed that the company did not show a significant growth potential. In the long run, its objective was a stagnation or a slight increase based on knowledge and strengthening of the competitiveness. For this reason, the estimated growth constant is slightly above the CNB targeted inflation rate applied since January 2010, which is 3%. At this stage, there have been obtained all documents necessary for the valuation of the XYZ company using the two-stage DCF model from the perspective of a third independent rational person. The valuation of the company was carried out according to the formula given below.

$$H = \frac{714,000}{(1 + 11.5\%)^1} + \frac{837,000}{(1 + 11.51\%)^2} + \frac{833,000}{(1 + 11.51\%)^3} + \frac{838,000}{(1 + 11.51\%)^4} + \frac{862,000}{(1 + 11.51\%)^5} + \frac{888,000}{(1 + 11.51\%)^6} + \frac{1}{(1 + 11.51\%)^6} \quad (4)$$

$$H = 8,382,000 \text{ CZK}$$

Using the two-stage DCF model, the value of the XYZ company was determined to CZK 2,955,000 in the first stage. In the second stage, the value was determined to CZK 5,427,000. By summing up the first and the second stage of the two-stage DCF model, the value of the business was determined to CZK 8,382,000.

## 6 Conclusion

The objective of the paper was to determine the objectivized value of a business from the perspective of a third rational person on the example of a specific company.

From this perspective, financial and strategic analysis of the XYZ company were carried out first. On their basis, a financial plan was drawn up. Before the valuation of the business was carried out, the operating result in the plan was increased by the return on the training centre building rental and by the performance component of the wage for the person employed to perform the work in the XYZ company.

The resulting value of the company calculated using the two-stage DCF model was determined to CZK 8,382,000. The objective of the paper was thus achieved.

In the paper, the term “objectivized value” was defined together with the process of its determination. In this context, it is necessary to validate the achieved economic results and, if necessary, to correct them from the perspective of a third independent person. In the example of valuation of a particular company, there were mentioned two items that have to be corrected for the valuation purposes. Specifically, it was an increase in the simulated profit from inefficient use of the company assets, and other modifications in terms of wages.

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**Primary Paper Section: A**

**Secondary Paper Section: AH**

## THE SPECIFICS OF VALUATING A BUSINESS WITH A LIMITED LIFESPAN

<sup>a</sup>MAREK VOCHOZKA, <sup>b</sup>ZUZANA ROWLAND, <sup>c</sup>PETR ŠULEŘ

*Institute of Technology and Business, School of Expertness and Valuation, Okružní 517/10, 37001 České Budějovice, Czech Republic*  
 email: <sup>a</sup>vochozka@mail.vstecb.cz, <sup>b</sup>rowland@mail.vstecb.cz, <sup>c</sup>petr.suler@cez.cz

**Abstract:** For business valuation purposes, three distinct approaches, earnings-based valuation, assets-based valuation, and market value-based valuation can be used. In the case of the earnings-based valuation, which is the most widespread in the Czech Republic, the valued businesses are generally upheld to the principle of going concern company, which implies the endless sustainability of the company. The present article deals with the situation of non-compliance with the principle of the going concern company, where the valuation is still profitable but with a limited lifespan, which is determined by the external conditions already known at the time of valuation. This article then deals with the valuation of a selected limited-lifespan business. In conclusion, the value of the selected business should be established, with an emphasis on the limited lifetime of the business.

**Keywords:** business valuation, earnings based valuation methods, businesses with limited lifespan, going concern principle.

### 1 Introduction

Business valuation is one of the most complex cases of valuation, as it deals with valuation of tangible and intangible assets, as well as valuation of assets not recorded in the accounting, which can be know-how, goodwill, customer base, etc. The contemporary literature of the business valuation distinguishes methods of valuation in three groups, namely earnings, assets and market value methods (Hrdý and Ducháčková, 2010). Business valuation experts generally prefer one of the earnings valuation methods in their practice, but it is desirable to be fully aware of all the pitfalls and inaccuracies of its use.

The earnings valuation methods perceive the valued entity as a functioning system (a set of tangible and intangible components) of profits with an endless lifespan. The element of infinity can be expressed in many ways, such as perpetuity until infinity, Gordon's growth model, and others.

On the contrary, assets methods assume the sale of individual components of the company's assets, and therefore the disappearance of its business activity.

The third group of methods is the market analogy whereby the price of the company is searched for through transactions with comparable businesses on the market. However, the evaluators are not usually aware of what factors were considered in the pricing process and under what circumstances the whole transaction took place (timing, extraordinary influences, etc.).

However, a problem may arise when the evaluator's task is to set the price of a business that does not meet the requirement of going concern and can not simulate the sale of its individual assets too reliably. In particular, they are businesses with a limited life expectancy, ie businesses where there is a presumption of future operation for a certain period of time, and then they are most likely to become extinct or will be forced to rethink significantly in their business activity, basically building a new business altogether.

The aim of the paper is to set out the proposed valuation procedure for a business with a limited lifespan on the example of a particular business.

### 2 Literary research

Business valuation is becoming more and more prevalent these days. Assets methods are based on the assumption that the value of a business is equal to the sum of the market values of its components. Under this method, the business' assets and

liabilities are adjusted from their accounting value to their market value. The adjusted net asset method is usually best suited to the valuation of a capital-intensive business or holding company, and when losses are continuously generated by a business (Saari, 2018). This means that investment in real estate should be part of every investment strategy (Bartková and Stefanová, 2016). This method is used to measure a business on the basis of the actual value of its assets and liabilities and assumes the termination of its business activities.

The earnings approach of business valuation is based on the underlying premise that each business has a certain potential to generate a certain income for its owners for the future. The earnings approach is one of the most important investment assessment methods. This method is one of the most popular valuation approaches and is usually used in valuating commercial real estate and valuating businesses. Basic mathematics is similar to the methods used for financial valuation, securities analysis or securities creation (Čibera and Krabec, 2015).

When using the earnings method, when buying assets with potential and earning expectations, the investor considers the amount of earnings and other factors that determine the revenue generating risks for owners under current market conditions and under the conditions foreseen for the future (Zhang and Chang, 2007). There are two earnings-based approaches that are primarily used in the valuation of a business: the discounted cash flow method and the capitalizing cash flow method. These methods are used to measure a business based on the amount of revenue the company expects in the future (Saari, 2018). The market value approach is a business valuation method that can be used to calculate the value of an asset or as part of a valuation process. Regardless of which property is valued, the market value approach explores the recent sale of similar assets and adjusts for differences in size, quantity or quality (Svobodová, 2015).

The Market approach is a valuation method where the evaluator determines the fair market value of the target company by examining actual transactions of orders or comparable companies. Both in mergers and acquisitions, as well as in the stock market, we are considering obtaining different value measures that apply to the target company (Krčh and Kubica, 2014).

Professional valuation standards require all these approaches to be taken into account in the valuation, even if the available information does not allow them to be trusted. Often, multiple approaches and techniques can be used. The results of multiple techniques often do not overlap, and the analyst's very important task is to reconcile different valuation results or decide which outcome or results should be discarded (Blake, 2016).

One of the basic assumptions that a valued entity should meet when applying earnings methods is to meet the going concern principle. Going concern is an accounting term for a company that has the resources needed to continue to operate for an indefinite period until it provides evidence to the contrary. This term also refers to the ability of a company to earn enough money to remain on the surface or to avoid bankruptcy (Citron et al., 2008).

Going concern is the fundamental principle of financial reporting. Its adoption determines the method of valuation and presentation of the assets and liabilities of the entity (Kaczmarczyk, 2018). Going Concern is the basic principle for preparing financial statements resulting from current legislation. The auditor, like the evaluator, must also verify that the financial statements have been prepared in accordance with this principle. If there is a fact that leads to the assumption that the continuation of the uninterrupted activities is not met, the entity shall present that information in the financial statements. The disclosure or

non-disclosure of such information has an impact on the auditor's opinion on the financial statements. International auditing standards define the auditor's capacity to respond in case of impending duration (Kříšková and Užík, 2016).

Modern approaches can also be used to value business. One is the principle of Artificial Neural Networks (in this paper used to predict the financial plan of the business). Artificial neural networks attempt to copy processes in the nervous system and the human brain through computer systems (Stehel et al., 2016). The use of artificial neural networks is very broad and is currently used predominantly to solve potential problems in the future (Pao, 2008). Artificial neural networks can be used mainly for function approximation, classification, and prediction of time series (Rowland and Vrbka, 2016). Time series analysis is an area in which neural networks can be widely used. Time series are defined as sequences of spatially and de facto comparable observations that are time-based (Sheikhan and Mohammadi, 2013). In terms of neural networks and time series, neural networks attempt to display time series behavior and predict individual data points in the best possible way. However, it is necessary to show the neural networks how to work properly with given time series (Vochozka and Machová, 2018).

The valuation of a business is usually based on the data of the financial statements (balance sheet, profit and loss account) which, given the principle of a fair and honest view give sufficient information about the business. The majority of the valuation methods are based on the financial plan created by the evaluator, who is upheld to the prospect of reality and the rationality of its fulfillment. In the creation of a financial plan, the items of the financial statements from the previous periods should be verified (Valášková, Klieštík and Kováčová, 2018).

### 3 Data and methods

The valued business does not fulfill the presumption of the going concern principle and therefore it is not appropriate for its valuation to use only the earnings valuation methods, as its estimated lifespan is limited by the validity of the existing lease agreement. Similarly, it is not appropriate to apply assets-based methods, which essentially presuppose the termination of the business on the valuation date. The market value-based approach can not be used at all because of the unavailability of data.

Valuation of the business in question, that is to say, a limited lifespan business, will be done by a combination of an earnings and assets valuation methods that appropriately reflects the current specific situation in which the business believes that during the following periods, until July 31, 2019 – that is to say, until the date of the expected closure of the business activity, can generate revenues sufficient enough to cover all liabilities and, above those, make a profit. Expectation of coverage of existing liabilities from future revenues largely predetermines the appropriate valuation method – in this case, the combination of the earnings method will be based on free cash flows and the assets method on the principle of market prices. The earnings method will be applied to determine the predicted value of the expected cash generated for the period from July 1, 2017 until July 31, 2019.

One of the main inputs of the earnings valuation (Discounted Cash Flow Methods) is the financial plan for the future period. The financial plan for the company will be based on the 2012-2016 accounting data, based on which the accounting data for the period 2017-2019 will be predicted using neural networks.

The determination of the discount rate will be made using the modular method based on data specified for Czech conditions and published by the Ministry of Industry and Trade of the Czech Republic and the Czech National Bank to the valuation date.

The assets method will be used additionally to determine the amount of funds received from cashing out the assets of the valued entity after the termination of its business. The resulting

value of an enterprise will then be determined as the sum of the present value of the estimated free cash flows and proceeds from the sale of the assets, taking into account the total amount of liabilities.

### 3.1 Valuation example

Below will be an example of a valuation of the selected limited lifespan business. The subject of the valuation is a business establishment – XYZ, s.r.o. Company registration number 12345678 (hereinafter referred to as the "Valuated business"), which deals with the operation of a cafeteria (the trade name "Elektra Cafeteria") in the industrial area in Prague 8. The subject business of the valued establishment is the operation of the public catering cafeteria, the delivery of ordered meals and the purchase and sale of goods.

### 3.2 Business description

XYZ, s.r.o. was registered in the business register on November 1, 1995, from the beginning it focused on catering. To the valuation day, the valued business operated a cafeteria – public catering in the industrial area in Prague 8. The operating premises are used on the basis of a lease agreement with the site owner. In addition to the sale of own meals and selected goods (mainly beverages) in the cafeteria itself, the company provides free delivery of its own meals in selected parts of Prague on the basis of an order. As a result of staff misconduct, according to representatives of the valued business, there has been a diversion of a portion of the monetary funds in the past outside of the valued business, resulting in an increase in liabilities for suppliers of input products and the landlord. Such a shift is also apparent from available accounting data. At present, the valued business is in the remedial phase – after the revealed diversion, the valued establishment tries to fully cover all its liabilities. As of the valuation date, the outstanding liability due to non-standard business activity remained at CZK 363,597.

The delivery of lunches was carried out using two Škoda Felicie Pick-up vehicles. Most of the cafeterias facilities in the eating area were owned by the landlord of the rented premises. Part of the kitchen equipment was, according to the representatives of the Valuated business, their personal property and will not be part of the valuation.

The activity of the Valuated business is firmly linked to the place of business of the cafeteria, where it is rented. Cafeteria clients are, for the most part, employees of companies based in the industrial area and the surrounding area. The possibilities of moving the cafeteria to other areas are thus considerably reduced, as the target group of clients (eaters) will be changed, as well as the suppression of most of the intangible components of business, reputation, goodwill, etc., when moving to a different location (even within one city).

The organizational structure of the Valuated business is fairly simple. The full-time employed staff based on an employment contract is made up of two managers and three other employees. One manager runs and operates the business as a whole, the other then focuses on the operation of the kitchen where he manages the three employees. In the case of a short-term need, the staff team is supplemented by other workers on the basis of a short-term employment agreement and limited work agreements.

### 3.3 Suppliers and customers

The suppliers of meat and vegetables can be considered key suppliers. In general, there are enough suppliers of raw materials for gastronomy on the market and therefore their negotiating power is not the most significant. Input raw materials (especially meat and vegetables) are a general product, with little interdependence only with a selected supplier, in case of non-compliance, it is possible to change the supplier without significant complications and an impact on the final product. The Valuated business has no long-term contractual contracts

obligations with its suppliers, deliveries are based on mutual trust and long-term cooperation.

Another situation occurs with the lessee of the premises of the Valuated business. As mentioned above, the activity of the Valuated business is strongly related to the place of operation – in the production site of the former Elektra company. The negotiating power of the landlord is therefore essential to the entire Valuated business. In the spring of 2017, an unnamed developer became the new owner of the production site of the former Elektra. In the opinion of the representatives of the Valuated business, it is a question of a short time horizon before the new owner's demolition work on the existing building begins and the subsequent development occurs. It is to be expected that the commencement of building modifications in the complex will cause the need to vacate the existing rented premises, which would de facto terminate the business or the entire existing activities of the Valuated business. The existing lease agreement of the Valuated business was signed for a fixed time period until July 31, 2019. The subsequent renewal of the lease is highly uncertain, almost unlikely. The negotiating power of the landlord can be regarded as very important.

Clients of the Valuated business are mostly employees and workers of companies located in the industrial area. It is therefore an individual clientel which is not contractually bound to use Elektra's cafeteria services. The Valuated business has no ordering system for meals (eg 24 hours in advance). Clients on-site decide to choose the desired food and the actual purchase. When delivering ready-made meals to contractual facilities (businesses, offices, ...), advance ordering of meals is a necessity. Payment for meals in the cafeteria takes place on the spot when the food is served, and one-off billing for a longer period of time (so-called "invoice") is also possible. It can be stated that most of the eaters visit the Elektra cafeteria regularly.

### 3.4 Market environment

In the immediate vicinity of Elektra's cafeteria there are several potential competitors providing public catering services.

The Fraji cantina is located about 250 m from the Elektra cafeteria, offering a comparable range of dishes (5 kinds of meals) in a similar price range.

About 480 meters from the Elektra cafeteria there is another public catering facility, Café Bar "Tri lípy", this café bar offers a selection of dishes (3 types of meals) and standard restaurant service.

Restaurant U Šebestů is located about 500 m east of Elektra's cafeteria, this is a full-service restaurant.

The Evaluated business is not in any direct competitive struggle with other businesses, especially thanks to a convenient location in the very heart of the industrial area, which employs several hundred (up to thousands) of employees and therefore potential customers.

Strong competition in the lunch delivery market in Prague means that lunch delivery is a supplementary affair based on traditional personal relationships and is not the result of any active business or marketing strategy for the Valuated business.

### 3.5 Description of business assets

On the basis of the presented list of fixed assets, it is possible to define items that were actively used to the valuation date:

- SERD Restaurant system,
- Škoda Pick UP,
- Škoda Felicia Van,
- Food packaging machine S 225,
- Nordline fridge.

By analyzing small assets, most of the small property was morally and technically obsolete as of valuation date, but still used for business activity.

Inventory of goods is virtually unmanaged and all delivered goods are immediately consumed, the inventory level is therefore constant and as minimal as possible.

The Valuated business collects most of its revenue from customers in cash directly in the cafeteria. When food is delivered, there may be a delay between food delivery and payment, these payments are usually made once a month on the basis of an invoice between the Valuated business and the customer. Payables of the Valuated business stem from standard business activity, as of the date of valuation they were received and unpaid invoices, invoices for external accounting, repairs and maintenance of kitchen appliances and payments for an internet connection. Other payables are to employee wages, social and health insurance payables, tax payables, etc. These items can be classified as standard payables directly related to the core business. Much more payables are recorded in respect to the Valuated business' shareholders who, from their own financial resources, covered the losses incurred in previous years. Payables to banks or other lending institutions were not recorded as of the valuation date.

## 4 Results

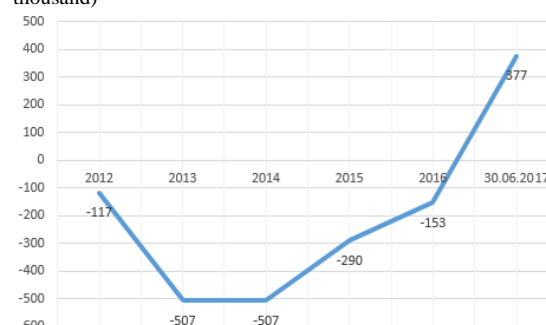
### 4.1 Analysis of the situation of the Valuated business

On a long-term basis, unemployment in the capital city of Prague is very low, almost to the level or even below the level of the natural rate of unemployment. Potential increase in the unemployment rate may impact the Valuated business in two ways. The first is the actual loss of potential clients in the cafeteria due to the dismissal of employees in nearby businesses, and then the drop in purchasing power of employees who would not receive lose their income, but the person close to them would lose it (especially a person living in a common household). According to the MoLSA forecast, the outlook for the unemployment rate for the years 2018 and 2019 is stable and will not directly or indirectly significantly affect the economic development of the Valuated enterprise.

The bottom line of the yearly growth of the Valuated business' earnings is determined by the expected inflation rate, if the price of the consumer is not adjusted to at least inflation, there would be a drop in the actual value of sales, which is difficult to imagine for a successful businessman. Long-term growth, on the other hand, is limited by the growth of the market as a whole. Besides taking into account the impact of the introduction of electronic revenue records on the growth of food sales in the first two quarters of 2017, the macroeconomic analysis makes it possible to assess the future growth of the Valuated business between 2% and 5%.

The figure below shows the development of the profit before tax for the accounting period of the Valuated business.

Figure 1: Profit or loss for the accounting period (CZK thousand)



Source: Authors

The figure above shows a jumpstart increase in the operating income in the first half of 2017, with a further doubling of the achieved value for the whole of 2017. A sharp increase in the operating income can be attributed to the consistent stabilization of the personnel base and to the operative efficiency of the whole company. The results achieved in this way can also be considered in future periods. Losses from previous periods were covered by shareholders' equity, total liabilities to shareholders at the date of valuation amounted to CZK 1,654,853.66. It can, however, be expected that over the next several periods the company will be able to generate a profit covering all existing liabilities and a reasonable profit. This is the main reason for staying in business despite negative performance in the future.

As of the valuation date, the Valuated business had no liabilities to banks or other lending entities.

The marketing and business activities of the Valuated business are greatly minimized; the number of clients for lunch delivery is rather historical, based on personal relationships with clients; the acquisition of new clients is rather sporadic given the total amount of meals sold per day.

The promotion of the Valuated business takes place on two levels. In the real world, there are several advertising banners with the inscription "Jídelna Elektra" located on the premises of the cafeteria. When considering the composition of the target audience, this type of promotion appears to be the most appropriate.

In the valuation of the Valuated business, a determinant element of its future development is the lease agreement for the cafeteria in the production site of the former Elektra company in Prague 8. The above described development of the circumstances regarding the change of ownership rights to the rented premises and future expectations of representatives of the Valuated business. It is precisely future expectations that play an important role in determining the value of the subject of valuation. In the case of the Valuated business, its existence is determined by maintaining the existing rental space. The existing lease contract or, rather, amendment No. 6 to the lease contract between XYZ, s.r.o. as tenant and Elektra a.s. as landlord, dated October 2, 2014, is for a fixed term – with validity up until July 31, 2019. Another extension of the lease as mentioned above is not foreseen. For these reasons, it is possible to consider the future profitability potential and the expected life of an enterprise for valuation only until the expiry of the lease.

#### 4.2 Valuation using the earnings method

100% of the business share of the Valuated business will be valued by the selected approach from the earnings methods group, namely the discounted cash flow method, which, as noted above, best describes the specific position of the valuated business. For the valuation purposes, a financial plan will be created on the basis of market data and expectations of current shareholders, from which they will be subsequently quantified and discounted to the present value of the expected free cash flow from the business to the shareholders (equity), by adding them together and adding the expected sale values of the movable assets, the value of the Valuated business as of the valuation date will be calculated.

All assets of the business are valued as operationally necessary and therefore vital for the economic activity of the enterprise.

The financial plan expresses the expected future development of the accounting value of the Valuated business until the termination of its activities, ie until 31 July 2019, it will be therefore created for the second half of 2017, 2018 and 2019. The financial plan processed using statistical methods is the content of Attachment 4 of this document.

The clearance of the rented premises is only assumed after the termination of the lease, ie during August 2019.

For reasons of caution, the implementation of only minimal marketing and business activities by the Valuated business, as well as a limited range of potential clients, the future yearly growth in accounting values is assumed at 2%.

The FCFE calculation is based on the adjusted operating income and is shown in the table below.

Tab. 1: FCFE Calculation

| Mathematical operation | Item  |
|------------------------|---|
|                        | Adjusted operating profit or loss before tax                                  |
| –                      | Interest expense  |
| =                      | Adjusted operating income before tax  |
| –                      | Adjusted tax on adjusted operating income                                     |
| =                      | Adjusted operating profit after tax (ie adjusted operating income for owners) |
| +                      | Depreciation  |
| +                      | Other costs that are not expenditures in a given period                       |
| –                      | Investment (in necessary operating capital, fixed assets)                     |
| –                      | Payments of interest-bearing foreign capital                                  |
| +                      | Acceptance of new interest-bearing foreign capital                            |
| =                      | Free Cash Flow to Equity (FCFE)   |

Source: Authors

Adjusted Operating Income (AOI) is one of the basic variables in DCF business valuation. To the operating income of a business, one-off expenditure unrelated to operating assets, financial investment income and interest income arising from operating assets are added at this stage. It is therefore necessary to set the adjusted operating income in each year of the first phase, and in the first year of the second phase, as seen in the attached financial plan. The AOI calculation procedure is contained in the table below.

Tab. 2: AOI Calculation

| Mathematical operation | Item   |
|------------------------|--|
|                        | Operating income   |
| –                      | Operating revenues which are one-off and unrelated to operating assets                               |
| +                      | Operating costs which are one-off and unrelated to operating assets                                  |
| +                      | Revenue from financial investments and interest income, if they come from necessary operating assets |
| –                      | Financial costs related to the necessary operation assets  |
| =                      | AOI before tax   |

Source: Authors

In the case of interest expense, this is the sum of all interest expense attributable to the given period. The Valuated business does not use interest-bearing foreign funds, loans from shareholders are not interest-bearing. Thus, the interest rates will be zero in the calculation.

This is a case of corporate tax and the table below shows the development of this tax in the Czech Republic in the years preceding the valuation. As can be seen from the table, the corporate tax rate did not change in the previous years and will be considered at 19% for all future periods.

Tab. 3: Development of the corporate tax rate in the Czech Republic

|                    | 2012 | 2013 | 2014 | 2015 | 2016 |
|--------------------|------|------|------|------|------|
| Corporate tax rate | 19%  | 19%  | 19%  | 19%  | 19%  |

Source: Edited according to the Tax advisors portal

In the past, the Valuated business has had negative operating income, which should be positively reflected in the defined tax

obligation in the future (by applying the loss as deductible items from the tax base). For the purposes of valuation, zero tax obligation will be considered in the following periods.

This is the sum of tax depreciation of tangible and intangible assets in the respective year. The amount of depreciation was taken from the financial plan.

For the calculation of FCFE, annually renewed investments in the amount of annual tax depreciation – renewal investments are considered. In the absence of any investment, the technical condition of assets would deteriorate, become more defective, thereby losing the competitiveness of such a service. Maintenance and redevelopment investments in the amount of depreciation should be done despite the limited life of the business, in order to maintain the existing quality standard and meet legislative requirements.

Tab. 3: Plan of investments and depreciation (in CZK thousand)

|              | 2017 | 2018 | 2019 |
|--------------|------|------|------|
| Investments  | 15.0 | 30.6 | 18.2 |
| Depreciation | 15.0 | 30.6 | 18.2 |

Source: Authors

The Valuated business does not use interest-bearing foreign capital (bank loans and other bailouts). Payables to shareholders are not interest-bearing. The repayment schedule was submitted to the assessor between the Valuated business and the lessor, dated 10 April 2017, dealing with the repayment of the outstanding rent. In total, the rental debt was CZK 383,597 as of the date of issue under this document. The repayments were arranged in the amount of CZK 10,000 per month between May and December 2017, then from January 1, 2018, a monthly installment of CZK 20,000 to the full settlement of the outstanding amount was agreed upon.

Tab. 5: Repayment of foreign capital

|                               | 2017      | 2018       | 2019      |
|-------------------------------|-----------|------------|-----------|
| Repayments of foreign capital | 60,000 Kč | 240,000 Kč | 63,597 Kč |

Source: Authors

As noted above, the first valuation step is the quantification of the adjusted operating income and then the free cash flow to equity (FCFE).

Tab. 6: Calculation of FCFE (in CZK thousand)

|                               | 2017  | 2018  | 2019* |
|-------------------------------|-------|-------|-------|
| Operating income              | 378.0 | 771.1 | 458.8 |
| Financial operational result  | -1.0  | -2.0  | -1.2  |
| AOI before tax                | 377.0 | 769.1 | 457.6 |
| Tax rate                      | 71.6  | 146.1 | 86.9  |
| AOI after tax                 | 378.0 | 771.1 | 458.8 |
| Depreciation                  | 15.0  | 30.6  | 18.2  |
| Investments                   | 15.0  | 30.6  | 18.2  |
| Repayments of foreign capital | 60.0  | 240.0 | 63.5  |
| Acceptance of foreign capital | 0.0   | 0.0   | 0.0   |
| FCFE                          | 318.0 | 531.1 | 395.3 |

\* Period from 1 January to 31 July

Source: Authors

The cost of equity ( $re$ ) will be determined for the purposes of valuation by the modular method, for which the data published by the Ministry of Industry and Trade of the Czech Republic (2017, 2018) will be used as input data. The calculation is based on the identification of possible risks and the subsequent sum of several partial risk margins and the risk-free rate of long-term government bond yields.

The ten-year government bond yield, based on the Maastricht criterion, was 0.77% (Government bond yields, 2018) as of the date of the valuation according to data from the Czech National Bank.

The risk premium for business risk, for financial stability and for size was taken from data published by the Ministry of Industry and Trade (MPO).

$$re = 0.77\% + 3.0\% \cdot 2.38\% + 1.22\% \quad (1)$$

$$re = 7.37\%$$

The table below shows the calculation of the current value / present value of the future cash flows of Valuated business.

Tab. 7: Determining the value of the Valuated business (in CZK thousand)

|                 | 2017  | 2018  | 2019  |
|-----------------|-------|-------|-------|
| FCFE            | 318.0 | 531.1 | 395.3 |
| Discount rate % | 7.37  | 7.37  | 7.37  |
| Business value  |       |       | 1,076 |

Source: Authors

The earnings value – the present value of the expected future earnings of the Valuated business as of the valuation date is CZK 1,076,000.

#### 4.3 Valuation of selected items by the assets method

As mentioned above, the Valuated business is existentially linked to the lease agreement with the premises in which it operates the Elektra cafeteria. The current lease agreement is valid until July 31, 2019, and no further extension in respect of changes in the ownership of the rented premises is assumed. Upon the termination of the business, the revenue from the sale of its assets is expected to exceed the amount of the stated earnings value.

Small furniture (kitchen equipment, other furnishings, refrigerator, etc.) are morally and technically obsolete as of the date of valuation, and their use is only possible in the existing business or establishments with a similar focus with lower requirements on qualitative criteria for individual items. It is assumed that the proceeds from their partial sale will cover the costs of disposal of other items and thus the income for the shareholders of the Valuated business will be negligible, down to zero.

As of the day of valuation, the Valuated business held cash at the register and in bank accounts at the total amount of CZK 568,608.34.

The cashable assets were valued by the direct comparison method and their value was stated at CZK 61,825. However, as this is the expected future income from the sale of movable assets upon the termination of the business, it is necessary to convert this income to the present value by the formula:

$$61,825 \text{ CZK} / (1 + 7.37\%)^2 = \text{CZK } 53,628.82 \quad (2)$$

The current value of movable assets for valuation purposes will be considered at CZK 53,628.

According to the representatives of the Valuated business, the state of inventory is stable on a long-term basis and ranges at +/- CZK 20,000. The company restocks inventory daily for immediate consumption. Inventory contains only items such as the remaining amount of beverages in barrels, the remaining amount of flour, oil, etc. Inventory of this type has only limited tradability in the food market, and at the planned closure of the business, a minimum residual quantity of inventory can be expected. Therefore, inventory will enter the valuation at zero value.

Receivables and payables of the Valuated business will be measured at face value. A summary of the receivables was presented to the assessor in the form of an overview of outstanding invoices issued. From this list, three overdue receivables of 2 years and over, for which recovery of the outstanding amount is highly unlikely, and are derecognised, these are receivables from ABC Consulting s.r.o. in the amount of CZK 10,560, and Grenox a.s. in the amount of CZK 5,050. The amount of receivables after such adjustment as of the valuation date is CZK 178,710.

Payables from business activity of the Valuated business according to the list of unpaid invoices received on the valuation date amounted to CZK 17,101.61.

Another obligation is the payment of the outstanding rent, which, however, due to the repayment schedule submitted, has already been taken into account in determining the yield value and can not therefore be included in this step. The payables for due rent as of the date of valuation amounted to CZK 363,597.

Other payables to employees, state, social security, etc. amounted to CZK 97,577.46.

Liabilities to shareholders that financially covered the loss of past years as of the date of valuation are CZK 1,654,853.66.

The valuation of the Valuated business will include the difference between receivables and payables, determined from: 178,710 CZK – (17,101.61 + 97,577.46 + 1,654,853.66) CZK = –1,590,822.73 CZK

#### 4.4 Own valuation

The own valuation will be calculated as the sum of the business' return value, the expected proceeds from the sale of the assets of the business, taking into account the collection of receivables and the settlement of all payables known to the evaluator.

Tab. 8: Own valuation of the Valuated business

| Item  | Amount          |
|---|-----------------|
| Yield value                                 | 1,076,000 CZK   |
| Proceeds from the sale of mov. property     | 53,628 CZK      |
| Cash  | 568,608 CZK     |
| Inventory                                   | 0 CZK           |
| Difference between receivables and payables | – 1,590,822 CZK |
| Total                                       | 107,414 CZK     |
| Total after roundup                         | 107,000 CZK     |

Source: Authors

#### 5 Conclusion

The present contribution shows the possibility of valuation of a business with a limited lifespan if it does not meet the valuation conditions using earnings, assets or market value methods. The aim of the paper was fulfilled, the contribution outlined the valuation procedure of the company with a limited lifespan, using the combination of earnings and assets methods. The combination of these two methods, according to the authors, is not widely used by the Czech expert community, although it best describes the situation in which the Valuated business was as of the valuation date.

On the example of a particular business, a valuation of the business with a limited lifetime was calculated using a combination of earnings and assets valuation methods. The further life of the business is fully dependent to the existence of the right to use the existing premises in the production site of the former Elektra company, therefore the valuation considered the limited lifespan of the business, termination of operation and subsequent liquidation of the assets, the valuation also reflected the expected proceeds from the sale of movable equipment. The value of the business was therefore set at CZK 107,000 as the

sum of the yield value – determined from the present value of future expected earnings over the projected lifespan and the assets value acquired by the projected sale of the movable assets of the business after its activity has been discontinued, taking into account the nominal amount of the liabilities.

The Valuated business was thus in a situation where it is obvious that it will operate for a certain period of time and will then cease to exist, or its relocation will mean essentially the creation of a new business, in a different industry, for new customers, etc. Analogically, it is possible to approach the valuation of the business with a clearly defined lifetime, where it is possible to create a financial plan for a business for its entire lifetime, as well as assume the situation on the market for movable and immovable assets to determine the expected proceeds from the sale of the property.

Mining businesses and businesses only focusing on one specific trend or deviation can appear in the same situation.

The difference between the Valuated business and these businesses lies in the time period where the lifetime of the Valuated business is strictly determined by a concluding lease agreement. This article could thus be followed by a focus on businesses with a less clearly defined lifetime in the future, although this lifetime is not unlimited or by a study of businesses that show high costs of liquidation after the end of their lifespan.

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**Primary Paper Section: A**

**Secondary Paper Section: AH**

## BIOECONOMICS DEVELOPMENT IN THE REGIONS: LITHUANIAN CLUSTERING ANALYSIS

<sup>a</sup>WALDEMAR GAJDA, <sup>b</sup>MANTAS SVAZAS, <sup>c</sup>VALENTINAS NAVICKAS

<sup>a</sup>*Warsaw Management School - Graduate and Postgraduate, Siedmiogrodzka str. 3A, 010083544, Warsaw, Poland*

<sup>b</sup>*School of Economics and Business, Kaunas University of Technology, Gedimino str. 50, 44239, Kaunas, Lithuania*

<sup>c</sup>*School of Economics and Business, Kaunas University of Technology, Gedimino str. 50, 44239, Kaunas, Lithuania*

email: <sup>a</sup>waldgaj@vp.pl <sup>b</sup>mantas.svazas@ktu.edu,

<sup>c</sup>valentinas.navickas@ktu.lt,

**Abstract:** The development of renewable energy has a significant impact on the structure of the economy through the redistribution of capital resources and jobs. An essential part of renewable energy is biomass, based on natural resources. Biomass energy is an integral part of the bioeconomy. Bioeconomy involves the production of added value from natural resources, emphasize the use of organic waste. The authors aim to provide evidence of the importance of biomass clusters for the development of the bioeconomy by studying the economic and social changes in individual regions. Research has shown that the use of biomass has significantly improved the social and environmental situation of the regions, thus multiplying the positive economic effects. Conversely, regions that remain dependent on fossil fuels, which are imported in many cases, are halt economic development and facing significant economic and social problems.

**Keywords:** Sustainable development, regional development, bioeconomics, biomass cluster

### 1 Introduction

Biomass clusters combine different business entities involved in biomass extraction, transportation, and power generation. Clusters concentrate together scientific potential capable of improving the technologies used. The activities of the biomass cluster contribute to the development of the bioeconomy, where resources that have been considered as waste are used to create additional value. The use of indigenous resources enables the development of new technologies and the employment of people from different backgrounds, thus reducing unemployment and social exclusion. Using wood as a source for heating is as old as mankind but processing woody biomass to generate fuel and electricity is in its infancy. Regardless of the way woody biomass is used, biomass processing can directly support local economies and local job markets, which is especially advantageous to rural economies where other economic opportunities are often limited. The forest-related energy-source literature emphasizes that the potential impacts of woody biomass processing energy on local and national economies is substantial (Jackson, Neto, Erfanian, 2018). The usage of biomass creates synergistic effects, which can multiply the positive economic effects. However, to achieve these effects, co-operation based on the principles of co-operation is essential. This is most easily achieved through the cluster structure. In the research of Erkus-Ozturk (2009), it is stated that clusters unite firms from different levels in the industrial chain (suppliers, customers), with service units, making firms within the cluster interdependent due to the value chain links through common technologies, inputs, customers, infrastructure and distribution channels. Improving the strength of the structure of the biomass energy sector through a pooling of resources is one of the key components of competitive success. Distinguished three important processes underlie geographical clusters: face-to-face contact, social and cultural interaction and the development of knowledge and know-how (Dicken, 2003).

The research topic is unique as the authors link the concept of the cluster, the development of renewable energy and the principles of bioeconomy. According to the authors, these factors are integral, since it is the concentrated local resources that can enable the regions of the countries to solve the relevant economic, social and environmental problems. The study provides a case of Lithuanian regions where the economic and social structure of the country changed significantly during the

analysed period. The use of biomass has reduced social exclusion, increased job creation, and tax collection.

In this research, the authors introduce possible directions for the impact of biomass cluster activities in developing a bioeconomy-based system, thereby enabling regions to become more economically self-sufficient and capable of ensuring the social well-being of their populations. Prosperity is achieved by creating new jobs and redistributing regional resources to meet other needs of the population. At the same time, new business units contribute to the development of the gross product bypassing the necessity to attract foreign direct investment.

Our study develops a rating system that allows comparisons between regions in different countries according to their level of economic and social development. A key component is the use of local resources to create new jobs and added value in the regions. At the same time, conditions are created for assessing the appropriateness of regional policy decisions within the framework of existing performance. Going beyond economic factors, the complex effects of adopting bioeconomy ideas across the country's regions are assessed.

The object of the study: Biomass clusters utilisation for regional bioeconomy development.

The aim of the study: To determine how the development of biofuel clusters can influence the development of bioeconomy in the regions.

The novelty of the study: The study showed that the sustainable development of the bioeconomy in the regions is ensured by biomass clusters, which create synergies through cooperation between business entities. Interacting business units in a biomass cluster create a combined total value that is greater than the sum of the values created by these units individually. Thus, the development of bioeconomy in the regions is accelerating due to clustering processes that ensure the sharing of resources and their benefits, relevant business information, etc. In the output, bioeconomy development ensures regional development.

### 2 Theoretical background

#### 2.1 Interaction Between Biomass Clusters and Bioeconomy

The activities of the biomass cluster integrate different fields of activity - fuel preparation and consumption, transportation capacity, scientific progress, waste collection, etc. A successful cluster can have a significant impact on the home region through the creation of workplaces and economic value. With the development of renewable energy, it was intended to create a clear concept that describes the diffusion of green ideas. Thus, came the concept of bioeconomy, which includes activities of clean technologies and business entities to achieve positive environmental impact, but without losing the opportunity to achieve a profit. Biomass clusters are particularly well-suited to promoting the bioeconomy, as they support collaborative ideas and aim to create maximum added value with limited resources. At the same time, value is generated from renewable resources, waste, thus reducing environmental pollution.

The main strength of the bioeconomy concept is the ability to use biomass in different directions according to the prevailing needs at that time. Biomass is the most continuous source of energy; biomass can be used either directly as solid fuel feeding power plants or indirectly after conversion into a secondary form of energy (e.g. syngas and biogas) by using air, oxygen and/or steam. In spite of the several advances achieved in biomass gasification systems, the direct use of biomass needs further developments (Amirante, Distaso, Tamburrano, 2017). There are unequal energy needs in different regions, and biomass consumption can fulfill the region energy needs. Several studies have analysed policies on international and national levels that support the use of woody biomass as energy generation source. These policies not only bring the environmental perspective, but

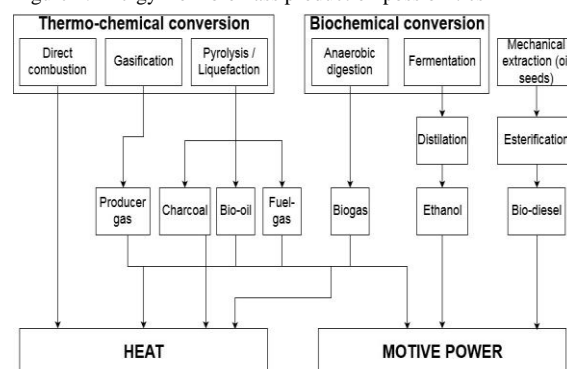
also address the economic influence that woody biomass processing can have in the local and regional economy. Woody biomass has the potential to create direct and indirect local jobs in rural areas, and this characteristic can be key to attracting new business opportunities in rural forested economies. Because more jobs create more output, woody biomass – either as a subset of a larger and more general biomass sector or as a specifically independent category – is the focus of recent studies, most of which assessed woody biomass processing economic impacts using input-output analysis (Jackson, Neto, Erfanian, 2018). Proper municipal policy decisions and mobilization of initial resources can assist to achieve consistent regional development goals. At the same time, the area of clean air is expanded, and the state of the environment is improved. Authors supplement, that woody biomass processing has many benefits as a renewable energy source compared to fossil fuels. Numerous studies have assessed the potential contribution of a wood-based energy source as an inexhaustible, while sustainably harvested, alternative for energy generation on a regional, national, and worldwide level. Therefore, due to climate change and other potential issues related to greenhouse gas (GHG) emissions, exploration of more environmentally friendly and sustainable energy sources like woody biomass should be encouraged. As the use of biofuels is commercially viable, is necessary to perform not only environmental impact analysis but also economic benefit research.

The biomass cluster generates great economic significance. Because it is a local cluster, its benefits are noticeable first and foremost by the region of activity. Waste disposal, solving social problems, and increased local energy flows are just a few of the benefits of the cluster. Like other business clusters, the biofuel cluster may decrease incentives for new business formation due to increased competition and crowding-out effects (or congestion costs) that result in diminishing marginal returns to entrepreneurial opportunities. Others claim clusters might lower the cost of starting a business by providing specialized suppliers, a local customer base, and producers of complementary products and services (Slaper, Harmon, Rubin, 2018). This is another area of performance efficiency - the cluster, which manages the resources of its members, directs them in the direction that would ensure the lowest cost of the product and maximize the benefits of the cluster members. At the same time, it avoids overinvestment situations where cluster members invest in the same equipment and thus waste financial resources. Instead, the focus is on placing an attractive product on the market, lowering its cost and adjusting to market prices.

The interaction between biomass clusters and the bioeconomy is inseparable from the idea of sustainable development. The sustainable usage of resources while ensuring a positive impact on the environment is a cornerstone of the bioeconomy. Biofuel cluster activities help to achieve this goal by focusing on the use of local natural resources. Sustainable development processes involves three major approaches: (1) sustainability as the maintenance of the stock of capital (natural, man-made, human and socio-cultural); (2) the triangular approach, which considers the three interrelated dimensions of sustainability (economic, social and environmental); and (3) the materials balance approach (del Rio, Burguillo, 2008). As the use of biomass is local in production, it multiplies the positive effects on the economies and promotes the development of the bioeconomy as a regional and national development direction. Modern bioenergy would be a central component of a future low carbon global energy system, playing a significant role in helping to decarbonize industries such as aviation, shipping, and long-haul road transport (IEA, 2017).

Bioeconomy analysis is inherent with the application of engineering solutions to energy production. The different ways of generating energy make it possible to achieve the desired effect in different regions of the countries. It depends on the desired use of fuel and the preferences of energy type. Woody biomass can be used for generating electricity, producing biofuels, and making biochemical such as adhesives, solvents, plastics, inks, and lubricants (Ozcan, Öztürk, Oguz, 2015).

Figure 1: Energy from biomass production possibilities



Source: Okello, Pindozi, Fagnano, Boccia (2013)

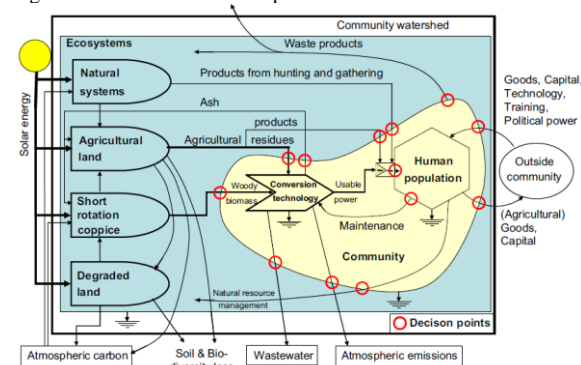
Fig. 1. present the basic processes that enable to produce certain types of energy from biomass. Each power generation technology requires different engineering solutions and investments, both for the power plant and for power distribution networks. In this case, the distinguished fuel groups are related to energy and heat extraction, natural gas extraction as well as biofuel for transport needs. Decision-making process, which engineering solutions are best suited for a particular region, assists further stimulate bioeconomy initiatives. It is performed with benefit-cost analysis, regional resource analysis, and evaluating of existing energy transmission networks. The cluster structure, which involves all stakeholders and guides them towards the common goal, contributes significantly to the efficiency of bioeconomy development.

It is necessary to emphasize the importance of economic vitality research. Additional aspects that strongly influence the economic viability are: (1) the estimated installed power; (2) the estimated lifetime, frequently laying between 15 and 35 years; (3) the heat and electricity efficiency, highly depending on the type of fuel and the conversion technology used; (4) the average load factor of the power plant, as it is directly related to the electricity generated and consequently to the revenues obtained (Carneiro, Ferreira, 2012). With this engineering information, the objective of an efficient energy production process can be achieved while strengthening the overall structure of the bioeconomy. Combustion, used to convert biomass energy into heat, mechanical power or electricity. Net conversion efficiencies range from 20% to 40%, even if higher values may be obtained when the biomass is co-combusted in coal-fired power plants. Meanwhile, critical logistic aspects strongly affect the economic and energy performances of bio-energy conversion systems, introducing limitation on their suitability (Caputo, Palumbo, Pelagagge, Scacchia (2005). The way in which energy is produced and the purpose for which it is used depend on the production strategy chosen and the prevailing circumstances. In some bioenergy pathways, farms are nothing more than the supplier of raw materials, for example for bioethanol fuels. In other cases, further processing and energy conversion takes place on farms by means of onsite biogasification plants and generators (Plieninger, Thiel, Bens, Hüttel, 2008).

The development of the bioeconomy concept encompasses various economic, engineering, environmental factors that enhance the country's competitiveness and the level of technical resources. The process of converting biomass into energy requires various engineering solutions that shape the need for innovation. This allows for a positive economic impact through the creation and development of engineering technologies. The Fig. 2. The development of the bioeconomy concept encompasses various economic, engineering, environmental factors that enhance the country's competitiveness and the level of technical resources. The process of converting biomass into energy requires various engineering solutions that shape the need for innovation. This allows for a positive economic impact through the creation and development of engineering technologies. The Fig. present all bioeconomy processes, how biomass becomes an energy source and what economic,

managerial and engineering solutions are needed to achieve the goal. The efficiency of biomass utilization depends on the current situation of transmission and distribution networks, their throughput, as well as the cluster's ability to handle residual materials (ash, natural fertilizers, etc.). The necessary engineering solutions significantly increase the efficiency of the cluster activities and opportunities to remain in the competitive market.

Figure 2: Biomass conversion process



Source: Buchholz, Volk, Luzadis (2007)

The structure of the bioeconomy is conducive to clustering, since all participants in the structure can make productive contacts with each other. The structure is conducive to information exchange and pooling of resources. Clusters possess a stockpile of knowledge built over time based on experience of their members. Cluster members can take advantage of this knowledge stock through what calls "knowledge spillovers" (Steinfeld, LaRose, Chew, Tong, 2012). In this case, the biomass energy sector matches the efficiency criteria for information exchange due to the necessity to maintain a short operating distance. bioenergy projects involving energy crops can make a significant contribution to rural income or employment increment. For example, energy crops lead to changes in agricultural labour patterns and give positive contributions to rural economic diversification (Thornley, 2006)

Elements of a study by Cannemi, García-Melón, Aragonés-Beltrán, Gómez-Navarro (2014) can assist to analyze the structure of the biofuel energy sector. The authors apply different approaches to analyzing the biomass market. The principles are based on the different characteristics of power plants, choice of investment solution, and flexibility of supply. According to the authors, the structure of the biomass energy sector may be influenced by the following factors:

- Valorization of agro-industrial waste or dedicated cultivation;
- Electricity and/or heating (cooling) production;
- Private or public investment;
- Short supply biomass chain (o70 km) or other (including importation);
- Smart/mini-grid distribution or centralized general grid connection.

The main sustainability indicators that are noticeable in the operation of the biofuel cluster are also highlighted (Evans, Strezov, Evans, 2009):

1. Price of energy generation unit must be considered since unfavourable economics are not sustainable;
2. Efficiency of energy transformation must be known for meaningful comparison;
3. Land use requirements are important as renewable energy technologies are often claimed to compete with agriculturally arable land or to change biodiversity;
4. Social impacts are important to correctly identify and quantify the human risks and consequences will allow better acceptance and understanding of some technologies that are often subject to public objection.

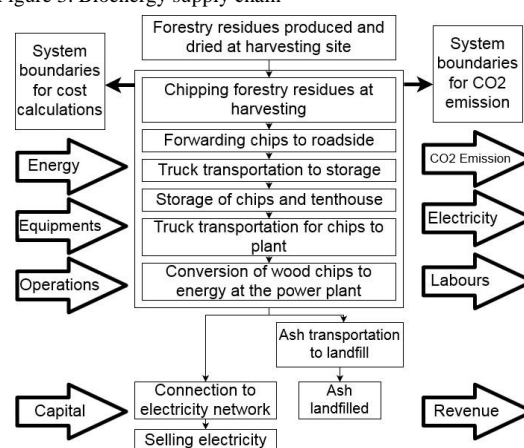
Biomass can be used quite widely. It can be used not only to obtain different types of energy but also for the production of green fuels and other raw materials. Biomass is part of the broader concept, which is often identified with biological fuel for transport. One type of resources are formed quickly enough (energy crops), but the other type of resources requires a very long time (water sludge). Certain raw materials that are formed over many years - sludge, fossil materials, peat - are separated from biomass. All these groups can be used to produce electricity, various types of energy (heat, steam, etc.), as well as fuel and the necessary chemistry. The main differences in production are related to the technologies used to generate energy and use renewable resources (Holmgren, Andersson, Berntsson, Rydberg, 2014)

When describing the full potential of biomass use, it is necessary to look at the benefits to the state and smaller subjects who have chosen to use renewable resources. Benefits of using biomass (Lapinskas, 2013):

- Ecological safety - abolishing polluting fossil fuels by using indigenous renewable resources instead;
- Economic benefits - funds, spent on buying fossil fuels, stays inside the country and is poured into the domestic economy. Also, GDP and people's purchasing power are growing;
- Social benefits - the creation of new jobs in all stages of biomass utilization;
- Energy security - independence from volatile energy supply markets, unilateral fuel pricing disappears;
- Export / Import Balance - With imports of energy and fuels decreasing, the ratio of imports to exports improves;
- Regional development - regions with low regional development would gain access to biofuel production and thus become more competitive at the national level.

The activity of biomass cluster is an integral part of a successful supply chain operations. The supply chain ensures a smooth supply of biomass and its conversion into energy. The biomass is sourced from different geographic locations, and different engineering solutions – trucks, rail, ship, etc. – are used to ensure smooth supply of biomass. The bioenergy process in the supply chain in Fig. 3. consists of three parts - the initial stage, the main supply procedure, and the impact analysis. The latter part links the effects of supply chain processes and bioeconomic processes in general. This suggests that the positive effects of the bioeconomy require sustainable development, engineering, and social solutions.

Figure 3. Bioenergy supply chain



Source: Ayoub, Martins, Wang, Seki, Naka (2007)

Critical solutions are related to biomass conversion in power plants, transportation, connections to energy networks. This ensures operational efficiency and consistent energy supply. The activities of the biomass cluster are essential in order to realize sustainable development goals. Being in a cluster allows mobilizing different types of local resources to create added

value. Over time, cluster activities become a significant part of the bioeconomy through the involvement of scientific institutions and public services. In this way, high technologies are created to meet the needs of society and strengthen the importance of the cluster. The development of the bioeconomy is beneficial not only for individual regions but also for the country, as it creates conditions for problems solving in long-term unemployment among the low-skilled employees, low national budget income, high social costs spheres.

## 2.2 Cluster Bioeconomic Importance for Sustainable Regions' Development

The development of bioeconomy involves two strands - local and large-scale. In the case of local development, each household switches to renewable resources, thus contributing independently to climate change mitigation. Large-scale development is ensured by the municipality's decision to invest in green energy production and its efficient transmission. The development of the bioeconomy is governed by documents and international agreements issued by international organizations.

An important factor contributing to the development of the bioeconomy is household investment. Every household's efforts to reduce fossil fuel consumption are important for future success. One of the most effective solutions is investing in low-generation technologies that enable fulfill all household energy needs. Micro-generation technologies allow households to produce their own electricity. Examples are photovoltaic solar panels, micro-cogeneration units and small wind turbines. A micro-cogeneration unit is a particular type of micro-generator, in the sense that it is a heating system with high efficiency, producing electricity as a by-product of the heat it generates based on fossil fuel or biomass (Geelen, Reinders, Keyson, 2013). Often households are more energy-efficient than public entities. This allows for increasing the degree of green energy efficiency.

The EU's position that bioenergy will remain the main source of renewable energy for the 2020-2030 period. Bioenergy will increase the potential for achieving positive climate and energy targets. Bioenergy is a highly flexible form of low carbon and renewable energy because it can be used in power and heat generation and transport. Bioenergy offers significant benefits in terms of energy security, growth, and jobs, especially in rural areas, technological innovation, environmental protection, and climate protection. On the other hand, despite the many positive results, there are concerns about the sustainability risks associated with its production and use (European Commission, 2016). In order to reduce the negative impact of conventional biomass production on food balance and greenhouse gas emissions, it is proposed to limit the production of first-generation biofuels from rapeseed and cereal grains and encourage biomass usage from agriculture and wood wastes, algae.

Various policy documents, scientific studies, statistical surveys analyzed the different composition of the bioeconomy by industry or sector. For example, in the sustainable bioeconomy strategy adopted by the European Commission, the bioeconomy sector includes agriculture, forestry, fisheries, food, wood and paper production, as well as part of the chemical, energy and technology industries (European Commission, 2012). The National Bioeconomy Inventories (by EU countries) published by the European Commission provide a breakdown of the bioeconomy sectors into three categories of economic activities (European Commission, 2014):

- Biomass production sectors - agriculture, forestry and fisheries;
- Fully (i.e. 100%) bio-based manufacturing sectors where biomass is processed into higher value-added products. It is the manufacture of food, beverages and tobacco products; manufacture of wood and of cork and articles thereof, except furniture; manufacture of paper and paper products, leather and related products;

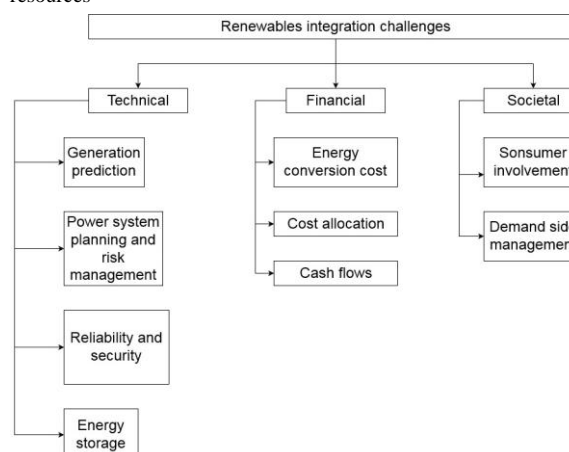
- Partially (i.e. less than 100%) bio-based manufacturing sectors where biomass is used as part of the raw material. These include textile, chemical, basic pharmaceuticals, rubber and plastic, furniture and other production.

The use and development of renewable resources are directly linked to sustainable energy conception and therefore the impact of economic, environmental and social development needs to be assessed for each sector. The use of each resource must be cost-effective, contribute to the reduction of greenhouse gas emissions, improve the human and natural environment, and at the same time help to solve social problems by creating new jobs, contributing to regional development and reducing social exclusion.

Many technologies can be used to generate energy from biomass, ranging from solid biomass combustion in heating systems to biogas plants and large biomass gasification plants. The importance of biomass energy is steadily increasing as concerns about climate-related emissions to the atmosphere increase. The use of biomass for heat production is already economically viable, but measures to promote the use of biomass for electricity generation are still needed. Such promotion shall be based on environmental, security of supply and social benefits.

The development of the bioeconomy concept faces challenges that make innovation applying more difficult. The challenges relate to both the search for engineering solutions and economic factors. Properly evaluated costs and selected technical solutions can ensure the success of the cluster and its competitiveness in the market, which shape the success of the whole bioeconomy sector. Fig. 4 classify the main challenges facing the realization of bioeconomy ideas. The challenges are technical, financial and societal. This is to emphasize the need to reconcile technological innovation, financial viability and public expectations of energy at competitive prices. Technical factors include the engineering parameters, necessary to ensure a smooth transition of the region towards the use of renewable resources. This is done based on cash flow and costs. Demand-side management is one of the societal factors which is the agreement with consumers on the distribution of energy consumption rates. Continuous collaboration with users allows achieving the most effective cluster activity, thereby gaining a competitive edge over competitors of biomass cluster.

Figure 4. Potential challenges in integration of renewable energy resources



Source: Ellabban, Abu-Rub, Blaabjerg (2014)

The wide concentration is needed for a smooth transition to biomass for energy purposes. This objective can be achieved by concentrating resources within the cluster structure. The positive effects of the cluster relate not only to increased competition in energy production but also to the synergistic effects of a growing social level, a stronger regional economic structure and better use of local resources. The influence of the biomass cluster on the development of the bioeconomy allows different regions to

interact with each other through the exchange of biomass resources and the workforce, thus creating a sustainable and socially acceptable environment. In further analyzing the positive impact on society, it should be noted that the impact of biomass clusters is not limited to reduced pollution levels and improved bio-waste management. The usage of biomass in the energy sector creates conditions for the development of a sustainable society. A sustainable society is conceived as a community of people capable of using scarce resources in a sustainable manner. One factor necessary for developing a sustainable society is decreasing, or at least not increasing, the total amount of energy used (Suzuki, Tsuji, Shirai, Hassan, Osaki, 2017). Tangible benefits of cluster activities are inter-firm synergies, cross marketing activities, search for innovative solutions (Perles-Ribes, Rodríguez-Sánchez, Ramón-Rodríguez, 2017). Biomass clusters can contribute to this by offering consumers a switch to more energy-efficient solutions. By maintaining constant communication with energy users, the cluster can guide them along the path of energy changes. This will allow for the preservation of funds within the country and multiply it for the fulfil the needs of society. A strong regional cluster (and related clusters) may enable agglomeration economies, including larger pools of skilled employees, knowledge spillovers, specialized suppliers, and sophisticated buyers (Haviernikova, Okręglicka, Lemańska-Majdzik, 2016). Proximity of related economic activity can also reduce transaction costs and induce the growth of specialized local institutions, such as educational programs and trade groups that reinforce the complementarities across related industries. Thus, a strong regional cluster should enhance the employment growth of the industries in the cluster through increasing efficiency, productivity, and/or returns to investment.

The development of the bioeconomy is inextricably linked to the cooperation of business subjects to achieve a common goal. The use of biomass helps to increase entrepreneurship in the regions by reducing the use of fossil resources. In less-developed countries, this fuel is often imported, thus biomass consumption promotes local energy production. In order to evaluate the impact of biomass cluster activities in the regions, a research methodology is used that allows assessing the complex effects created by the cluster. At the same time, the importance of bioeconomic processes is demonstrated. The Lithuanian case, which provides an understanding of the economic, social and environmental benefits of biomass conversion, is selected for evaluation.

### 2.3 Methodology and research findings

The main methodological tool is the application of cluster analysis. It allows subdividing regions according to certain characteristics that are selected for the purposes of the study. The research data covers economic, social and environmental perspectives. Cluster analysis investigates the economic capability of regions and the changes brought about by the change in the way energy is produced. This will allow an objective analysis of the changes caused by the use of biomass.

The initial phase of the study involves determining the characteristics of the study. Reference is to the case of Lithuania, analyzing different regions of the country. Lithuania has made significant progress over the decade in promoting the usage of biomass, which was reflected in its evaluation of economic and social indicators. The country has significantly reduced its imports of fossil fuels through the use of indigenous biomass, thus enabling the conditions for regional competitiveness growing. The information in Table 1 shows that the dynamics of the five indicators will be studied over the last nine years. The indicators cover the main characteristics of energy use, the social situation and the size of regional budgets.

Table 1: Research information

| Indicator | Meaning  |
|-----------|--|
| Sample    | 49 municipalities                                    |
| Data      | Municipalities income and expenditures, thousand EUR |

|                  |                                     |
|------------------|-------------------------------------|
|                  | Costs for social allowance, th. EUR |
|                  | Heat price, euro ct./kWh            |
|                  | Expenditure for gas, th. EUR        |
|                  | Costs for biomass, th. EUR          |
| Analyzing period | 2008-2017                           |
| Currency         | Euro                                |

Source: Statistics Lithuania

The study uses data on municipalities' in Lithuania, excluding the largest cities and municipalities, that do not have district heating systems. The selected municipalities are similar in population, economic capacity, and have similar problems. Renewable biomass and fossil fuels are the most used in municipal heat production. This has a significant impact on budget revenue and expenditure. The number of recipients of the social allowance reflects unemployment problems and the ability of municipalities to solve them. However, the potential of biogas production from agricultural and food industry waste and biodegradable municipal waste is underutilized in Lithuania, although the production of biogas from agricultural waste and sewage sludge has been increasing lately. The potential of biogas production for this production is increased by the low utilization potential of agricultural and food industry waste, biodegradable municipal and food waste in Lithuania.

Cluster analysis is used to conduct the study. The K-mean method was chosen as the most appropriate method of analysis, which allows to efficiently group regions according to different characteristics in search of causation. The simplest and most commonly used algorithm, employing a squared error criterion is the K-means algorithm. This algorithm partitions the data into  $K$  clusters ( $C_1; C_2; \dots; C_K$ ), represented by their centers or means. The center of each cluster is calculated as the mean of all the instances belonging to that cluster. The algorithm starts with an initial set of cluster centers, chosen at random or according to some heuristic procedure (Delgado, Porter, Stern, 2014). In each iteration, each instance is assigned to its nearest cluster center according to the Euclidean distance between the two. Then the cluster centers are re-calculated.

The center of each cluster is calculated as the mean of all the instances belonging to that cluster:

$$\mu_k = \frac{1}{N_k} \sum_{q=1}^{N_k} x_q \quad (1)$$

where  $N_k$  is the number of instances belonging to cluster  $k$  and

$\mu_k$  is the mean of the cluster  $k$  (Rokach, Maimon, 2005).

The cluster analysis resulted in three clusters which are characterized differently. Table 2 gives the main characteristics that allow to draw initial conclusions about the distribution of clusters

Table 2: Information of cluster analysis (Part 1)

| Cluster Number of Case | Costs for biomass, th. EUR | Expenditure for gas, th. EUR | Costs for social allowance, th. EUR |
|------------------------|----------------------------|------------------------------|-------------------------------------|
| 1                      | Mean                       | 796792,1                     | 1191199,7                           |
|                        | Std.Deviation              | 740480,7                     | 2263087,4                           |
|                        | Minimum                    | 0,0                          | 0,0                                 |
|                        | Maximum                    | 3485510,0                    | 13628891,3                          |
| 2                      | Mean                       | 540728,9547                  | 2062653,959                         |
|                        | Std.Deviation              | 614318,8                     | 3643976,8                           |
|                        | Minimum                    | 0,0                          | 0,0                                 |
|                        | Maximum                    | 3909484,5                    | 29611508,3                          |
| 3                      | Mean                       | 472564,5                     | 309982,3                            |
|                        | Std.Deviation              | 261144,1                     | 491455,7                            |
|                        | Minimum                    | 68998,8                      | 0,0                                 |
|                        | Maximum                    | 1077863,8                    | 1808350,9                           |

Source: created by authors

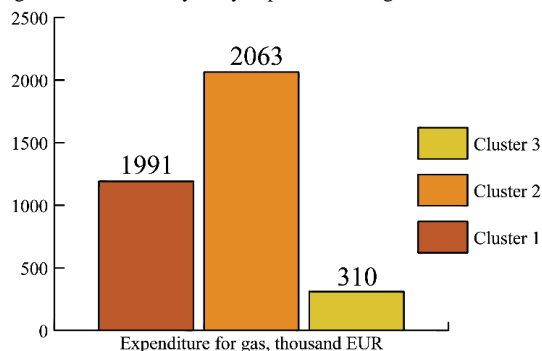
Table 3: Information of cluster analysis (Part 2)

| Cluster Number of Case |                | Municipalities expenditures, th. EUR | Municipalities incomes, th. EUR | Heat price euro ct/kWh |
|------------------------|----------------|--------------------------------------|---------------------------------|------------------------|
| 1                      | Mean           | 27230,2                              | 26702,5                         | 6,12                   |
|                        | Std. Deviation | 14562,7                              | 14750,7                         | 0,8                    |
|                        | Minimum        | 6199,9                               | 5871,3                          | 4,12                   |
|                        | Maximum        | 97994,2                              | 101508,1                        | 8,23                   |
| 2                      | Mean           | 26901,16                             | 26207,116                       | 7,86                   |
|                        | Std. Deviation | 12448,8                              | 12065,1                         | 1,08                   |
|                        | Minimum        | 7697,4                               | 7937,4                          | 5,78                   |
|                        | Maximum        | 78229,8                              | 77050,1                         | 10,27                  |
| 3                      | Mean           | 21526,1                              | 20622,5                         | 6,53                   |
|                        | Std. Deviation | 3792,7                               | 3812,5                          | 1,15                   |
|                        | Minimum        | 14349,5                              | 13609,8                         | 5,14                   |
|                        | Maximum        | 29428,5                              | 28793                           | 10,31                  |

Source: created by authors

In the case of the first cluster, significant differences between the clusters are related to the use of the chosen fuel. This later shape the changes in the following indicators. A more detailed analysis of the changes is presented in the figures.

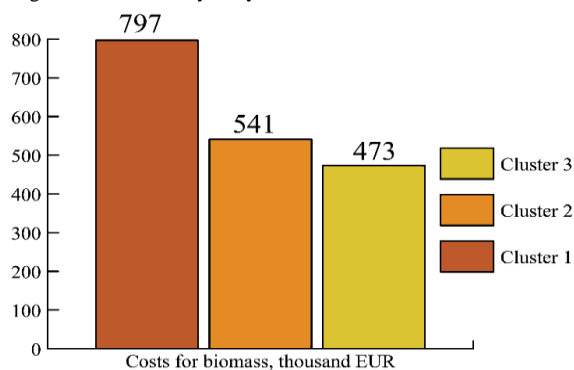
Figure 5: Cluster analysis by expenditure for gas information



Source: created by authors

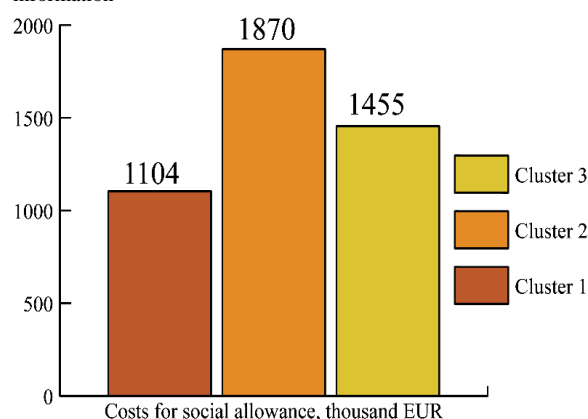
Both Fig. 5, and Fig. 6 the first cluster combines municipalities, that using biomass, while in the second cluster the gas-consuming regions are concentrated. The third cluster is dominated by indecision about the most appropriate fuel type - neither biomass nor fossil fuels dominate these regions. The information in the second cluster reveals significant costs for gas, thus revealing the inability of regions to access local resources. The information presented in Fig. 6 shows similar dynamics of the change of indices.

Figure 6: Cluster analysis by costs for biomass information



Source: created by authors

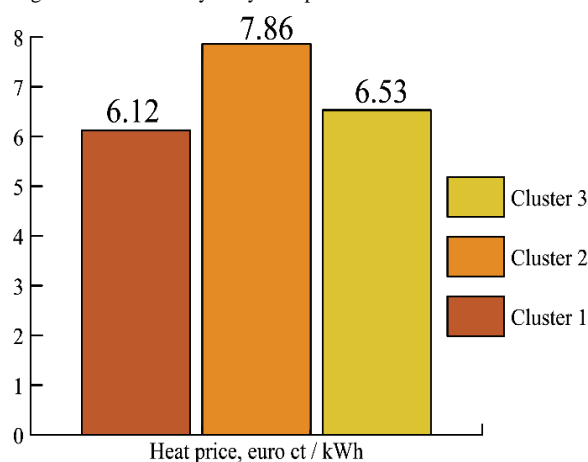
Figure 7: Cluster analysis by costs for social allowance information



Source: created by authors

According to Fig 7, there is a significant difference in the level of social allowance expenditures, reflecting the efficiency of the first cluster income structure and job creation in the forestry sector. Meanwhile, the second cluster is problematic - the funds allocated for social assistance outweigh the costs of other clusters. The competitiveness of the biomass cluster and the efficiency of the bioeconomy concept is reflected in the heating price, which is the lowest compared to the other two clusters. This enables people to save funds while channelling it to other needs. This enhances regional competitiveness and demonstrates the positive impact of bioeconomy processes on both society and municipalities. As in previous cases, the third cluster has no clear direction.

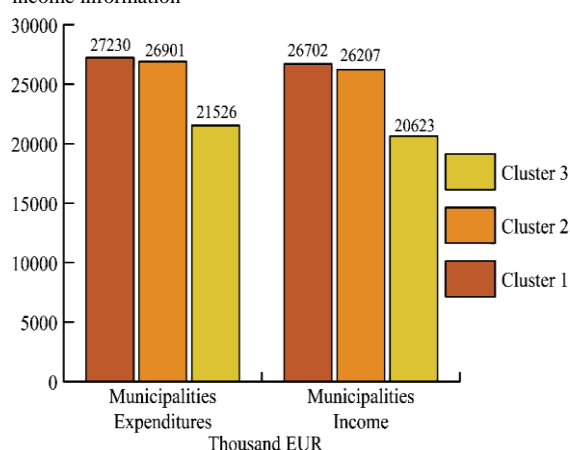
Figure 8: Cluster analysis by heat price information



Source: created by authors

Regions in the first cluster generate more budget revenue, while spending similarly as regions in the second cluster. In addition, the cost structure of the first cluster is more sustainable than that of the other clusters, as it creates value within municipalities and solves social problems such as long-term unemployment and costs for social allowance. Municipalities that use biomass attract more funds into their budgets, thus enabling the creation of public benefits.

Figure 9: Cluster analysis municipalities expenditures and income information



Source: created by authors

In conclusion, the use of local resources promotes economic circulation in the regions, enabling their sustainable development. It paves the way for wider bioeconomy initiatives related to more efficient use of biomass, utilization of various organic wastes, and development of technologies inside the country. Regions with high levels of unemployment and high expenditure on social allowance need to rethink their policies, perhaps choosing to follow the example of neighboring regions and develop renewable energy systems. Lithuania's example shows that it can be an effective route for small countries that are significantly dependent on fossil fuel imports.

### 3 Conclusion

The biomass cluster is a structure based on today's realities, which allows the regional potential to be mobilized for prevailing economic and social challenges. The main idea of the cluster is to utilize local organic wastes and create added value. Biowaste is formed in woodlands, livestock farms and abandoned lands. Cluster activities enable wastes to become a marketable product with economic value. The use of biomass can also be developed internationally, thus developing bioeconomy ideas. The concept of bioeconomy is based on the cooperation of different business entities in order not only to improve environmental conditions but also to obtain tangible financial benefits. As the bioeconomy grows, cluster activity is critically important.

The analysis of Lithuanian case showed that during the period under review, the competitiveness of certain regions increased significantly due to the increased use of biomass. As the use of biomass increases, related indicators are changing - reduces the heat price and the cost of social allowance, meanwhile increases the revenue of municipal budgets, which can be used to increase the welfare of the population. The biomass cluster is the backbone of the bioeconomy, solving long-standing social problems and reducing regional inequalities.

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**Primary Paper Section: A**

**Secondary Paper Section: AH**

## EATING DISORDERS IN ADOLESCENCE: SOCIAL CAUSES AND CONSEQUENCES

<sup>a</sup>LUCIA TÓTHOVÁ

*Department of Social Work, Faculty of Arts, Pavol Jozef Šafárik University in Košice, Moyzsova 9, 040 59 Košice, Slovak Republic*  
email: <sup>a</sup>lucia.tothova1@upjs.sk

The paper was created in the framework of the grant project Vega 1/0285/18 entitled "Risk behaviours of adolescents as clients of social work due to their loneliness".

**Abstract:** The understanding of eating disorders (EDs) as purely female diagnosis is crumbling, disease affects individuals with different educational, cultural and family background of all ages, but it mostly affects adolescents, in which the paper is focusing on. The number of people suffering from eating disorders is increasing, the disease penetrates into developing countries or even third world countries. These changes and the increasing prevalence of eating disorders cause efforts to identify risk factors and causal mechanisms of these disorders. Since social factors are not fully recognized in the etiology of eating disorders, paper analyses the risk factors together with the social consequences of eating disorders, emphasizing the multifactorial nature of EDs.

**Keywords:** Adolescence, Eating Disorders, Risk Behaviour, Social Context.

### 1 Risk behaviour of adolescents

People go through several ontogenetic phases during their life, each of which brings the specifics that characterize a group of peers of a particular age. These common features are subject to developmental patterns, which help to create theories of periodization of human development, focusing on different psychological, physiological and social aspects (Langmeier, Krejčířová, 2006).

In a biological sense, the period of adolescence is defined as a life stage that is associated with growing up, reproductive ability and the end of growth. However, biological maturation take place simultaneously with psychological changes and social inclusion of an individual occurs too. We are talking about the period between childhood and adulthood (Nielsen Sobotková et al., 2014). However, demographic pathways to adulthood have changed significantly over the past 50 years (Studer, Liefbroer, Mooyaart, 2018). The transition to adulthood is moving to a higher age, it is now being localized not in the second, but rather in the third decade of human life and it is individualized. Over time, the traditional sequence of events is disappearing too: the completion of school – employment – own housing – marriage – family (Shanahan, 2000). Key indicators such as leaving a parent's home, marriage or parenting are delayed. Other events, such as entry into free cohabitation, an extramarital child, have also gained popularity in the US and Europe (Thornton, Axinn, Xie, 2007; Billari, Liefbroer, 2010; Cherlin, 2010). There is an increasing number of so-called "backward" events, such as returning to parents after a period of independent living, break up of partner relationship or re-studying after several years of employment. This means a transition from a linear course of life to a cyclical one (Filadelfiová, 2007), which is now becoming a civilization model (Džambazovič, 2012).

In adolescence, mental abilities develop and this period often brings hard emotional expressions and swings. One of the general opinions is, that adolescence is a troubled period in a life of a human, it can be called as a period of "storms and crises" (Atkinson, 2003). The desire for emancipation from the family environment and the need to identify with another, in most cases peer group, arrives (Williams, 2007). It is therefore a period of life when it is important for an individual to fit into the peer group. To become a member of such a group, an individual often has to perform certain tasks. It may be a certain feature that is characteristic for the given group, such as listening to the same music, wearing extravagant clothes or having the same view of the world. However, some of these groups may require risk behaviours, such as smoking, drug use, drinking alcoholic beverages, or a general lifestyle change for the worse. Although an individual may not have had such tendencies yet, due to the desire to fit into the group, he/she can take over this nature of

behaviour (Novotná, 2010). Globally, we can talk about socio-pathological phenomena or risk behaviours, while Lichner and Šlosár (2017) consider adolescents to be the most important risk group in terms of an emergence and development of risk behaviour.

One of the forms of risk behaviour among adolescents are eating disorders, as shown by the results of many studies (e.g. Garfinkel et al., 1995; Woodside et al., 2001; Striegel-Moore et al., 2005). During the period of adolescence, there are changes in body appearance (Atkinson, 2003), individuals are extremely focused on their appearance, which for them is some tool that could help them to achieve their desired position in the society or group, it acts as a tool of self-realization or as a mean of solving problems (Kopčanová, Kopányiová, Smiková, 2016). Adolescent pays more attention to his/her appearance, he/she has to accept changes in appearance caused by reaching sexual maturity and developing secondary sex characteristics. He/she compares himself/herself with peers, tries to approach the current standard of attractiveness, or on the contrary, resigns and rejects it (Thorová, 2015). He/she is worried about how the peers will accept him/her, if he/she will be different (Šiňanská, 2013). Appearance is used as a strategy to gain attention (Thorová, 2015). Changes that take place on the body and the body itself, are the basis of identity in adolescence and identity development processes are associated with body image (Voelker, Reel, Greenleaf, 2015; Vašková, Lovašová, 2019). Higher interest in self-care and appearance has its own benefits, as well as negatives that can be reflected in unhealthy eating habits that can develop into eating disorders.

### 2 Eating disorders

Eating is one of the necessities in the life of every person, as it is a basic biological need. However, the perception of eating is different for people. By eating habits, people can express their opinions and attitudes. The hunger strikes or fasts that have roots in religion mean voluntary renunciation of food - whether in part or in full, for the purpose of internal purification, preparation, or expectation. For some, eating may be a ritual, with certain principles and rules. For another, it is just a way of "relieving hunger". Some people enjoy their food, it is a pleasure for them. They like to try new foods and discover unknown flavours. The ways how people eat are different. If they lead to the preservation of human existence and do not create wrong habits in any way, it is only a natural difference between people. If so, we can talk about eating disorders (Obuch, 2007).

Eating disorders are complex diseases that affect mostly adolescents and are considered to be the third most common chronic disease in adolescent women (Golden et al., 2003). Currently, they are classified as socio-pathological phenomena, listed as forms of risk behaviour with a distinct aspect of addiction to eating and food. It is a conscious (but not always realized) form of self-harm, respectively self-destruction of an individual (Hupková, 2009).

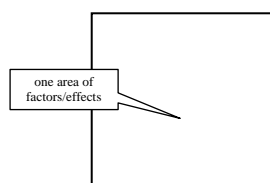
The increasing prevalence of eating disorders raises efforts to identify risk factors and causal mechanisms of these disorders, while their identification is important for identifying risk groups and targeted prevention and intervention.

At the present, eating disorders are perceived as multifactorial disorders with a pattern of symptoms that represent a common path, rather than of single-factor causal theories (Garner, 1993). Interest focused in various ways on the benefits of environmental and social factors, psychological predisposition and biological vulnerability, while recent studies on family aggregation have renewed interest in the benefits of genetic predisposition (Rome et al., 2008).

According to the author, in this context, eating disorders can be seen as a cube, each side of which is another separate area of risk factor involved in increasing the risk of eating disorders, as well

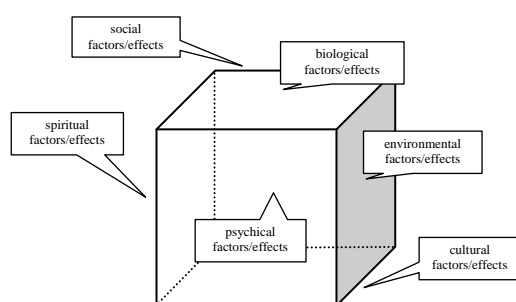
as the effects of eating disorders. However, for the correct perception of EDs, these areas of factors and effects need to be perceived holistically. If we look at the cube from one side only, it will be possible to perceive only one range of factors or effects, while others escape. But looking at the cube as a complex, thus perceiving eating disorders as a complex, it is possible to observe all spheres of factors and effects (Fig. 1 and Fig. 2), as the interplay of a wide variety of factors contributes to the disease and the wide range of effects is caused by disease. The complex etiology of eating disorders and knowledge of its consequences require a multifactorial character that takes into account multiple domains.

Fig. 1 Visibility of one domain of risk factors/ consequences of EDs



Source: author

Fig. 2 Multifactorial character of EDs



Source: author

The aim of the paper is to identify and review the evidence of risk factors and effects of eating disorders that could serve as focal points for integrated preventive interventions. As social factors are not fully recognized in the etiology of eating disorders, the author seeks to emphasize them, together with the social effects of EDs, but not in terms of isolating them from other variables.

## 2.1 Social risk factors of eating disorders

Although social factors are less frequently identified as causal factors of eating disorders, several factors have received support. Carson et al. (1996, in: Heretik, sr., 2007) report low socio-economic status, social role disorders, prejudice and discrimination, economic and employment problems, social change and uncertainty as pathogenic social impacts on mental and somatic disorders. Krch (2010) distinguishes several types of social factors affecting the emergence of EDs:

- media pressure (via the internet and television) on ideas and life models,
- underweight woman is considered the ideal of beauty,
- superficial linking slowness with health,
- specific food requirements,
- obesity not tolerated by society,
- excessive focus on physical appearance,
- competition among peers,
- obesity and subsequent diets caused by incorrect eating habits.

Likewise, according to Buchanec et al. (2001), social expectations and influences that exert pressure on modern women play a significant role in the development of these disorders. They are more often children and adolescents whose parents are perfectionists with an increased tendency to protect their offspring, or on the other hand, those who neglect care. In causal relationship with the disease, mother is more often reported.

The area of social risk factors is therefore closely connected to family relationships. It has been proven that parents directly contribute to their children's eating problems by commenting on their appearance or weight, and trying to influence them in this direction. It has also been shown that functional family relations, regular family meals and positive atmosphere at the table, have a significant positive impact on children's mental health and the sense of subjective well-being, while also negatively correlate with symptoms of child depression and unhealthy weight control. Family weight comments (e.g., mockery or encouragement of parents to make their child to hold a diet) have been associated with many symptoms of impaired mental conditions (Rašticová, 2009). Polivy, Herman (2002) and Kluck (2008), recognize the family as an important factor associated with the development of eating disorders. In particular, they talk about parents who are involved in a high level of parental control, express critical comments, emotional needs of their children.

Family problems have been identified as risk factors (Haworth-Hoepfner, 2000; Holiday et al., 2005), Campbell and Rohrbach (2016) state that disruption of families because of divorce, separation or alienation, abuse, excessively strict nurture, but also a lack of social support, educational problems, unemployment, difficult working conditions, inappropriate housing, poverty, cultural and spiritual identity belongs to the risk factors.

Eating is a basic biological need. However, people may compensate for failures by food (Prigl, 2008). EDs seemingly "solve or help to forget" the stress and suffering that a person can experience in his/her life. They create a kind of illusion that starvation suppresses emotional stress, but it is primarily an expression of dissatisfaction, unhappiness and stress (Papežová, Hanusová, 2012). Psychosocial burden or lack of interest and love from the family or the neighbourhood is being solved by food (Prigl, 2008).

An important role is played by peers, especially among adolescents (Vincent, McCabe, 2000; van den Berg et al., 2002; Ata, Ludden, Lally, 2007; Lampard et al., 2014). During this period, peers influence the development of individual personality, physical characteristics and behavioural trends. An adolescent tends to resemble his/her friends in appearance and social attributes, but also in interests, attitudes and behaviours (Schutz, Paxton, 2007; Markey, 2010). Healthy and good friendship, trust in friend, acceptance of peers makes it possible to accept the image of an adolescent's body, reducing the likelihood of developing eating disorders (Schutz, Paxton, 2007; Thompson et al., 2007). Romantic partners have an impact through negative commentary on appearance too (Weller, Dziegielewska, 2004; Sheets, Ajmere, 2005).

In addition to the influence of the family, peer groups, the pressure from friends, social isolation and loneliness were most often identified (Lee, 1997). According to Scheel (2012), the latest research shows that up to two-thirds of people that suffer from EDs experience social anxiety. It turns out, however, that these people often suffer from the social anxiety even before the EDs occur, which implies that there is a correlation between EDs and social anxiety, and that one influences, respectively determines other. The people with EDs report the fear of criticism and public humiliation as a main source of anxiety. Most often it is the fear from the judgement of others, particularly in relation to body proportions and the choice of food, or the way in which food is consumed (e.g. slicing food into small pieces, deliberately leaving out certain ingredients, etc.). Many people suffering from EDs claim that the feelings of

others are more important to them than their own. These feelings and unsatisfactory social relationships are reduced or even displaced into a safe world and food.

Attention is drawn to the concept of social support that is related to the feelings of individual love, care, appreciation. It is considered an important factor of protection against eating disorders (Bodell et al., 2011). The element of social support is the development of a strong network of mutually supportive relationships and the ability to seek help if necessary (Jašková, Sabolová Fabianová, 2018). Although the real amount of support for people with eating disorders may be similar to that of healthy individuals, those who are suffering from these disorders are very dissatisfied with their support networks, perceiving them as insufficient (Fitzsimmons, Bardone-Cone, 2011). Other studies (Gonzales, Kohn, Clarke, 2007) also highlight an important role of social support, as well as the role of social functioning and social inclusion (Meyer, Gast, 2008). A strong relationship between the social interaction problems and EDs has been registered (Alves et al., 2008).

## 2.2 Social consequences of eating disorders

The social impacts of eating disorders are characterized by the fact that friendly and social relationships are disrupted. A person suffering from the disorder does not trust people around him, because he/she feels strong that he/she can handle the situation alone. However, these behavioural deviations may also cause social isolation over time (Papežová (ed.), 2010). Social isolation can arise from uncertainty of personal relationships that is not unique (Černá, 2008). Excessive attention to dieting, restricting or controlling weight, leads to a vicious circle. Conflicts with family or friends multiply too. Physical contact with other people is slowly disappearing. Subsequently, disgust to one's own body arises, causing the occurrence of depressive conditions (Papežová (ed.), 2010). Frequent fluctuations in weight lead to mood swings, and to depressive disorders (Černá, 2008). Anorexic patients suffer from alternate depressive and euphoric feelings resulting from biochemical changes, irritability, experience instability, panic, paranoia, anxiety, remorse, anguish, guilt, inferiority, disgust, shame, they resort to self-harm, and have suicidal (Leibold, 1995). High social anxiety occurs (increased susceptibility to social feedback) (Striegel-Moore, Bulik, 2007).

Easy to observe are communication problems, such as loss of humor, too much food bias, an individual avoids social contact and social events associated with food, other issues include social isolation and socio-phobia, loss of acquaintances and friends, problems in partner and love life occur (Krch et al., 1999; Papežová, 2000).

People suffering from EDs have no difficulty in abandoning their previous activities and friends, losing interest in work or study, they are unable to concentrate. Through their hostile and aggressive behavior, they try to drive away all people who try to explain to them that their behaviour is not normal, or that they are seriously ill (Leibold, 1995).

## 3 Conclusion

At the present, great attention is paid to the problem of eating disorders, as these disorders are becoming more common. The issue of EDs also begins to be perceived as a social problem in our conditions, and social work should also be a part of its solution.

Eating disorders are most common in adolescence, which is a challenging period in terms of the number of changes that occur during it. There is a differentiation of the status of parents in the life of the adolescent, while the role of peer groups increases, their position strengthens and influence grows.

The author's effort was to analyze the social risk factors and the impacts of eating disorders in the relevant width, while in order to identify them, the paper reflects the adolescence, the changes that occur during this period, the role of the family and peers.

Although it focuses on the social area of these factors and impacts, it emphasizes the multifactorial approach in the context of eating disorders.

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#### Primary Paper Section: A

#### Secondary Paper Section: AN

# DETERMINING DEVELOPMENT OF BUSINESS VALUE OVER TIME WITH THE IDENTIFICATION OF FACTORS

<sup>a</sup>MAREK VOCHOZKA, <sup>b</sup>VOJTĚCH STEHEL, <sup>c</sup>ZUZANA ROWLAND

*Institute of Technology and Business, School of Expertness and Valuation, Okružní 517/10, 37001 České Budějovice, Czech Republic*

email: <sup>a</sup>vochozka@mail.vstecb.cz, <sup>b</sup>stehel@mail.vstecb.cz, <sup>c</sup>rowland@mail.vstecb.cz

**Abstract:** The objective of the paper submitted is to determine the development of the business value over time using a selected valuation method and identification of factors leading to changes in its value, with a specific quantification of each of these factors. Based on financial and strategic analysis of a Company XYZ, the two-stage DCF model was chosen. The difference between the values over time determined the growth of the value. Subsequently, there were identified factors influencing the change of the value of the company over time, with a concrete quantification of the influence of individual factors.

**Keywords:** business value, factors influencing company value, inflation, DCF model, development of business value over time

## 1 Introduction

Business valuation is currently paid more and more attention to. For this reason, several effective methods have been developed to determine a business value. Business valuation is also a scientific discipline which is addressed not only by academics but also business owners and managers. In specific cases, the need to determine business value is based on legislation. Other reasons for business valuation include its sale or settlement of joint ownership.

A number of methods can be used to determine business value. Each of them is based on specific data of a company being valued. In this context, it is possible to determine the usual price of a company, its market value, the objective price of a business, etc. The methods used to determine a specific type of a business value are divided into income, market, and asset (substitution) approaches (Vrbka et al., 2019). Using the valuation process, a situation of selling a company to a third independent rational person is simulated. The process of business valuation should include certain steps necessary to correctly determine the value of a company, including the collection and analysis of the data on the business being valued, drawing up its financial plan, and subsequent selection and application of a valuation method (Mařík et al., 2018).

The objective of the paper is to determine the development of business value over time and identification of key factor and the extent to which they have influenced the development of the value of a company. The calculation of business value will subsequently be shown on a concrete sample company, XYZ.

## 2 Literary research

Over time, business value is formed by many factors. Mertzhal et al. (2017) state that the creation of a business value is influenced by its capital in the form of human resources. This capital can be increased through various employee trainings. According to Rachmawati (2019), the observance of the accrual principle in a business accounting has a long term impact on the creation of its value. According to his findings, larger companies have a better ability to observe this principle and thus increase their value than smaller companies. Nazarova (2015) examined the influence of mergers and acquisitions of a large company on its overall value. In some specific cases, the diversification of a company's portfolio can lead to an increase in its value due to a better geographical location of its supply base closer to final consumers.

Business value is influenced primarily by microeconomic and macroeconomic factors. Macroeconomic factors can be used to forecast the company's earnings in a specific time horizon. The influence of macroeconomic factors on the company's earning

can be determined using Fama-MacBeth regression. On a sample of business operating in the USA between 1962 and 2009, this model has previously confirmed the heterogeneous impact of macroeconomic information about earnings forecast for a particular business, while the results in earnings forecasts differed considerable across sectors (Shu et al., 2013). Khaustova (2016) analysed specific macroeconomic factors that influence innovation activities of Ukrainian companies. Based on the dynamics of macroeconomic indicators' indexes, the main threats and opportunities of macroeconomic environment have been identified which indicate the direction of innovation activities in the future.

The creation of business value in agricultural sector is significantly influenced by microeconomic factors. Microeconomic factors in agriculture can lead to restructuring the organizational forms of such companies. They are also able to influence the production factors, and, ultimately also the performance of production systems, thus becoming the cause of structural changes in the sector (Bosc, Belieres, 2015). According to Blažková and Dvouletý (2019), microeconomic factors influencing the creation of a business value include also the size of the company and the length of the period the company operates on a specific market. The food-production chain is always headed by an agricultural company producing the basic raw material for the production in this economic sector. In the case of investing in agriculture, from the investors' perspective, the economic efficiency of the food industry should be strengthened through public support and regulations.

Time aspect of the creation of business value as well as its earnings can be considered in the short term. According to Sapkauskienė and Leitonienė (2010), in terms of time, speed is a competitive advantage that companies have over their competitors in case they are able to react quickly to a sudden change in the market. This can also refer to launching a new product or technology before the competitors can do so. It is therefore the length of the company response time to a change in the market. In such a case, the response time is described as a time-based competition (TBC).

In terms of the development of value over time, there is also an issue of the difference between the real and nominal business value. Although nominal value can increase over time, after its conversion into the real value net of the effect of the inflation rate over the time difference, the increase can be smaller than it originally appeared. According to Bratsiotis et al. (2015), the inflation targets of the national banks reduce the inflation persistence. Moreover, they claim that the states that started to introduce inflation targets at the end of 1980s or at the beginning of the 1990s were able to reduce the inflation persistence significantly or even eliminate it. Phiri (2016) carried out an analysis on the sample of 46 African states in terms of the acceptance of the inflation target by the individual states between 1994 and 2014. He also tried to find out whether the inflation persistence was higher or lower before the introduction of the inflation target. It was concluded that the inflation persistence of the African states which introduced the inflation target was reduced by 40%. Conversely, the inflation persistence of the African states which did not introduce the inflation targets increased by almost 290% for the same period.

In the Czech Republic, inflation targeting was started in 1998. Horváth (2008) conducted an analysis of the inflation rate after introducing its targeting using the method of vector autoregression on the basis of monthly data on the inflation rate for the period 1999-2007. He claims that inflation targeting is a significant factor of inflation expectations, which was significantly reduced due to a stricter monetary policy of a lower inflation target.

Another factor affecting the development of business value over time is gross domestic product (GDP) of the state where the company operates. The issue of GDP development has been addressed in many studies, especially in terms of its forecasting. In the Czech Republic, GDP has been monitored by the Czech Statistical Office (CSO) since 1990. As a response, Fischer et al. (2013) created a methodology which is in line with the processes of determining GDP by the CSO. This was used to convert the data on the national income from the years 1970-1989 to the current GDP. This significantly extended the time series of the GDP development for its more detailed examination from a longer historical perspective. Sixta et al. (2013), as one of the co-authors of the transformation of the national income into GDP between 1970 and 1989, subsequently used these results to compare the development of GDP in the Czech and Slovak Republic. Until 1992, GDP was the same in both states, since the states created one common state, Czechoslovakia. After their separation, the GDP of each state started to develop differently, with the GDP of the Czech Republic was higher than that of the Slovak Republic for most of the time. In addition to economic factors, GDP is also affected by a number of non-economic factors. Tumer and Akkus (2018) created a model to forecast the impact of individual non-economic factors on the development of GDP using artificial neural networks (ANN). The non-economic factors included mainly the level of education, number of scholarly publications per one academic worker, the number of researchers per one non-academic employee, the percentage of research-related expenditures in relation to the GDP development, and the number of patents per person. The results say that the created ANN is able to forecast the GDP development based on the non-economic factors with high accuracy.

For business valuation, a number of income, market or asset (substitution) approaches are used. The issue of business valuation was dealt with e.g. by Mikáčová and Gavrilková (2013). Income-based value of a company is a key indicator for investors and business owners. The identification of the development of business value over time can significantly influence the selection of the company's next strategic approach in order to increase its value in the future.

The income-based valuation approaches include e. g. the method of discounted cash flow (DCF). For the application of this method, it is necessary to determine the amount of the future cash flows. According to Kumar (2016), for the DCF method, there are three basic valuation models: dividend discounted model (DDM), free cash flow to equity (FCFE), and free cash flow to the firm (FCFF). This method is also in a single-stage, two-stage or three stage variant of the calculation of business value.

Sayed (2015) examined the degree of accuracy of the prediction of the business value development determined using the DCF method at 70% compared to the actual future state. On the other hand, the accuracy of the prediction of the business value development using the accounting value is only 51.1%. The DCF method thus seem to be more accurate in the case of forecasting the future development of business value.

### 3 Materials and methods

A model company XYZ, whose business activity is in the agriculture sector provided partial financial statements from the period 2007-2011. First, it will be necessary to find out whether the company assessed meets the "going concern" principle using the financial and strategic analysis (Amin et al., 2014), on which basis the method for its valuation will be chosen. Following this step, two financial plans will be drawn for the company. Each of the plans will be used for the valuation of the Company XYZ using the selected valuation method for two dates of valuation: 17 February 2007 and 14 July 2011. The difference between the values of the Company XYZ will express the difference of the value of the business over the past time horizon (about 4.5 years). Furthermore, the paper will be focused on the

identification of the factors which caused the change in the model company value in this particular case.

Financial and strategic analysis of the Company XYZ will be carried out with regard to the concept of the company and its situation between 2007 and 2011. The Ministry of Trade and Industry (MTI) does not have any official methodology for conducting financial analysis. However, there have been efforts of the MTI to implement certain methodological elements that shall be contained in the financial analysis of each particular sector. Financial analysis of a company shall contain several techniques that can be followed. These include quantitative testing methods based on processing the data in the financial statements, by which individual indicators of financial health of the company are derived. This include e.g. the absolute method with sees the items in the financial statements as the absolute indicators and does not consider other phenomena. Within this technique, it is possible to identify the indicators in financial statements as state and flow variables. Another method is relative method, which consists in measuring data from financial statements, i.e. this method is used to see one data as the data influencing other information (Vochozka, 2016).

Absolute indicators include horizontal and vertical analysis of financial statements. These methods are used when determining the development trends in a company. Horizontal analysis is used to monitor the development of the company over time, while vertical analysis is applied to identify the financial statement structure related to some meaningful quantity.

For the purpose of this contribution, the technique of ratio indicator will be chosen. It is a technique where one or a group of financial indicators is divided by another financial indicator or a group of financial indicators, given that there is certain relation between the individual indicators. These indicators include the indicators of profitability, activity and liquidity, and indebtedness (e.g. Vrbka, Rowland, 2019).

Another step will be to confirm or reject the "going concern" principle of carrying out the strategic analysis of the Company XYZ. Strategic analysis is one of the steps in the process of business valuation which can be used to define the overall income potential of the business valued.

Since the owner of the Company XYZ was not paid any remuneration for the job performed, but only financial reward resulting from the ownership, from the perspective of a third rational person, it is necessary to calculate simulated wage costs for the owner of the Company XYZ, or wage costs for a person that would have to be employed by an independent investor so that a financial plan could be drawn up, whose results will be FCFE necessary for valuation of the company according to the method selected.

To determine the development of the Company XYZ's value over time, two-stage DCF model will be used. Using this method, the value of the company will be determined at both valuation dates. For the calculation of the value at the first valuation date (17 February 2007), the selected length of the first stage for the calculation will be almost five years (February 2007-2011). The year 2012 will be the first year of the second phase of the calculation. For the calculation of the value at the second calculation date, the length of the first phase will be five years (2012-2016). The year 2017 will be the first year of the second stage of calculation. Formula 1 shows the calculation of the Company XYZ's value using the two-stage DCF equity model of the future development:

$$H = \sum_{t=1}^T \frac{FCFE_t}{(1 + n_{VK(z)t})^t} + \frac{FCFE_{T+1}}{n_{VK(z)T+1} - g} * \frac{1}{(1 + n_{VK(z)T})^T} \quad (1)$$

where: H – business value,  
FCFE<sub>t</sub> – Free cash flow to equity for owners in year t,

$N_{VK(z)i}$  – costs of equity at specific indebtedness in year  $i$ ,  
 $T$  – number of years of first stage,  
 $g$  – growth rate in the second stage.

One of the key parameters of income-based approach of the DCF valuation is a discount rate. The discount rate using the two-stage DCF equity model is represented by alternative cost of equity.

The discount rate will be determined at each of the valuation dates. To determine the amount of cost of equity ( $r_e$ ), used for discounting future FCFE, build-up model can be used – Formula 2 (Vochozka, Rousek, 2011).

$$r_e = r_f + r_{pod} + r_{finstab} + r_{LA} \quad (2)$$

where:  $r_e$  – costs of equity,  
 $r_f$  – risk-free return,  
 $r_{pod}$  – risk premium for business risk,  
 $r_{finstab}$  – risk premium for financial stability,  
 $r_{LA}$  – risk premium for size of company.

As input values for the build-up model of determining alternative cost of equity, the data released by the MTI and Czech National Bank (CNB) will be used. For the valuation of the Company XYZ at 17 February 2007, the discounted rate will be increased by 1%, which will reflect the specific risk associated with the lack of information when drawing-up the financial plan, which results due to the lack of data provided by the model company XYZ. It can be assumed that the financial plan is thus burdened with a possible deviation resulting from the limited amount of input data.

Subsequently, it will be necessary to determine the growth constant  $g$ . Growth constant is used in the second stage of the selected DCF equity method for the determination of the continuing value. Growth constant is the response to the question of expected long-term growth of the company in the future. In its determining, the historical data of a given company and the data on the market and sector in which the company operates shall be considered. In the long-term, in order to maintain the “going concern” principle, the lower limit of the growth rate is the CNB target inflation, since it can be assumed that as the price of inputs in the Company XYZ increase, the company will have to reflect this increase in the input prices into the price of production (Vimpari, Junnila, 2014; Speranda, 2012). Determining the value of the growth constant will be based on the data provided by the CNB and MTI.

To determine the values of the company at the valuation dates, the calculation of their difference will be carried out. This difference will provide the information on the development of the company value over time.

The last step will be the identification of the factors participating in the change of the Company XYZ's value over time. There will also be a quantification of the individual factors' influence on the change in the company value.

#### 4 Result

First, financial analysis of the company was carried out, which served as a basis for drawing-up the financial plan. Financial analysis was carried out on the basis of five previous financial years of the model company XYZ. Based on the financial analysis, it can be stated that the model company XYZ was viable in the reference period but it was not strong in capital. The biggest strength of the company was the ownership of a part of the land where the agricultural activities were performed. It was also concluded that the company is able to achieve long-term profitability, but if the subsidy is reduced, the company would suffer significant financial loss.

Strategic analysis showed that the company XYZ could secure its position in the market by appropriate promotion of its activity and products. Since the main activity of the company XYZ is the production and sale of beef from the slaughter of beef cattle, its market position is largely influenced by the state of domestic and European beef market.

Based on the analyses carried out, it can be stated that the company XYZ meets the conditions of the “going concern” principle and it is thus possible to carry out its valuation using the two-stage variation of DCF equity method.

#### Determining of value at 17 February 2007

To determine the value of the company at the first valuation date, it was necessary to draw-up financial plan of the company for the period 2007-2011. The resulting financial plan is shown in Table 1.

Tab. 1: Financial plan of Company XYZ for valuation at 17 February 2007 (in thousands CZK)

| Year | Operating results | Financial results | Wage – employee | Corrected operating result before tax | Tax | Corrected economic result after tax | Depreciation | Investment | Loan repayment | Drawdown of credit | FCFE |
|------|-------------------|-------------------|-----------------|---------------------------------------|-----|-------------------------------------|--------------|------------|----------------|--------------------|------|
| 2007 | 1960              | -147              | 339             | 1474                                  | 354 | 1120                                | 1960         | 1067       | 735            | 0                  | 1278 |
| 2008 | 2156              | -49               | 356             | 1751                                  | 368 | 1383                                | 1960         | 1121       | 412            | 0                  | 1811 |
| 2009 | 2264              | 0                 | 374             | 1890                                  | 378 | 1512                                | 1960         | 1121       | 392            | 0                  | 1959 |
| 2010 | 2377              | 25                | 393             | 2009                                  | 382 | 1627                                | 1960         | 1121       | 0              | 0                  | 2467 |
| 2011 | 2496              | 29                | 412             | 2113                                  | 401 | 1711                                | 1960         | 1121       | 0              | 0                  | 2551 |
| 2012 | 2621              | 34                | 433             | 2222                                  | 422 | 1800                                | 1960         | 1121       | 0              | 0                  | 2639 |

Source: Authors

Based on the financial plan drawn-up (Table 1) it is evident that the financial result of the Company XYZ will be negative only in the years 2007 and 2008. The resulting financial analysis thus reflects well the prediction of good financial health of the company in the long term. This also indicates continuous growth of FCFE.

Subsequently, the discount rate at first valuation date was determined. The calculation was carried out using Formula 2.

$$r_e = 3.89\% + 3.32\% + 2.14\% + 1.71\% = 11.06\% \quad (3)$$

$$r_e^* = 11.06\% + 1\% = 12.06\%$$

where:  $r_e^*$  is the discount rate increased by specific risk resulting from the lack of information.

The input values were obtained from the data released by the MTI (Ministry of Trade and Industry, 2009) and CNB (Czech National Bank, 2019). After increasing the discount rate by 1%, which reflects the specific risk associated with the lack of information when drawing-up the financial plan, the resulting value of the discount rate is 12.06%, which will be used for determining the value of company XYZ at the first valuation date.

Another step was to determine the growth constant  $g$ , which is the last one of the key values necessary for the calculation of the company value using the selected method. The value of the growth constant is in the range of the rate of growth of the CNB's target inflation rate and nominal GDP growth. The CNB's inflation target in 2007 was 3%. In 2010, the CNB announced a new inflation target of 2%. According to the Macroeconomic Forecast of the Ministry of Finance of the Czech Republic from January, real GDP growth was estimated at 5.0% (Ministry of Finance of the Czech Republic, 2008). Similar

GDP growth was expected by the CNB, whose estimated GDP growth was at the interval of 4.4%-6.6%. However, the strategic analysis of the company XYZ showed that the company did not have an important growth potential. In the long run, its objective was stagnation or slight growth. For this reason, the estimated growth constant was slightly above the CNB's inflation target applied since January 2010, which is 3%.

In this stage, there were collected all data necessary for the calculation of a usual price of the company XYZ at the first valuation data using the selected method. The valuation of the company at the first calculation data was carried out using Formula 1.

$$H = \frac{1,278,000}{(1 + 12.6\%)^1} + \frac{1,811,000}{(1 + 12.6\%)^2} + \frac{1,959,000}{(1 + 12.6\%)^3} + \frac{2,467,000}{(1 + 12.6\%)^4} + \frac{2,551,000}{(1 + 12.6\%)^5} + \frac{2,639,000}{(12.6\% - 3\%)^6} \cdot \frac{1}{(1 + 12.6\%)^6} \quad (4)$$

$$H \cong 20,942,000 \text{ CZK}$$

Using the two-stage variant of the DCF model, the value of the XYZ company was determined at CZK 6,231,000 in the first stage. In the second stage, the value was determined at CZK 14,711,000. By summing up the first and the second stage of the two-stage variant of the DCF method, the value of the company XYZ as of 17 February 2007 was determined at CZK 20,942,000.

#### Usual price of the company as of 14 July 2011

To determine the value of the company as of the date stated above, it was necessary to draw up the financial plan of the company XYZ, in this case for the period of 2012-2017. The resulting financial plan can be seen in Table 2.

Tab. 2: Financial plan of Company XYZ for valuation as of 14 July 2011 (in thousands CZK)

| Year | Operating results | Financial results | Wage – employee | Corrected operating result before tax | Tax | Corrected economic result after tax | Depreciation | Investments | Loan repayment | Drawdown of credit | FCFE |
|------|-------------------|-------------------|-----------------|---------------------------------------|-----|-------------------------------------|--------------|-------------|----------------|--------------------|------|
| 2012 | 2389              | 79                | 339             | 2128                                  | 404 | 1724                                | 1715         | 1117        | 274            | 0                  | 2047 |
| 2013 | 2472              | 81                | 349             | 2204                                  | 419 | 1785                                | 1767         | 1151        | 0              | 0                  | 2401 |
| 2014 | 2546              | 83                | 360             | 2270                                  | 431 | 1839                                | 1820         | 1185        | 0              | 0                  | 2473 |
| 2015 | 2623              | 86                | 371             | 2338                                  | 444 | 1894                                | 1874         | 1221        | 0              | 0                  | 2547 |
| 2016 | 2702              | 88                | 382             | 2408                                  | 458 | 1951                                | 1930         | 1257        | 0              | 0                  | 2624 |
| 2017 | 2783              | 91                | 393             | 2480                                  | 471 | 2009                                | 1988         | 1295        | 0              | 0                  | 2702 |

Source: Authors

Table 2 shows that the drawn-up financial plan indicates the assumption that the company XYZ will continuously increase its value for the shareholders.

As in the case of determining the usual price of the company as of the first valuation date, for determining the discount rate, formula 2 was used.

$$r_e = 3.79\% + 3.95\% + 1.41\% + 2.23\% = 11.38\% \quad (5)$$

The input values were obtained from the data released by the MTI (Ministry of Trade and Industry, 2012) and CNB (Czech National Bank, 2019). The growth in the risk premium for business risk is probably caused by the economic crisis, when generally all types of entrepreneurship started to be seen as more

risky than before. The same level of identified discount rate will be used for all future periods.

As in the case of determining the growth constant  $g$  for determining the value of the company XYZ as of the first valuation date, also in the case of determining the growth constant, it was based on two limit values, CNB's targeting inflation and estimated growth of GDP carried out by the Ministry of Finance of the Czech Republic. As mentioned above, the CNB's inflation target until January 2010 was set to 2%. The growth of the actual GDP was estimated by the Ministry of Finance to 2.5%. Nominally, the growth could achieve about 4.5%. As in the case of determining the growth constant for the first date of the company valuation, the results of strategic analysis were considered. The estimated growth constant was slightly above the CNB's inflation target applied since January 2010, that is, 2.5%.

At this point, all data necessary for the calculation of a usual price of the company XYZ as of the second valuation date using the same method as in the first case were available. Also in this case, formula 1 was used to determine the value of the company.

$$H = \frac{2,047,000}{(1 + 11.38\%)^1} + \frac{2,401,000}{(1 + 11.38\%)^2} + \frac{2,473,000}{(1 + 11.38\%)^3} + \frac{2,547,000}{(1 + 11.38\%)^4} + \frac{2,624,000}{(1 + 11.38\%)^5} + \frac{2,702,000}{(11.38\% - 2.5\%)^6} \cdot \frac{1}{(1 + 11.38\%)^6} \quad (6)$$

$$H \cong 24,690,000 \text{ CZK}$$

In the first stage, the value of the company XYZ determined using the two-stage variant of the DCF method was CZK 8,749,000, while in the second stage, the value was CZK 24,690,000 as of 14 July 2011.

The difference between the values of the company in the first and second stage indicated the increase in the value of the company XYZ. The value of the company increased by CZK 3,748,000 between the first and the second valuation date (CZK 24,690,000 – CZK 20,942,000 = CZK 3,748,000).

#### Factors influencing the change in the value of company XYZ over time

Based on the drawn-up financial plans for the determination of the values of the company for both valuation dates, as the main factors causing the increase in the value, three macroeconomic indicators and inflation were identified: sales in agriculture, change in the growth constant  $g$  and tax.

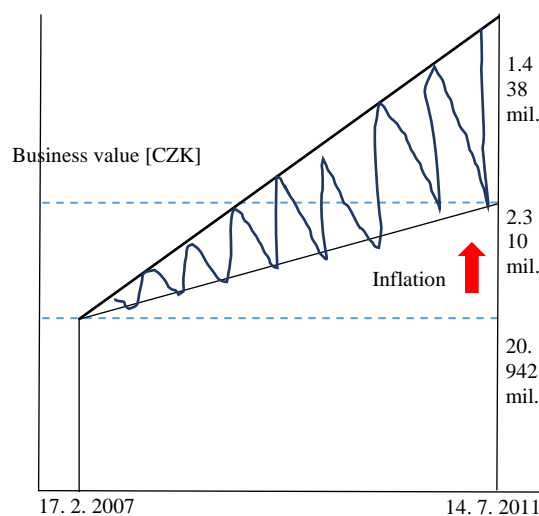
Based on the percentage difference of the values between both valuation dates (Czech Statistical Office, 2019), the percentage changes in sales in agriculture were set at 18.61%, the growth constants  $g$  at 16.667%, and the tax rate at 20.8334%.

Before the calculation of the individual factors' share on the increase in the company value, the original value of the company had to be increased by inflation between the first and second valuation date. In this period, the inflation increased by 11.04% (Czech Statistical Office, 2019), which is CZK 2.31 million in the case of the model company XYZ. The value of the company was thus increased by the inflation to CZK 23,252,000 (CZK 20,942,000 + CZK 2,310,000 = CZK 23,252,000).

Subsequently, the individual macroeconomic indicators' share on the increase in the value of the company by the remaining CZK 1,438,000.

(CZK 24,690,000 – CZK 23,252,000 = CZK 1,438,000) was calculated. Figure 1 shows the development of the XYZ company's value over time with the impact of inflation.

Figure 1: Development of Company XYZ's value over time with the impact of inflation



Source: Authors.

Calculation of percentage was carried out using the following formula:

$$x = \frac{1,438,000 \text{ CZK}}{(\text{difference of sales in agriculture} - g + \text{difference in tax})} \quad (7)$$

$$X = \frac{1,438,000 \text{ CZK}}{(18.61\% - 16.667\% + 20.8334\%)} = 63,135 \text{ CZK}$$

where: X is the amount of change in the value by 1%.

Subsequently, the individual macroeconomic indicators affecting the development of the company value were recalculated.

- Difference of sales in agriculture

$$63,135 \text{ CZK} * 18.61\% \cong 1,174,942 \text{ CZK} \quad (8)$$

- Growth constant g

$$g = 63,135 \text{ CZK} * (-16.667\%) \cong -1,052,271 \text{ CZK} \quad (9)$$

- Difference in tax

$$63,135 \text{ CZK} * 20.8334\% \cong 1,315,316 \text{ CZK} \quad (10)$$

The difference of sales in agriculture between the two valuation dates increased the value of the company XYZ by CZK 1,174,942, the decrease in the growth constant g between the two valuation dates reduced the value of the XYZ company by CZK 1,052,271, and the reduction of the tax rate between the two dates increased the value of the company XYZ by CZK 1,315,316.

## 5 Conclusion

The aim of the contribution was to determine the company value over time while considering the perspective of a third independent rational person.

The financial and strategic analyses carried out confirmed that the company meets the condition of "going concern". Based on the drawn-up financial plan for both valuation dates, the development of the company value was determined by means of the application of the DCF equity method in its two-stage variant. The same methodology was then applied in a model case

of the company XYZ operating in the agricultural sector. The development of the XYZ company's value was evaluated as positive based on the methodology used. The value of the company in the reference period increased from CZK 20,942,000 to CZK 24,690,000. It was thus an increase by CZK 3,748,000.

In the final part of the contribution, this amount was divided by the macroeconomic indicators that had been identified as key ones for the development of the value of the model company. The inflation increased the nominal value of the company by CZK 2,310,000. The difference of the sales in agriculture resulted in the increase of the value by CZK 174,942, the decrease in the growth constant g resulted in the decrease of its value by CZK 1,052,271, and the reduction in the tax rate caused the increase in the value by CZK 1,315,316.

All objectives of the contribution were thus achieved.

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**Primary Paper Section: A**

**Secondary Paper Section: AH**

# METHODOLOGY FOR DETERMINING THE RATE OF RETURN ON RENTAL OF BUILT-UP LAND

<sup>a</sup>JAROMÍR VRBKA, <sup>b</sup>PETR JUNGA, <sup>c</sup>TOMÁŠ KRULICKÝ

*Institute of Technology and Business, School of Expertness and Valuation, Okružní 517/10, 37001 České Budějovice, Czech Republic*

email: <sup>a</sup>vrbka@mail.vstecb.cz, <sup>b</sup>22879@mail.vstecb.cz, <sup>c</sup>krulicky@mail.vstecb.cz

**Abstract:** Establishing the usual rent for a built-up land with different landowners and owners of the buildings standing on it is a very specific phenomenon that has been widespread in the past. The aim of our paper is to compile a valid methodology for determining the usual amount of rent for 2016 and verify this procedure on a model example. For the determination of the usual amount of rent for the use of built-up land in 2016, the so-called simulated rent method was used, which is based on the rate of performance of immovable properties. The immovable property performance for 2016 was set at 5%. The usual amount of annual rent for a model built-up land should be, according to the usual prices from 2016, CZK 33,809 according to the used method.

**Keywords:** usual rent, simulated rent method, built-up land.

## 1 Introduction

In the case of building that is classified according to section 2 and 3 (1) Act No. 183/2006 Sb. on land-use planning and building regulations, standing on land owned by a person other than the owner of the building, the rights of the land owner are restricted (Czech Republic, 2006). This contradiction in property rights arose on the basis of the old Civil Code No. 40/1964 Sb. which expired on January 1, 2014 and which allowed this different ownership without the need for mutual written agreement between the two parties (Czech Republic, 1964). In this case, the landowner is limited in the possibility of using his own property. The owner of a land cannot commence an activity in connection with his land which would give them any benefit from his property.

The new Civil Code seeks to significantly reduce this state of property relations, but refers to this possibility in Sections 1240-1256 by a regulation on the "right of construction". By this right the owner of the land allows the owner of the building to have this building located on his land. On the basis of this agreement, the landowner will allow the building on his land. When negotiating this agreement, the amount of compensation usually also in the form of a financial consideration corresponding to the rent for the land is usually negotiated. Also, this right to use the land through the right to build can be abandoned for non-financial consideration or completely free of charge. The construction right is negotiated for a definite period with a maximum duration of 99 years (Vrbka et al., 2019).

Usually, in the case of financial performance, the amount of compensation for the impossibility of using the land by its owner is determined by the comparative method. Today it is rather a rare case of ownership relations between the owner of the land and the owner of the building standing on it. For this reason, and also because of publicly unavailable information on this condition and other information on comparable lands under the building of another owner, it is very difficult to find a sufficiently large set of the same cases and thus determine the amount of consideration using the comparative method (Vochozka et al., 2019). In our paper we are therefore going to deal with the determination of rent for built-up land using the so-called Simulated Rent method, which should belong to the landowner as compensation for allowing the building on his land. In case of sale of this land, according to section 3056 Act No. 89/2012 Sb., the Civil Code, the owner of the building has the pre-emption right under the same conditions as any other candidate (Czech Republic, 2012). The aim of the paper is to compile a methodology on the basis of which it is possible to determine the amount of usual rent for built-up land for 2016. Pursuant to Section 629 (1) of Act No. 89/2012 Sb., the Civil Code, according to which the rent is subject to the statutory limitation period of 3 years, so 2016 is historically the latest

possible, when applying a retroactive claim for financial compensation for allowing the building of a foreign owner on his land. (Czech Republic, 2012).

Our methodology will then be applied to a model case where the rent for a built-up area of 90 m<sup>2</sup> will be determined. One of the requirements for the methodology is its applicability to the whole territory of the Czech Republic, possibly also to other countries of the world. Due to the possibility of comparison, the price per 1 m<sup>2</sup> of this land will be considered as the basic conversion unit, either in the form of rent or the usual price of the land. Subsequently, we are going to verify the correctness of the unit price per m<sup>2</sup> of land we have found by confronting with regulation No. 441/2013 Sb. to implement the Act on Valuation of Assets, which in Annex No. 22 sets the rate of return according to individual types of immovable property.

## 2 Literature research

Soil is a key factor in spatial planning (Honová, 2009). This is a very limited production factor, particularly in some suburban areas (Ding, Lichtenberg, 2011). For this reason, great attention should be paid to methods of determining its value, especially in urban areas. It is necessary to realize that land is not a product of any production process, and by placing a building for any purpose, the whole of these possession is consumed at least until the life of the building (Torres, 2015).

For any type of land use it is possible to rent or lease it. In the case of land lease, the landowner leaves the land to the tenant for use and he pays the rent for it or gives him part of the proceeds (Brabenec, 2010). It is possible to lease agricultural land, plant or inventory (Czech Republic, 2012). On the other hand, the building plots, which were intended for the construction of buildings by the city plans, are rented. According to Rymanov (2017), it is possible to reduce the financial compensation for the use of agricultural land by reducing taxes on labor and capital. A reduction in those taxes could, in his view, offset the differences in the amount of the rent between the different plots of land with different characteristics which contribute to the formation of the rental price.

According to annual reports on the land market from farmy.cz portal, the price of agricultural land has been increasing in recent years. Since 2016 its price per m<sup>2</sup> has risen from CZK 20.41 to CZK 24.1 (between 2016 and 2017, the price per m<sup>2</sup> of agricultural land increased by 15.2% and between 2017 and 2018 by 2.4%) (farmy.cz, 2017, 2018, 2019). This is positive for the landowner, but very negative for the landlord.

The increase in rent for agricultural land is also responsible for increasing its average productivity by applying fertilizers or making it more efficient using more modern technologies. At this point, its value will increase along with demand. This claim was confirmed by Schadeva et al. (2016), which followed the development of land rentals in 1997-1998 and 2010-2011.

According to a study conducted in one of the larger German cities, the post-fordist urban hierarchy allows landowners to treat the land as a net financial asset. In this respect, this German city is above the average of all European cities. Rental of these immovable properties ensures their owners above-average income. In particular, in this German city, the increase in the income from the rent of land in the boroughs began to be most pronounced in the early 1990s (Schipper, 2013).

Tideman and Plassman (2018) state a high-quality transport network increases the value of construction in an urban environment. In critical cases, according to the authors, it may happen that the value of the building falls below the cost of its construction, which is a very negative phenomenon. This is said to be the case when the owner and landlord of the space in a

particular building is forced, for example, due to the concept of the city development plan, which significantly affects the attractiveness of its building in terms of transport services, reduce the amount required for selling or renting the building.

Krulický and Horák (2019) determined the rate of return on investment into an immovable property in the Czech Republic through long-term lease. They set the return on this investment into an immovable property to 3.58%, which does not include expected inflation as well as the potential increase in property value over time. With the usual expected annual rate of inflation in the Czech Republic, they set the overall rate of return at 5.58%. It is important to note that the immovable property itself does not lose its value in regular and proper maintenance, but its value is increasing. If such an immovable property is used by the owner for rent, its revenue from that property together constitutes two components. The first component is the financial performance received from the tenant for its use. The second and often neglected part of the return is the increasing value of this immovable property over time. This statement is supported by the fact that if a landowner owning a building has acquired its immovable property in the past and suddenly decides to sell it all over time, it would collect a higher amount of money for it than its purchase price. It is the difference between the purchase price and the subsequent sale of an immovable property that forms its second income component (Jakoubek and Brabenec, 2012).

Demetriou (2016) used an automatic valuation method for land valuation. It is a method that determines the value of a plot based on an artificial neural network (ANS). Based on the input data, the market value of a particular valued land is then determined. The real benefit of this paper is the connection of this artificial neural network with GIS systems. On the basis of that interconnection, the market value of any land can be determined by that method. Also Tayfur et al. used ANS to determine the amount of rent for land or building. (2014). ANS created by him estimates real the prices of immovable properties on the basis of natural disasters affecting the area of interest (earthquake, typhoon, etc.). It is clear from these claims that these disasters have a very significant impact on the level of rents. He also reminds that this ANS is also useful in designing the expansion of urban areas. With this approach, further urban development can be streamlined so that in the event of a natural disaster, the collapse of one building does not cause the collapse of other surrounding buildings, thus minimizing the financial and life losses of the affected population.

According to Yaygir and Hacikoylu (2018), the provision of revenue-generating services in commercial buildings increases the attractiveness of the entire site for entrepreneurs, investors and, last but not least, for clients using these services. These services usually help to expand the locality's civic amenities. At the same time, the attractiveness of a particular site will increase the value of neighboring plots. If this happens, the landowner should be entitled to a higher financial benefit from the lease of the land. Usually, however, the amount of the lease is fixed for a certain period of time and cannot be manipulated by the owner in any way. In this context, there is also the question of the course of use of buildings in the city center in the longer term. Chang (2016) recalls that with evolution, the society is demanding more and more new types of services and, as there is no more space for the construction of other buildings in the urban area, the existing building needs to be refurbished to provide other (new) kind of services or production of modern products.

Rebelo (2009) discussed the value of land on the basis of the usual selling prices of land by the municipal authorities. She subsequently modified these required amounts on the basis of the decision on the location of public and private activities on neighboring plots according to the city's development plan. She also observed the mutual characteristics between the building and land markets. Based on this, she prepared models that should be followed by real estate agents in determining the value of the land offered. Albouy et al. (2018) note the value of land in urban areas increases with the size of the city, as well as the value of agricultural land on the outskirts.

Kvíčalová et al. (2014) dealt with the economic level of households in various regions of the Czech Republic. In connection with this, the prices of rental and sale of immovable properties differ in particular regions and especially in their regional cities. Based on her findings, she states that using the Paerson correlation coefficient, she concludes that there is a high link between the various variables indicating the economic situation of the population in specific regions. She thus concluded that the GDP index has the greatest impact on the price formation of possession in the region. This is related to the difference in prices for the sale or rental of immovable properties.

Oertel et al. (2019) claims that, recently, due to the favorable economic environment in the US market with immovable properties, such properties have become the target of many European investors. The return on these properties is very lucrative for European investors. The European investor will earn more from renting an immovable property in the US than from an immovable property in Europe. It also appears that the risk of return on investment into an immovable property in the US is lower than in Europe. For this reason, they also claim that European investors are showing an increasing interest in investments in this direction. Srivatsa and Lee (2012) dealt with the convergence of rental and immovable property income in European countries. When the single currency (€) was adopted, it was possible to compare rental rates and rental income in different European countries. Sigma-convergence in rents and returns in individual European countries is very significant. Unfortunately, beta-convergence could not be determined. Lima Jr. And De Alencar (2008) conducted research in the same area. In their case, it was the attractiveness of investment for US investors in immovable properties in South American Brazil. Overall, they consider investment from the US as a very profitable type of investment. They add that in the Brazilian market with immovable properties, a US investor can earn higher returns than investment on the domestic real estate market.

Given the nature of the land as a specific production factor, special consideration should be given to its valuation when necessary. In many cases there is a high demand to determine its most accurate value. Over time, the value of this production factor also varies depending on many circumstances. The methods described above for determining the value of the land based on ANS and GIS (Demetriou, 2016), comparative methods based on data from various relevant sources (Rebelo, 2019; Albouy et al., 2018) and using the Paerson correlation coefficient (Kvíčalová et al. 2014) are not applicable to our specific case. These methods are always based on a large set of readily available data, from the perspective of the property relations of the land and the buildings on it. However, our specific case is rather rare, because at present we rarely encounter a situation in which a different landowner and an owner of the buildings standing on it are present. This type of ownership relationship is currently a remnant of the legislation that is no longer valid and therefore it is not possible to determine the value of our model land using any of the above methods. So we approach our very specific research question using our own land value method.

### 3 Materials and methods

Recent trends in the valuation field perceive valuation as a search for the shortest interval in which the resulting search value should fluctuate. The extent of the resulting interval then depends on the quality and quantity of the input data used, and ideally, it should be a determination of one particular value at a predetermined interval. At the beginning of any valuation, the searched value can range from  $-\infty$  to  $+\infty$  and by professionally selected methods, this interval narrows. The first step will be setting the lower and upper limits of the search interval.

The lower limit of the searched interval will be set at CZK 0 / m<sup>2</sup>. It is not assumed that there will be a negative benefit to the landowner, that is, the landowner should provide the owner of the building some financial performance. The land would also

suffer from a negative benefit even if the land yielded less benefit to its owner than is spent on its ownership. This is the case, for example, when spending large amounts on greenery maintenance. However, it cannot be assumed that the land in question brings negative benefits to its owner if the land is in a single functional unit by its non-standard standard. On the other hand, because of the limited land in the vicinity (the city center of Pilsen), the land benefits its owner in the form of a free area (garden) to the house and brings the possibility of commercial use – for example establishment of an outdoor terrace, commercial and restaurant premises, etc.

The upper limit of the search interval will be determined in the amount of rent for commercial premises - restaurants in Pilsen. It is possible to assume that the rent for the use of these premises, ie the use of the building, already includes the rent for the use of the land under the building. In the vast majority of cases, the ownership of land and buildings standing on it is unified, and therefore a similar intellectual distribution of rent for construction is rather a neglected fact and the landlord (the owner of the building and land) requires a cumulative return on both immovable properties. However, if this ownership is different, it can be concluded that the upper limit of the sought interval is just the rent required for the use of the entire building, incl. land. The upper limit of the interval will be determined by the comparative method.

As mentioned above, the so-called simulated rent method will be used to determine the rent, which should be within a defined interval. For its application it is necessary to determine the usual price of the land in question and to set a reasonable rate of return. The usual price of the land will be determined by the comparative method. The rate of land yield will be determined using causally-intuitive methods.

To determine the upper limit of the search interval, we will have a set of data on renting buildings with the same type of use from the same location in Pilsen, where our model land is located. The data are going come from real estate advertising servers. It should be noted, however, that due to the availability of data, we are forced to work with data from 2019, so it is reasonable to assume that the rental prices were lower in 2016 which does not pose any problem for the determination of the upper limit of the search interval for the building lease. Since this will be a heterogeneous set of data, we will have to convert it to the unit price for renting 1 m<sup>2</sup> of space so that we can then use the comparison method to determine the upper limit of the search interval. Since it will be a fully built land, the amount of its rent will be based on the amount of rent for the building on it. For the final determination of the upper limit of the search interval we use the mean value of the obtained data. Table 1 represents the amount of monthly rent for immovable properties with the same use in this location and their area.

Tab. 1: The amount of rent for the use of buildings of the same type of use with floor area

| Number of offer | Monthly rent | Area (m <sup>2</sup> ) |
|-----------------|--------------|------------------------|
| 1               | CZK 42,000   | 119                    |
| 2               | CZK 66,200   | 331                    |
| 3               | CZK 30,000   | 119                    |
| 4               | CZK 39,000   | 160                    |
| 5               | CZK 23,500   | 129                    |
| 6               | CZK 15,000   | 50                     |

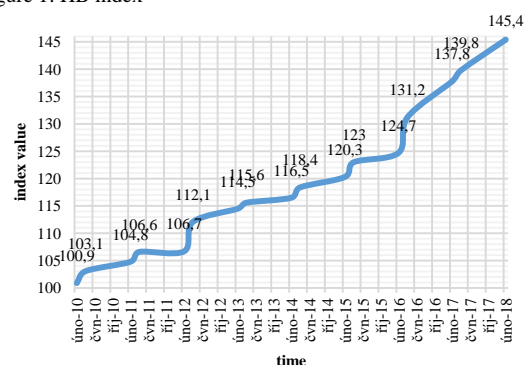
Source: Own

As outlined above, it will be necessary to determine the usual price of the land in question for the application of the simulated rent method. To determine the usual price of land, we will use a comparative method of all available data on the land sales made in this city. Since the data on land sales prior to 2016 represented a very small set of data to determine the usual price of the land in question, we had to base our data on sales made in the 2014-2018 period. This can only be assumed that data from years other than 2016 will be adjusted with regard to the development of the price of immovable properties which is expressed by the

HB index. After finding out the final prices for which the sale of land has been made in this period, the individual price per 1 m<sup>2</sup> will be calculated based on their area. Although the considered lands are located in the cadastral area of the city of Pilsen, their value will be influenced by other pricing factors. It will therefore be necessary to correct individual prices. This correction will be made by using four coefficients marked K<sub>0</sub> up to K<sub>3</sub>. These coefficients are size coefficient (K<sub>0</sub>), location coefficient (K<sub>1</sub>), coefficient of utilization and utilization rate (K<sub>2</sub>) and price adjustment factor (K<sub>3</sub>). The size coefficient (K<sub>0</sub>) expresses the influence of the size characteristics of the land on the unit price. In case of size characteristics, this is an expression of generally observed dependency according to which the unit price decreases as the acreage increases. The site coefficient (K<sub>1</sub>) expresses the suitability and attractiveness of the location of the assessed and compared lands. The locations closer to larger settlements, with good transport links and civic amenities, are rated as more attractive. The coefficient of utilization and utilization rate (K<sub>2</sub>) takes into account the possibilities of land use in terms of the documentation of territory planning, size and shape characteristics for the construction project.

The price adjustment coefficient (K<sub>3</sub>) is applied when the sale of a comparable immovable property was made more than one year later than the year (2016) in any course of time, i.e. older or even younger business cases. In our case, we therefore have to use this coefficient, which reflects the development of the prices immovable properties and is based on the HB index. The HB index is based on real estimates of market prices of individual immovable properties that have been financed through the bank (hypotecnibanka.cz, 2019). The HB index is constructed using a hedonic model that monitors up to 30 different property parameters, dividing immovable properties into three groups, namely apartments, houses and lands. Figure 1 shows its development for land.

Figure 1: HB index



Source: Mortgage Bank, 2018.

After obtaining such adjusted prices for these lands, a median calculation will be made to remove the extreme values on both sides of the price scale. This median will therefore represent the usual price of the land in question by applying the comparative method. The list of completed sales of land is shown in Table 2.

Tab. 2: The list of usable lands for construction from the time period of 2014-2018 for the determining of the unit price for the land in question

| Sale No. | Sale price     | Acreage (m <sup>2</sup> ) |
|----------|----------------|---------------------------|
| 1        | 3,725,000 CZK  | 790                       |
| 2        | 11,742,000 CZK | 1,957                     |
| 3        | 2,912,000 CZK  | 208                       |
| 4        | 350,000 CZK    | 86                        |
| 5        | 5,025,000 CZK  | 1,005                     |
| 6        | 3,150,000 CZK  | 451                       |
| 7        | 4,500,005 CZK  | 238                       |
| 8        | 3,928,500 CZK  | 428                       |

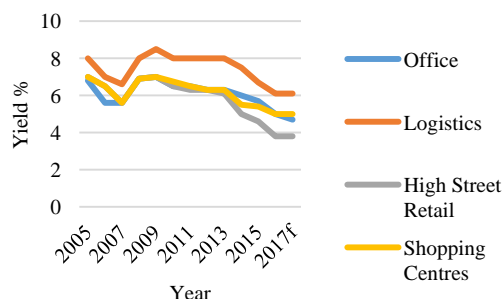
Source: Own

In total, eight cases of completed sales as well as currently offered lands for building on sale have been found, which we could use.

We will further discuss the determination of a reasonable rate of performance achieved by immovable properties in 2016. The performance of an immovable property is an annual percentage of the property's return in relation to its price, the so-called yield.

From a purely business point of view, renting a land means for a landlord a lower level of risk in comparison to renting a building. There are usually higher operational costs of buildings, while these costs are minimal in case of a built-up land. The same applies to the risk of damage or theft by the tenant. Yield values are published by international real estate agencies and consulting or investment companies. These companies usually report yield values for different types of immovable properties. As an example, we will show some of the graphs showing the development of the yield value in the Czech Republic (Figures 2 and 3).

Figure 2: the development of the yields of immovable properties in the Czech Republic in the period of 2005-2017 according to BNP Paribas

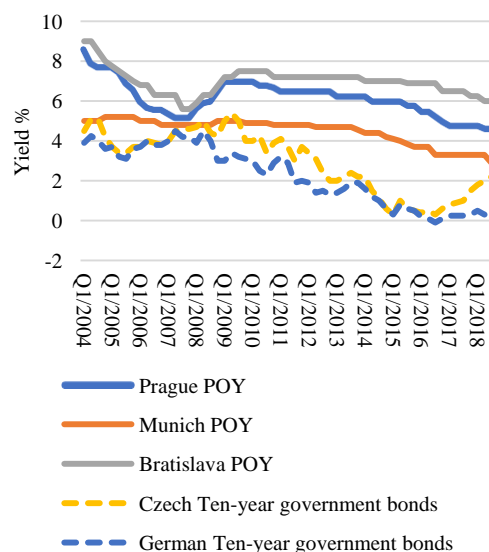


Source: BNP Paribas Real Estate, 2017

According to BNP Paribas (2017), prime yield in all real estate segments fell by 0.8 pp to below 5% for office space during 2016. The yield of shopping and retail space decreased by 0.4 pp to 5% during 2016, and the storage space yield fell by 0.75 pp to 6%.

REICO of Česká Spořitelna a.s. is a 100% daughter company of Česká Spořitelna a.s. that is a member of an multinational Erste Group AG. REICO deals with investments into immovable properties and property market analysis and publishes information about acquired yields of immovable properties. REICO holds CSNF – Česká Spořitelna property fund, which is one of the oldest immovable property funds in the Czech Republic, and registers properties in the Czech Republic, Slovakia and Poland. According to their study, "Prime Office Yield" was around 5.5% in the second half of 2016 and was in a decline. The historical development of Prime Office Yield is shown in Figure 3.

Figure 3: Development of property yield in the Czech Republic in the period of 2004-2018 according to REICO



Source: REICO, 2019

Another internationally recognized real estate agency is the CBRE multinational group. According to its report on the immovable property market in 2016, the yield of office space in Europe was around 4.5% (CEE, 2017). Moreover, companies such as the DRFG investment group, the Deloitte and KPMG advisory groups and Duff & Phelps are also involved in determining yield levels.

In terms of investment into an immovable property, the rate of business risk is of great importance to the investor. The business risk is determined by the Ministry of Industry and Trade for individual business activities in the Czech Republic. The data published by the Ministry of Industry and Trade (2017) are used to calculate the amount of costs using the modular method, one of the components of the cost of equity is a premium for a business risk. The premium for business risk (marked as  $r_{pod}$ ) expresses the level of risk depending on the field of business activity or the prevailing field of business and is determined for individual branches of the economy classified by CZ-NACE. The activity of landlords, real estate agents or brokers is in the field of L – real estate activities. According to the Financial Analysis of the Corporate Sector for the year of 2016 in the section of CZ Nace L Group – real estate activities, the premium for business risk ( $r_{pod}$ ) of the whole business sector was 4.19%.

At this stage of our research, all the necessary data are available to determine the simulated rent for this type of built-up land in the required year. The simulated rent reflects the assumption of validity of a certain link between the usual price of the object lease and the required rent. The simulated rent is calculated from the formula No. 1.

Formula No. 1: the calculation of simulated rent

$$\text{usual price} * \text{rate} = \text{simulated rent} \quad (1)$$

Subsequent multiplication of the calculated amount of simulated rent by the acreage of land gives the resulting amount of simulated rent for built-up land in 2016. This value will therefore correspond to the potential yield for the owner of the built-up land. It will be an adequate amount of financial compensation for preventing the disposal of their land for the purpose of generating revenue in 2016.

Since there is a regulation (Czech Republic, 2013) concerning the method of valuation of assets in the Czech Republic, we will use this regulation to verify the accuracy of the calculation

according to the methodology we propose. This regulation takes into account three indices when determining the usual price of land. The Real Estate Market Index ( $I_T$ ), Land Position Index ( $I_p$ ) and Restrictive Index ( $I_o$ ), will be calculated according to the relevant formulas in this regulation. Pursuant to Section 4 (1) of regulation No. 441/2013 Sb. the basic price will be set for one  $m^2$  of this type of land according to formula No. 2 (Czech Republic, 2013).

Formula No. 2: The total index  $I$

$$I_T * I_p * I_o = \text{total index } I \quad (2)$$

#### 4 Result

On the basis of the methodology, the upper limit of the rent valid for 2019 is set first. The resulting value is calculated according to Table 1 (see above). By dividing the required rent by the floor area of similar restaurant facilities, we have obtained the results shown in Table 3. A total of six offers have been found on the advertising servers of real estate agencies to rent similar buildings in the West Bohemian metropolis, where our model land is located.

Tab. 3: The evaluation of the rent in a restaurant facility

| Offer No.  | Monthly rent | Acreage ( $m^2$ ) | Rent per unit (CZK/ $m^2$ ) |
|------------|--------------|-------------------|-----------------------------|
| 1          | 42,000 CZK   | 119               | 353                         |
| 2          | 66,200 CZK   | 331               | 200                         |
| 3          | 30,000 CZK   | 119               | 252                         |
| 4          | 39,000 CZK   | 160               | 244                         |
| 5          | 23,500 CZK   | 129               | 182                         |
| 6          | 15,000 CZK   | 50                | 300                         |
| Mean value |              |                   | 255                         |

Source: Own

The mean value of these rents is determined on the basis of the results of unit prices per  $m^2$  of rented buildings used for restaurant and catering activities. On the basis of our calculation it can be stated that the upper limit of the rent per unit price per  $m^2$  of our model land is 255 CZK /  $m^2$ . Subsequently, eight plots of land have been found which were either sold in the past or are currently being offered for sale. The final sale price was monitored in case of already completed sales; the current sale price and the area of the land in offer were monitored as well. Using these two figures, the usual unit price per  $m^2$  of land, which had been sold or offered, was determined again. Table 4 shows a list of completed sales and current offers of land. Table 4 also shows the correlation coefficients  $K_0 - K_3$  used to correct the unit price of each land. The last column of Table 4 represents the adjusted unit price per  $m^2$  of land according to the correlation coefficients. The last column of Table 4 represents the adjusted unit price per  $m^2$  of land according to the correlation coefficients.

Tab. 4: The determination of the usual price of lands usable for construction

| Sale price (CZK) | Acreage ( $m^2$ ) | Unit price (CZK/ $m^2$ ) | $K_0$ | $K_1$ | $K_2$ | $K_3$ | UJC* CZK/ $m^2$ |
|------------------|-------------------|--------------------------|-------|-------|-------|-------|-----------------|
| 3,725,000        | 790               | 4,715                    | 1.08  | 1     | 0.9   | 1     | 4,583           |
| 11,742,000       | 1,957             | 6,000                    | 1.15  | 1     | 1     | 0.88  | 6,072           |
| 2,912,000        | 208               | 14,000                   | 1     | 1.05  | 1     | 0.94  | 13,818          |
| 350,000          | 86                | 4,070                    | 1     | 1.1   | 1     | 0.94  | 4,208           |
| 5,025,000        | 1,005             | 5,000                    | 1.1   | 1.05  | 1     | 1     | 5,775           |
| 3,150,000        | 451               | 6,984                    | 1.05  | 1.1   | 1     | 1.11  | 8,954           |
| 4,500,005        | 238               | 18,908                   | 1     | 1.1   | 1     | 1.07  | 22,254          |
| 3,928,500        | 428               | 9,179                    | 1.05  | 1.05  | 1     | 1     | 10,120          |
| Median           |                   |                          |       |       |       |       | 7,513           |

\*UJC – adjusted unit price

Source: Own

To remove the extreme values at both ends of the price scale, the median of all obtained adjusted unit price values per  $m^2$  was calculated. The median was set at CZK 7,513 per  $m^2$ .

On the basis of publications issued by domestic and foreign institutions, the percentage yield on an immovable property was determined. The yield of Czech immovable properties in 2016 ranging from 4-6% was consistently confirmed by the surveyed studies of investment and consulting companies. Based on the available data and economic theories we determined the yield value in this interval. According to ARTN (2017), publishing BNP Paribas results, the prime yield in 2016 fell to just below 5%. In 2016, the DRFG (2018) recorded a 5.04% yield on investment in immovable properties. According to REICO, the value of yield in the second half of 2016 was 5.5% and was in decrease (REICO, 2019). CBRE set the yield value in the Czech Republic for 2016 at approx. 4.5% (CBRE, 2017). The advisory group Deloitte and KPMG set the yield value in 2016 at 5.25% (Deloitte, 2019) and approx. 5% (KPMG, 2016). Duff & Phelps set the yield for 2016 at 4% (Duff & Phelps, 2017). These determined yield values are usually based on the rent of the building, including its land, where the risks from the rent are higher.

According to the Ministry of Industry and Trade (2017), the risk of own business activity in the economic sector of the business with immovable properties was assessed at 4.19%. Thus, the adequate business yield to cover the business risk in the sector, which the entrepreneur voluntarily undertakes to do business in this market, was just 4.19%.

Based on this data, using causally-intuitive methods and risk analysis for the owner of a land under construction, such as the risk of theft, destruction or depreciation of the land, which range from low to moderate in terms of probability and impact, we consider the mean value of immovable property yield of 5.0% for the final calculation of simulated rents. It is necessary to state that all companies dealing with yield values report that the value of the yield in the Czech Republic declined quite steeply in 2016 for all types of immovable properties according to their use.

The final amount of the usual rent for one  $m^2$  of built-up land for the calendar year 2016 was determined by the use of a simulated rent according to the relation given in the methodological part of the contribution. The calculation according to the formula No.1 is the following:

$$7,513 \text{ Kč} * 5.0\% = 375.65 \text{ CZK} \quad (3)$$

Subsequently, it is necessary to multiply the determined value by the acreage of the land. The acreage is 90  $m^2$ . The final calculation is in the following form:

$$375.65 \text{ CZK} * 90 \text{ m}^2 \doteq 33,809 \text{ CZK/year 2016} \quad (4)$$

The usual amount of annual rent for a built-up land should be 33,809 CZK according to the usual prices from 2016 according to the simulated rent method.

However, it is necessary to realize that this yield at the value of the above mentioned 5.0% is only for the renting of the land itself, the value of which is determined by the building standing on it. The secondary yield from this land is an increase in its value for its owner in the long term. If the landowner decides to stop renting his land and sell it to the landlord under a pre-emptive right or to another person, he will undoubtedly receive a higher financial performance for it than he had paid when he initially acquired it. This fact is often neglected in the literature. The total economic return on the land is therefore greater in the course of time. It is mentioned for example by Krulický and Horák (2019).

In order to verify the accuracy of our calculation and the applicability of our proposed rent calculation methodology by the use of the simulated rent method, our results have been compared with regulation No. 441/2013 Sb. Pursuant to Section

4 (1) of this regulation, the basic price of this type of land was set at CZK 5,550. The immovable property market index was 1.010, the land location index was 1.340 and the restrictive index was 1.000. The total index is equal to the product of all three indexes. The calculation of the total index is done according to the formula No.2.

$$1.010 * 1.000 * 1.340 = 1.353 \quad (5)$$

Subsequently, the base price of this land was multiplied by the total index I to determine the land price. After multiplying by the total index we got the determined price of land in the amount of 7,509.15 CZK/m<sup>2</sup> (based on our methodology set at 7,513 CZK / m<sup>2</sup>). It can therefore be claimed that a very similar value of the land can be obtained by applying the procedure of the determining of the usual price of land that is usable for building when the correlation coefficients are employed.

The unit monthly rent for one m<sup>2</sup> of our built-up land is 31.3 CZK / m<sup>2</sup> (375.65 CZK / 12 = 31.3 CZK). Given the location of the compared lands, which are located in the wider centre of the West Bohemian metropolis, it can be stated that the amount of annual rent of the model built-up land set by us is adequate.

## 5 Conclusion

Our paper describes the methodology proposed by us for calculating the usual amount of rent for a built-up land with a different owner than the owner of the building standing on this land for the period of 2016. In our methodology we described all the steps that had to be taken before applying the simulated rent calculation method itself. This was a very specific case of determining the amount of rent for a land. Due to the nature of the model land it was not possible to use the standard comparison method to determine the rent. The whole methodology was applied to a model case that reflects the aforementioned ownership relationships. Our calculations were confronted with the regulation No. 441/2013 sb. (Czech Republic, 2013). Our proposed methodology is applicable throughout the Czech Republic. Unit monthly rent was also determined. All the objectives of the paper were thus met.

It is also worth remembering that institutions determining immovable property yield also monitor foreign markets with immovable properties. When obtaining this data for a particular country, it is certainly possible to apply our methodology to other countries. The paper thus significantly contributed to the professional discussion on the topic.

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**Primary Paper Section: A**

**Secondary Paper Section: AH**

## VERIFICATION OF NEW ELECTRONIC TECHNICAL TEXTBOOKS IN THE CURRENT SCHOOL

<sup>a</sup>LUBOMÍR ŽÁČOK, <sup>b</sup>MILAN BERNÁT, <sup>c</sup>RENÁTA BERNÁTOVÁ

<sup>a</sup>*Matej Bel University in Banská Bystrica, Faculty of Natural Sciences, Department of Technology, Tajovského 40, 974 01, Banská Bystrica, Slovakia*

<sup>b</sup>*University of Prešov in Prešov, Faculty of Humanities and Natural Sciences, Department of Technology, Ul. 17. Novembra 1, 081 16, Prešov, Slovakia*

<sup>c</sup>*University of Prešov, Faculty of Education, Department of Natural Sciences and Technological Disciplines, Ul. 17. Novembra 15, 080 01, Prešov, Slovakia*

email: <sup>a</sup>lubomir.zacok@umb.sk, <sup>b</sup>milan.bernat@unipo.sk, <sup>c</sup>renata.bernatovala@unipo.sk

The scientific study was written as a part of the project VEGA 1/0147/19 Research degree of correlation between knowledge and skills to solve technical problems in vocational and technical education.

**Abstract:** In the Slovak Republic, there are still no textbooks for technical education in lower secondary education. The authors work on creating modern electronic and multimedia textbooks. In the scientific study, the problem of verifying the new electronic textbook for technical subjects in primary school is being solved. Textbooks are important in the educational process. Before the introduction of the electronic textbook into practice, the authors decided to scientifically verify the electronic textbook in practice. In the first part of the article, they describe the characteristics of the textbook. Another part of the study is devoted to setting research hypotheses. Subsequently, the hypotheses were verified in practice. We have found that our electronic textbook has its meaning in practice. The pupils who worked with her achieved higher achievements. Differences between pupils in the control and experimental groups were also statistically significant. The differences were statistically significant at all three levels of learning according to Niemierkos taxonomy of educational objectives. This is an important finding in our research process. We can state that a quality and scientifically valid textbook will contribute to the effective teaching of technology in the Slovak Republic.

**Keywords:** electronic textbook, pupils, education, technology, school

### 1 Introduction

The content of the subject matter is enriched by information connected to the relation of man to work, with the need to acquire basic work skills and habits in different work areas. Education in this area is heading towards creating and developing key competencies of students by leading them to objective learning of their surroundings, to the needed self-confidence, to a new attitude and values in relation to work of man, to technology and to the environment. Goals of technical education at elementary schools include cognitive, affective and psychomotor areas which need to be developed proportionally. Teachers in the educational process manage both technical and professional facts and make students acquainted with them. To reach the goal, they use appropriate teaching aids, both traditional and modern, as necessary (Askerud, 1998). The information age has brought ICT technologies to the educational process, and they are opening new dimensions for it. Computer-aided instruction may change the traditional form of education from passive acquisition of information into an active discovery. Teachers cease to be only intermediaries of knowledge, but they become managers of the cognitive process of their students. Education using new forms with the help of ICT was relevant mainly to universities, which have a modern information infrastructure with a quick access to the Internet. Both secondary and elementary schools are beginning to use this type of education increasingly more. Literary teaching aids prepared in an electronic form represent an important element of the system of teaching aids. They represent a basic source of information which contains didactically compiled subject matter delimited by the curricula, prepared in line with didactic principles. The aim of our scientific study is to briefly characterize the process of developing an electronic textbook for the "Technology" subject for the fifth grade in lower secondary education. We have also included outcomes of the performed pedagogical experiment focused on verification of an electronic textbook named "Technology for the 5th Grade of Elementary Schools".

### 2 Brief characteristics of the electronic textbook and of electronic texts

The electronic textbook has its place in the system of literary teaching aids (Žáčok, 2016). Electronic text is an ordered set of understandable signs and format information capturing a string of ideas of its author. It is also very easy to transform electronic texts formally; during such transformation the sign system changes, but the content does not. Sign systems used by humans in the form of a text, image, sound and other combinations are automatically transformed into a digital system both when being saved in the computer and when exiting the computer. Data may then be transferred easily and at high speeds from one medium to another (e.g. from a hard disk to a CD-ROM or a Flash disk). Programmes enabling easy automatic content transformation are gradually developed, e.g. different kinds of text condensation with minimum information losses. Interactivity is demonstrated not only in the possibility of automatic search for text strings but also in the fact that each reader can work with a document based on the status of their knowledge basis and the choice of process alternatives and the reader has e.g. a possibility to communicate with the author. In addition, a full text method (full text, natural language processing) may be used in digitalized texts. Artificial intelligence may be used to recognize objects in digitalized images, etc. (e.g. when recognizing objects in aviation images). Electronic textbooks are characterized by easy and flexible manipulation with data and their files saved in the computer, what is demonstrated in any structuring or restructuring a text, image or a musical work (Bloor, 1992). Contrary to traditional texts which worked with one type of data at a time, electronic texts enable to combine text, visual and acoustic data or video sequences and their simultaneous viewing in one device.

### 3 Methodology of Research

When dealing with the topic of the scientific study, the goal of the authors was to characterize the reasons for developing and the importance of textbooks in technical education at elementary schools. In the empirical part, the authors are focused on the researched topic "To what extent the developed and applied electronic textbook effects students when performing better in the cognitive and psychomotor areas". The authors have opted for corresponding methods to help them achieve the set objective. Main methods applied during review of expert and scientific studies included analysing the acquired knowledge and the development tendencies in the education system. In a pedagogic experiment we compared groups of students. In one group of students, instruction was carried out using traditional methods, and in another group of students, the instruction was carried out using a developed electronic textbook. A non-standardized didactic test was used to compare performances of the students. We have designed the didactic test according to Turek (1995). We have also discovered that the outcomes (performances of students) in the control and in the experimental groups are different and statistically significant.

We were trying to find out the extent in which the new Technology textbook will help 5th grade students or influence the degree of their acquired knowledge. Instruction in a control group (C) was carried out in a traditional manner (students did not work with the new textbook) and students in an experimental group (E) worked with the new textbook. After the end of instruction in the control and in the experimental groups we used a didactic test for both groups at the end of the natural pedagogical experiment. The didactic test was intended for 5th grade students at elementary schools. The didactic test was a non-standardized continuous NR test. We established the following hypotheses:

*H<sub>0</sub>: Results achieved in the non-standardized didactic test will be equal in the control and in the experimental groups.*

*H<sub>1</sub>: As a result of instruction with the new textbook, respondents of the experimental group will perform better in the cognitive*

area compared to the control group where instruction will be carried out using traditional methods without the new electronic textbook.

$H_{1,1}$ : We suppose that as a result of instruction with the new textbook, students of the experimental group will perform better in the "remembering" learning level compared to the control group students where instruction will be carried out without the new electronic textbook.

$H_{1,2}$ : We suppose that as a result of instruction with the new electronic textbook, students of the experimental group will perform better in the "understanding" learning level compared to the control group students where instruction will be carried out without the new electronic textbook.

$H_{1,3}$ : We suppose that as a result of instruction with the new electronic textbook, students of the experimental group will perform better in the "specific transfer" learning level compared to the control group students where instruction will be carried out without the new electronic textbook.

The researched sample was composed of 5th grade students of elementary schools. We researched 1 control group consisting of 300 students and 1 experimental group consisting of 300 students. The control and experimental groups represented a sample with 600 students. A basic set included 40 elementary schools from all eight regions in the Slovak Republic. (By drawing lots) we randomly chose 16 (two schools from each region) elementary schools where the pedagogical experiment was being carried out. Students were randomly (by drawing lots) divided into two groups - an experimental and a control group. The control and the experimental groups were equal in terms of the number and the gender of students. The pedagogical experiment was conducted in the 5th grade of elementary schools, while none of the students had repeated any previous grade and the students were of almost the same age.

We focused on the structure of a non-standardized didactic test. We used a cognitive didactic Technology test (hereinafter referred to as "DT") for the 5th grade of elementary schools.

As a second step we delimited a rough content of the DT. The rough content of our DT is as follows:

- Man and technology;
- Man and production in practice;
- Utility and gift objects.

When preparing the non-standardized didactic test we followed Turek's principles (1995). Our aim was that the didactic test covers the inspected subject matter in an even and representative manner, i.e. to achieve the highest content validity of the DT. We analysed specific goals. In our case specific goals are subordinated to general educational goals and they respect acquisition of key competencies of 5th grade students in Technology. We prepared a specification table (Table 1). The specification table determines the content on which the tasks of the DT should focus, their numbers and levels of acquisition of knowledge according to Niemierko's taxonomy of educational goals.

Table 1: DT specification table

| Sequence number | Topics  | Number of tasks for: |               |                   |
|-----------------|---|----------------------|---------------|-------------------|
|                 |   | remembering          | understanding | specific transfer |
| 1.              | Man and technology                                      | 1                    | 2             | 0                 |
| 2.              | Professions of craftsmen in the past and at present     | 1                    | 1             | 0                 |
| 3.              | Product, creation of a simple product                   | 1                    | 1             | 1                 |
| 4.              | Sketch of a simple product                              | 0                    | 0             | 1                 |
| 5.              | Technical materials and tools for product manufacturing | 1                    | 0             | 0                 |
| TOTAL           |   | 4                    | 4             | 2                 |

In the step IV, we determined the form of DT tasks. We prepared both open and closed tasks for the DT. We prepared open (production and fill-in) tasks with brief answers. Closed tasks were mainly matching tasks and tasks with selection of correct answers. We proposed different tasks in our DT. When formulating them, we used the following pedagogic documents: textbook, national and school educational programme and written preparations for instruction units. We designed a bank of tasks for the DT, from which we chose 10 tasks for the DT. We opted for a 10-minute test duration. Students had the least time for tasks where correct answers were to be selected. Tasks in which students were adding (creating) answers were more time-consuming. For these tasks, we increased the necessary test time to 1-2 minutes. We prepared two variants of DT tasks with different sequences of the tasks. We assigned weights of significance to the tasks, which may be seen in the Table 2.

Table 2: Weighing DT tasks

| Learning level         | Remembering | Understanding | Specific transfer | Non-specific transfer |
|------------------------|-------------|---------------|-------------------|-----------------------|
| Weight of significance | 1           | 2             | 3                 | 4                     |
| Task No.               | 1,4,9,10    | 2,3,5,6       | 7,8               | -                     |

Since our DT contained fewer than 20 tasks, we proposed a comprehensive scoring of tasks in the DT. The Table 3 contains a detailed analysis of DT scoring.

Table 3: DT scoring

| Task | Number of /scored/ points | Description   |
|------|---------------------------|---|
| 1    | 0.5                       | 0.5 point for the correct answer.                         |
| 2    | 1                         | 1 point for the correct answer.                           |
| 3    | 1                         | 1 point for the correct answer.                           |
| 4    | 0.5                       | 0.5 point for the correct answer.                         |
| 5    | 4                         | 0.5 point for each correct answer, max: 4 points.         |
| 6    | 2                         | 1 point for correctly matching the answer, max: 2 points. |
| 7    | 3                         | 1 point for each correct answer, max: 3 points.           |

|    |     |   |
|----|-----|---|
| 8  | 3   | Max. 3 points for drawing a correct sketch. |
| 9  | 0.5 | 0.5 point for the correct answer.           |
| 10 | 0.5 | 0.5 point for the correct answer.           |

DT tasks are assigned weights of significance because not all tasks are always equal. It is always more valuable to understand something than only to remember it, and it is even more valuable to be able to apply what has been learnt than to understand it. We consider such differences when allocating the weights of significance. Tasks in the DT, in our case prepared based on 3 levels of acquisition of subject matter, which are solved only by remembering something, have been assigned the weight of significance 1, tasks with understanding have received the weight 2, and tasks focused on a specific transfer have been given the weight 3.

#### 4 Statistical Verification of Research Hypotheses and Results of Research

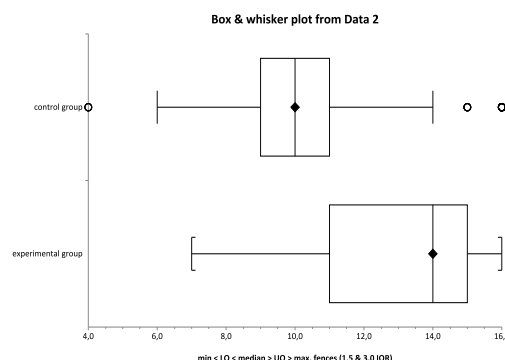
We wished to know the performances of students in the didactic test. If they filled in the 5th grade didactic test correctly, 5th grade students could be awarded the highest gross score (GS) of 16 points. It is obvious from the descriptive statistics (Table 4) that 5th grade students of the experimental group mastered the subject matter more successfully than students of the control group. The calculated arithmetic average and the standard deviation were calculated in the reliability interval: lower interval: -95%, upper interval +95%. We may conclude from the average acquired from the measured researched sample that the calculated arithmetic mean for the experimental group is from the measurement reliability interval of 12.41 to 13.00, and for the control group, it is from the measurement reliability interval of 9.85 to 10.36. We have also found out that deviations of values from means are not so high, so we may state that the arithmetic means are more valid. The variation range is from 4 (minimum value) to 16 (maximum value). The Table 4 shows that the minimum score awarded in the didactic tests for the 5th grade was 4 points and the maximum score was 16 points. The median calculated for the control group was 10 and for the experimental group 14. That is to say, half of students in the control group scored  $\leq 10$  points in the DT, and the other half of students scored  $\geq 10$  points in the DT. In the experimental group, a half of students scored  $\leq 14$  points in the DT, and the other half of students scored  $\geq 14$  points in the DT. Based on the descriptive statistics, we may also state that the sharpness coefficient is not equal to zero, and we therefore conclude that the distribution of values is sharper (asymmetric) than the standard distribution of values.

Table 4: Basic (descriptive) statistics

| Variables              | control group | experimental group |
|------------------------|---------------|--------------------|
| Valid data             | 300           | 300                |
| Missing data           | 0             | 0                  |
| Sum                    | 3,032         | 3,812              |
| Mean                   | 10.106667     | 12.706667          |
| Variance               | 5.145775      | 6.789922           |
| Standard deviation     | 2.26843       | 2.605748           |
| Variance coefficient   | 0.224449      | 0.205069           |
| Standard error of mean | 0.130968      | 0.150443           |
| Upper 95% CL of mean   | 10.364402     | 13.002728          |
| Lower 95% CL of mean   | 9.848931      | 12.410606          |
| Geometric mean         | 9.847348      | 12.413884          |
| Skewness               | 0.506633      | -0.396087          |
| Kurtosis               | 4.27024       | 2.092984           |

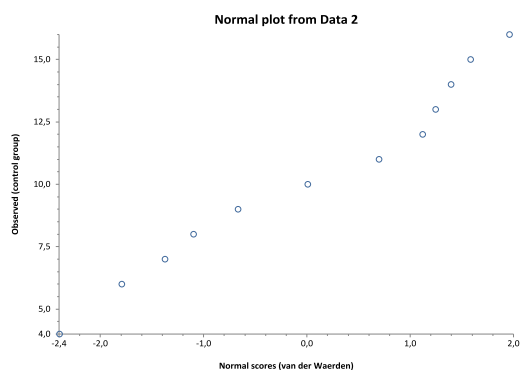
|                     |    |    |
|---------------------|----|----|
| Maximum             | 16 | 16 |
| Upper quartile      | 11 | 15 |
| Median              | 10 | 14 |
| Lower quartile      | 9  | 11 |
| Interquartile range | 2  | 4  |
| Minimum             | 4  | 7  |
| Range               | 12 | 9  |
| Centile 95          | 15 | 16 |

We may also see in graph 1 that the results achieved in the experimental group were better than in the control group. It is obvious from Fig. 1 that the mean value of the set is equal to 10 in the control group and to 14 in the experimental group. The median is the mean value which divides a relevant sequence of values into two approximately identical halves. In the case of systemic division of values, the median is equal to the mean. In our case, we have found out that the calculated arithmetic mean and the median are not equal. We have measured a higher deviation of the median from the mean in the experimental group. The quartile range represents the area of mean 50% of values of the variables, i.e. from 6 to 14 in the control group and from 7 to 16 in the experimental group. That is to say, it represents a difference between the third and the first quartile (75th and 25th percentile). The quartile range is important for determining the so-called outliers. In our case, we have found out that there are few outliers beyond the (quartile range) interval in the researched set.

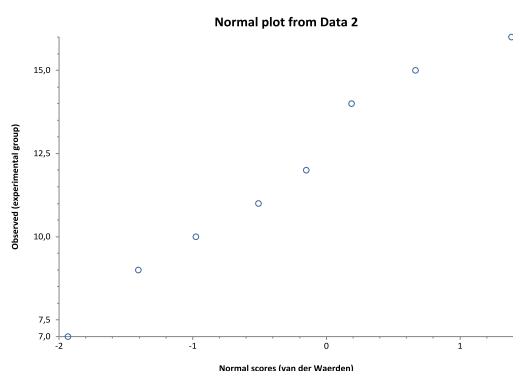


Graph 1: Median, quartile and variation range of the variables from the exit test in the 5th grade

We analysed the values to find out if such outcomes are statistically significant. To be able to choose a correct analysis of values, we had to examine the assumption of standard distribution of likelihood of random errors first. We examined the assumption of standard distribution of likelihood of random errors using normality charts (Graph 2, Graph 3) and also by comparing variances of basic sets. The charts (Graph 2, Fig. 3) are not clearly symmetric, and the calculated variances are not equal either. The residuum is the difference between an actual and an estimated value. In our case, residua have no standard distribution because the residua normality chart did *not form a line*, or, in other words, the form of standard likelihood charts is not acceptable (Graph 2, Graph 3). Graph 2 and graph 3 indicate that the assumption of standard distribution of the basic set was not correct.



Graph. 2 Assessing the normality of accidental errors – chart of normality of residues in the control group



Graph 3: Assessing the normality of accidental errors – chart of normality of residues in the experimental group

Based on the discovered facts we decided to use a non-parametric Kruskal–Wallis test to find out the existence of statistically significant differences between the control and the experimental groups (Chajdiak & Rublíková, 1994).

Since we compared the results of students from the control and the experimental groups, we are verifying the validity of the zero hypothesis by analysing the variance (using a non-parametric test, more particularly). We compared the results on the significance level of  $\alpha=0.05$ . The significance level is an expected likelihood of rejecting the zero hypothesis which we have determined before. In our case, the p value (calculated value) is the lowest likelihood for rejecting the zero hypothesis determined based on results of selective finding. Therefore, we identify the two values with different symbols. The way how we may decide about the test result is to compare the p value and the  $\alpha$  significance level. The following rule applies (Chajdiak, 1994):

For the particular  $\alpha$  significance level:

1. we are rejecting the zero hypothesis if  $\alpha \geq p$  value.
2. we are accepting the zero hypothesis if  $\alpha < p$  value.

This form of testing is the fastest and the most comfortable if we have a computer available because most statistical programme systems calculate the p value. In this case, it is enough if we compare the p value with the  $\alpha$  significance level which we have determined, and we may decide about the test result very quickly and simply (Meyer & Seaman, 2014).

The below-stated text contains a calculation and a finding if there are statistically significant differences in performances of students of the control and the experimental groups and also in

performances of students of the control and the experimental groups at the remembering, understanding and specific transfer learning levels.

Table 5: Kruskal–Wallis test (total performances of students)

|  |
|--|
| Variables: control group, experimental group |
| Groups=2                                     |
| df=1   |
| total observations = 600                     |
| T = 135.169201                               |
| P<0.0001                                     |
| Adjusted for ties:                           |
| T = 135.111137                               |
| P < 0.0001                                   |

In our case, the measured p value is the lowest likelihood for rejecting the zero hypothesis determined based on results of selective finding. In our case, the calculated p value (Table 5) is lower than the  $\alpha$  value (0.05). The test statistics is in the area of rejecting the zero hypothesis. We are therefore rejecting the zero hypothesis and concluding that the achieved results are statistically significant in favour of the experimental group. Such finding is significant at the  $\alpha$  significance level of 0.05 (95%). To conclude, we may express significance of the  $H_1$  hypothesis, i.e. the  $H_1$  hypothesis has been proved correct with the significance level  $\alpha$  of 0.05 (95%).

Table 6: Kruskal–Wallis test (performances of students at the "remembering" learning level)

|  |
|--|
| Variables: control group, experimental group (understanding) |
| Groups=2   |
| df=1   |
| total observations = 600                                     |
| T = 36.473363  |
| P<0.0001   |
| Adjusted for ties:   |
| T = 37.802138  |
| P < 0.0001   |

We were also finding out if there are statistically significant differences between the control and the experimental groups at the remembering learning level. The calculated p value (Tables 6) is smaller than the  $\alpha$  value. We may state that the achieved results are statistically significant in favour of the experimental group at the remembering learning level. Such finding is significant at the  $\alpha$  significance level of 0.05 (95%). The  $H_{1.1}$  hypotheses have been proved correct.

Table 7: Kruskal–Wallis test (performances of students at the "understanding" learning level)

|  |
|--|
| Variables: control group, experimental group (remembering) |
| Groups=2   |
| df=1   |
| total observations = 600                                   |
| T = 34.756023  |
| P<0.0001   |
| T = 37.040276  |
| P < 0.0001   |

We were also finding out if there are statistically significant differences between the control and the experimental groups at the understanding learning level. The calculated p value (Tables 7) is smaller than the  $\alpha$  value. We may state that the achieved results are statistically significant in favour of the experimental group at the understanding learning level. Such finding is significant at the  $\alpha$  significance level of 0.05 (95%). The  $H_{1.2}$  hypotheses have been proved correct.

Table 8: Kruskal–Wallis test (performances of students at the "specific transfer" learning level)

|   |
|---|
| Variables: control group, experimental group (spec. transfer) |
| Groups=2  |
| df=1  |
| total observations = 600                                      |
| T = 92.974445   |
| P<0.0001  |
| Adjusted for ties:  |
| T = 96.583817   |
| P < 0.0001  |

We were also finding out if there are statistically significant differences between the control and the experimental groups at the specific transfer learning levels. The calculated p value (Tables 8 ) is smaller than the  $\alpha$  value. We may state that the achieved results are statistically significant in favour of the experimental group at the specific transfer learning level. Such finding is significant at the  $\alpha$  significance level of 0.05 (95%). The  $H_{1,3}$  hypotheses have been proved correct.

## 5 Discussion

From 1 September 2015, innovated state educational programmes started to apply in the regional school system in lower secondary education. The "Technology" subject was also affected by the changes. Since textbooks for the "Technology" subject are still in short supply at elementary schools, we have decided to write an electronic textbook for students of the 5th grade at elementary schools as a part of the project. The electronic textbook named "Technology for the 5th Grade of Elementary Schools" is divided into three areas. The content of each area is composed of basic and extended subject matter. There are revision tasks at the end of each area. The textbook contains also projects which students deal with directly during school lessons or as a part of the assigned homework (Němec & Krišťák, 2017). A correctly developed electronic textbook gives students a free and easy access to information they need. When developing the electronic textbook, we met the below-stated requirements:

- understandability – the didactic text must be comprehensible;
- language correctness – all texts written by us are clear, professional, grammatically and stylistically correct and apposite;
- high creative and graphic level – from the creative and graphic point of view, our texts are appealing and they enhance the aesthetic sense of students;
- ergonomic requirements – the text and illustrations are designed in such a way that students find their bearings easily in the electronic textbook.

## 6 Conclusion

In general, we may state that textbooks or literary teaching aids have had their justified place in technical education in the current school system. Literary teaching aids are intended for students. Teachers use different sources of information to prepare for lessons, e.g. technical literature. Nowadays electronic textbooks and other electronic texts used in the educational process are very important, particularly thanks to several above-mentioned advantages. In our scientific study we have pointed out to the options of developing and preparing an electronic textbook for the "Technology" subject. Technology has its future in the educational process. The "Technology" subject included in lower secondary education develops not only students' knowledge but also skills which are very important and needed for young people to find jobs in the modern information society.

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## Primary Paper Section: A

## Secondary Paper Section: AM

# COMPARISON OF APPRAISAL APPROACHES OF ORGANIZATIONS IN THE CZECH REPUBLIC AND THE SLOVAK REPUBLIC THROUGH THE NATIONAL QUALITY AWARD FRAMEWORK - USING EFQM MODEL

<sup>a</sup>OTÍLIA ZORKÓCIOVÁ, <sup>b</sup>LENKA SCHWEIGHOFER,  
<sup>c</sup>HANA PALUŠKOVÁ

*Universtiy of Economics in Bratislava, Dolnozemska cesta 1,  
852 35 Bratislava*

*email:<sup>a</sup>otilia.zorkociova@euba.sk,*

*<sup>b</sup>lenka.schweighofer@euba.sk, <sup>c</sup>hana.paluskova@euba.sk*

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**Abstract:** The ability to compare business performance assessments is now an indispensable aspect of maintaining companies in a highly competitive international market. Achieving entrepreneurial excellence requires continuous monitoring of the entire business process which consists on ways of self-assessing based on highly effective methods of evaluating an organization's performance level. Self-assessment is realized through the application of internationally recognized Business Excellence models, by applying simultaneous organizations to reach the highest recognition of excellence at national and international level. The aim of the scientific treatise is to point out the ever-increasing importance of achieving Business Excellence in business strategies of companies to increase its competitiveness in international markets. Along with analyzing possibilities of achieving excellence through the utilization of the business excellence model - EFQM as a starting point for obtaining an internationally recognized company awards, especially in Europe, with an emphasis on comparing its applications in the Slovak and the Czech Republic.

**Keywords:** total Quality Management, Business Excellence Excellence models, Self-assessment, EFQM

## Introduction

In today's highly confrontational international environment, increasingly number of entrepreneurs are striving for success. Companies's achievements lean on its maximum openness of transformation, adaptation or even stimulation of new changes as a orientation towards market, customers and services in conjunction with strategic dimensions development of success, top management creation from the most talented professionals, the latest technologies possession and etc. Similarly, aspects as optimal performance, efficiency and excellence can contribute with the success of companies.

Business success is considered to be an organization's performance assessment that records positive outcomes in several aspects while also achieving its goals in a variety of external outcomes including customers, products, business relationships as well as its internal business processes, employees, education..., to reach the level of excellence. This proceeding is related to strategies which facilitate performance management respectively its survival in a highly competitive environment. Achieving entrepreneurial excellence requires continuous monitoring of the entire process, allowing the organization to reveal its areas of potential improvement by applying methods of increasing organization performance. This process is based on evaluating an organization's performance level of self-assessing by highly effective methods. Self-assessment is formed on concrete application of internationally recognized Business Excellence (BE) models by applying simultaneous organizations to reach the excellence status at national and international level.

The aim of the scientific treatise is to point out the ever-increasing importance of achieving Business Excellence in business strategies of companies to increase its competitiveness in international markets. Along with analyzing possibilities of achieving excellence through the utilization of the business excellence model - EFQM as a starting point for obtaining an internationally recognized company awards, especially in Europe, with an emphasis on comparing its applications in the Slovak and the Czech Republic.

## 1 Problem formulation

In 1961, A.V. Feigenbaum introduced the concept of Total Quality Management (TQM), under which we identify the process of unifying not only processes but also all functions in the company in order to continuously optimize costs, increase functionality and quality at once and satisfy customer's needs by delivering quality goods and services. Many organizations around the world recognize TQM's philosophy. Initially, it succeeded in manufacturing companies, but later on its application began to achieve excellent results in improving service quality. The TQM model captures several fundamental elements such as: identifying employees with the goals of company management, teamwork enhancement, customer orientation as well as continual improvement in terms of learning organization. One of the most important aspects of TQM is to focus attention primarily on improving quality which is so-called the driving force of organizing companies to achieve business excellence. Entrepreneurial Excellence (Business Excellence) brings along the economic benefits of the organization by continuously improving its performance. Together with its principles underlying the global Business Excellence framework, which can pave the way for long-term success and continuous progress.

The principles of excellence extend the lifecycle of products through their continuous improvement, using cutting-edge technologies and innovations. The deepening of the globalization has become an important factor in business management development. The penetration of international markets, supported by the application of management excellence can enhance the economic performance and strengthen businesses competitiveness. It reduces costs of purchased inputs by actively involving a wider range of suppliers in the selection process which helps to optimize corporate resources.

Business Excellence is according to L. J. Portera and S. J. Tannera an essential part of learning and measuring the internal system of organizations that enables to identify strengths and opportunities for improvement, while developing cutting-edge arrangements. Self-assessment is a comprehensive, systematic and regular evaluation of an organization's activities. These types of business or organizational assessment are one of the most powerful tools available. These authors also declare that the achievement of organizational excellence is based on TQM. The results are milestones of success and progress. If they are not monitored regularly it is very difficult to keep pace, commitment and more importantly, motivation and desire to achieve higher performance standards. Organizations need to practice a continuous process of improvement in the form of the following activities: do, control and act (Porter, L.J. - Tanner, S.J., 2004).

T. Peters, and N. Austin perceive excellence as the result of the following critical success factors (Dahlgard-Park, S.M. - Dahlgard, J.J., 2006):

- implementation of people - employees,
- permanent customer care,
- constantly introducing innovations,
- management which combines the first 3 factors (employees, customers, innovations) at all levels of the organization.

Slovakian authors Z. M. Štok et al. define excellence as quality enhancement, perceiving it as high quality or even as the highest possible quality. It is a combination and interaction of values, incentives and activities, leading to exceptional success. Following the authors's view, excellence is the driving force behind the development, quality and personal, group and organizational growth (Štok, Z. et al., 2010).

Croatian economists Z. Pozega; B. Crnkovic and A. Udovicic are of the opinion that Business Excellence represents a high level of quality at all levels of the organization. They consider to be truly excellent organizations, those who have adopted the concept of Business Excellence as an important tool for future development where quality is an integral part of the entire organization. Business success is defined and measured by different qualitative and quantitative indicators, while BE is a form of qualitative measurement of the organisation's advance. (Pozega, Z. - Crnkovic, B. - Udovicic, A., 2014).

## 2 Methodology

Self-assessment is one of the most effective tools for analyzing, measuring and improving the efficiency and performance of a quality management system for achieving "Business Excellence". It is a method that is mainly used to assess the fulfillment of the application of comprehensive quality management approaches in the form of internationally recognized models (eg EFQM excellence model).

The primary goal of self-assessment may be characterized by the following steps (American Society for Quality, online, 2000):

- Identifying strengths in key processes;
- Using potential areas for improvement;
- Work in areas that require improvement;
- Regular monitoring of the impact of appropriate action plans.

At the organizational level, the main purpose of self-assessment is to identify strengths and the areas for enhancement while developing performance improvement action plans. By identifying strengths and weaknesses, an organization can expand and implement an improvement strategy by analyzing the current situation in relation to business models through which a quality prize can be obtained, but the main result of self-assessment is a clear distinction between what an organization has achieved and what needs to be done to implement steps in relation to obtaining a quality award.

### 2.1 Self-assessment instruments

The best-known tools of self-assessment are undoubtedly the models of excellence so-called Business Excellence Models (MBE). They represent a proven tool for strengthening and developing competitive advantages and their long-term sustainability. Direction and goals of organizations are set in such a way that processes are continuously improved, competitive advantages are strengthened and thus competitiveness is increased. Business Excellence models also act as a practical tool for evaluation, which forms the basis of the so-called "common language" of companies. It strongly promotes the sharing of the best practice. It includes all the elements and creates a well-structured, dynamic system that can respond very flexibly to market and environmental changes. The first Business Excellence models emerged in the US and Western Europe in 1980 as a result of the need to raise product quality in response to advances in improving quality and thus the competitiveness of Japanese production. The models themselves were first applied by the so-called forms - quality awards, respectively as TQM models. Over time, however, Business Excellence models have been replaced with "quality" models or "TQM".

The BE models themselves are linked to the application of models of different forms in the various countries of the world. The most practitioners using these models in different continents:

- Deming Prize Model in Japan
- Malcolm Baldrige Model in the United States
- EFQM Excellence Model in Europe.

The basis of the implementation of all the above-mentioned models are TQM pillars focused mainly on customer satisfaction, employees and process quality.

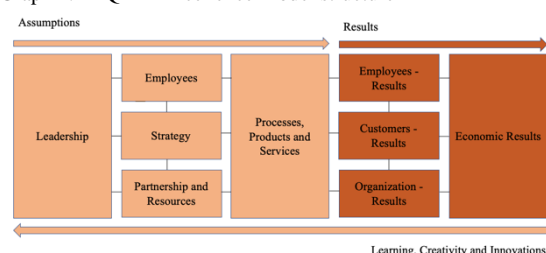
### 2.2 Application of Excellence Model – EFQM in Europe

Nowadays a proven model based on the initiative of European organizations seeking universal definition of excellence, has been used across the Europe - the EFQM Excellence Model. The European Foundation for Quality Management has been set up to highlight and continually promote sustainable success and to provide advice to those seeking to achieve it.

The EFQM model serves as a suitable management framework for self-assessment of business entities (through precisely defined 9 criteria) and enhancing the processes of organizations to achieve sustainable excellence. It is used in conditions of different organizations, regardless of sector, size, structure and so-called maturity - which represents the time needed to operate on the market for 3 primary purposes: *the self-assessment process* - where the model is the basis for comparing strengths and opportunities to the organization enhancement, *as a means of improving* - those organizations that want to advance and improve the management system and *to reward companies* - which by using this model can achieve long-term positive results, namely by obtaining the European Quality Award, which is currently considered as a prestigious award for the activities of organizations from different sectors (Grasse, M. - Dubec, R., Rehak, D., 2010).

This model consists of nine criteria (Graph 1) and assumes that the organization can achieve critical "excellent" results only when it meets the needs of external customers, its own employees along with accepting additional demands and requirements.

Graph 1: EFQM – Excellence Model structure



Source: own processing according to Efqm, online, 2012a

Each criterion of the EFQM model consists of individual sub-criterias. It has 9 main criterias and 32 sub-criterias whereas each sub-criterion is divided into another criterias which are further evaluated (Efqm, 2017):

- Criterion 1: Leadership (5 sub-criterias - max 100 points)
- Criterion 2: Strategy (4 sub-criterias - max 100 points)
- Criterion 3: Employees (5 sub-criterias - max 100 points)
- Criterion 4: Partnerships and Resources (5 sub-criterias - max 100 points)
- Criterion 5: Processes, Products and Services (5 sub-criterias - max 100 points)
- Criterion 6: Customers Relationship Results (2 sub-criterias - max 150 points)
- Criterion 7: Employees Results (2 sub-criterias - max 100 points)
- Criterion 8: Organization results (2 sub-criterias - max 100 points)
- Criterion 9: Economic Results (2 sub-criterias - max 150 points)

The EFQM Excellence Model defines 5 major ways and approaches for organizations to evaluate their performance: questionnaire, pro-form, workshop, matrix chart, and the European Quality Award (EFQM Excellence Award). The latter method is the most complex, but the most objective, because the organization is classified using a self-assessment report that

describes the fulfillment of criteria and sub-criteria of the EFQM model. Then the report will be presented to qualified reviewers who identify strengths as well as weaknesses of the organization for which they will propose improvements and through the identified circumstances, evaluate their business strategy in the final report.

### 3 Comparison of Assessment Approaches of Organizations in the Czech Republic and the Slovak Republic through the National Quality Award Framework based on EFQM

The National Quality Award is the highest award that Czech organizations (since 1995) and Slovakia (since 2000) can obtain in the area of quality management systems. The main objective of the National Quality Award is to launch the "Ways to achieve excellence" as ways to innovate and improve all organizations' activities in the 21st century. In the Slovak Republic, the organization of the National Quality Award is considered to be one of the main activities of the National Quality Program of the Slovak Republic (2017 - 2021) whose role is to contribute to improving the quality of products and services of organizations operating in the private and public sectors while focusing on sustainability and competitiveness in all spheres of society. The Office for Standardization, Metrology and Testing of the Slovak Republic (coordinator of the State Quality Policy) announces the competition at regular intervals since 2000. In 1994 - 2000 its predecessor was the Slovak Republic's Quality Award. In November, during the European Week of Quality in Slovakia, a yearly tradition became the announcement of the competition, which is finished with the announcement of the results, always in November of the following year.

The idea of implementing the National Prize for Quality of the Czech Republic dates back to the time of the Czechoslovak Federation (1992), with the first prize being awarded three years later in 1995. In 1997, the Czech Prize Model was harmonized with the European Quality Award model, EFQM Excellence Award. Since this year, national awards have been presented in the Spanish Hall of Prague Castle by leading Czech political leaders. A significant milestone for the Czech Republic (2013) was the gradual harmonization of individual programs with the international EFQM award. Successful EFQM national organizations (participants) have the opportunity to enter the EFQM Excellence Award. The National Quality Award of the Czech Republic, at which the Ministry of Industry and Trade of the Czech Republic is actively involved, is one of the most prestigious awards in this area in the Czech Republic.

The methodological framework for evaluation in the Slovak Republic consists of the application of the EFQM Excellence Model and the CAF Model. While the CAF model is designed exclusively for the public sector (which is not dealt with in this scientific paper, although it is based on similar and simpler principles than EFQM), the business and public sector organizations can use the EFQM excellence model. The Slovak National Quality Award thus fulfills not only the pricing function, but also the motivation of the participants for further progress.

The Czech Republic appreciates private and public sector organizations (regardless of size and industry) through individual programs of the National Quality Award of the Czech Republic, namely: *START program* (business and public sector), *START EUROPE program* (business and public sector), *START PLUS program* (Business and Public Sector), *CAF program* (Public Sector), *EXCELLENCE program* (Business and Public Sector) - is fully compatible with EFQM's Excellence Model, a long-standing tool for successful organizations, especially in Europe, but also in the world (Sdružení pro oceňování kvality, online, 2016).

Since Start, Start Europe, and Start Plus programs do not have such as denunciation value, they can be seen as a stage of excellence through which organizations can, in a simplified way, evaluate their level of achievement before deciding to apply a top-level excellence rating EFQM. For the reasons given above

and the effort to carry out an analysis aimed at applying the EFQM Excellence Model, which will have a real informative value, we could only choose the Excellence Program, which is fully compatible with the EFQM model, as a benchmark in the Czech Republic. In the comparison of applications and evaluation of the EFQM model, we have observed somewhat different procedures, respectively the degree of achievement and award of this point, as shown in Table 1. Valuation levels depend on the number of points that the organization received during the competition.

Table 1: The EFQM Excellence Model and its Valuation Levels in Slovakia and the Czech Republic

| SR – Excellence Model EFQM |  | CR – Excellence Program (EFQM) |   |
|----------------------------|--|--------------------------------|---|
| Number of points           | Achieved award level   | Achieved number of points      | Achieved award level  |
| 200– 300 p                 | Award for involvement of the organization in the competition | 200–299 p                      | Perspective Organization                                      |
| 301–400 p                  | Award of the organization's performance improvements         | 300–399 p                      | Successful Organization                                       |
| 401 p and more             | Award Finalist   | over 400 p                     | Excellent Organization (Recognition for Excellence (4 to 5*)) |
| min. 450 p                 | Slovak National Quality Award winner                         |                                |   |

Source: own processing according to Sdružení pro oceňování kvality, online, 2016; Úřad pro normalizáciu, metrologiu a skúšobníctvo, online, 2018

In order to evaluate the achievement of the highest level of excellence of companies by applying the EFQM exceptionality model in the Slovak Republic and the Czech Republic in recent years, it was necessary to unify the assessment base due to the partially different methodology, as shown in Table 1. Therefore, with the level of the "winner of the National Prize" of the Slovak Republic, we will compare the "Excellent Organizations with 5 \*" in the Czech Republic and we will compare the "Award Finalist" in the Slovak Republic in the case of the Czech Republic "Excellent Organizations with 4 \*" - as a starting point for this unification, we used the overall point score interface that organizations can gain from the assessment and categorize them into individual award levels.

#### 3.1 Analysis of Business Excellence Awards for Entrepreneurs in the Czech Republic and in the Slovak Republic based on Comparison of Application Conditions of EFQM Excellence Model

For the purpose of analyzing the implemented EFQM model in the Czech Republic and in the Slovak republic with the real ability to compare the organizations that applied it, we have obtained relevant information available for the period 2013-2018. By that time, the information was in one of these countries, to the extent and structure that we needed inaccessible or the individual assessment bases differed so much that they were incomparable. In 2013, the individual programs of excellence in Slovakia and the Czech Republic were gradually harmonized with the international EFQM award. Since our goal is to evaluate the achievement of the highest level of excellence of Slovak and Czech organizations by applying the EFQM Excellence Model, we chose a period 2013-2018 to ensure comparability of data for both countries. Table 2 gives an overview of the organization that achieved the highest level of excellence in the reporting period based on the application of the

EFQM Excellence Model in the National Quality Award in the Slovak Republic and in the Czech Republic and specifically - Winner in the Slovak Republic and Excellent Organization in the Czech Republic.

Table 2: Achieving the highest level of excellence of organizations based on the application of the EFQM Excellence Model in the National Quality Award in the Slovak Republic and the Czech Republic in 2013 - 2018 (Winner in SR & Excellent Organization - 5\* in CR)

| Year | SR  | CR   |
|------|---|--|
|      | Award Finalist:   | Excellent Organization (Recognition for Excellence 4*):  |
| 2013 | Chemosvit Folie, a. s.  | Donghee Czech s. r. o.   |
|      | Slovenská pošta, a. s. (Slovak Post)  | Městský úřad Hranice (City Office Hranice)   |
|      | Úrad pre obrannú štandardizáciu, kodifikáciu a štátne overovanie kvality (Defense Standardization, Codification and State Quality Assurance Office) |  |
| 2014 | HANIL E-HWA AUTOMOTIVE SLOVAKIA, s. r. o.   | Hyundai Motor Manufacturing Czech, s. r. o.  |
|      | I.TRAN., s. r. o.   | AHOLD Czech Republic, a. s.  |
|      | Social service facility - Slnecný dom, n. o.  | Střední odborná škola multimediální a propagační tvorby, EDUSO (High School of Multimedia and Promotion) |
| 2015 | Slovenská informačná a marketingová spoločnosť, a. s. (Slovak Information and Marketing Company)  | AHOLD Czech Republic, a. s.  |
|      | Strojnícka fakulta Technickej univerzity v Košiciach (Faculty of Mechanical Engineering, Technical University of Košice)                            |  |
| 2016 | Kia Motors Slovakia, s. r. o.   | Miele technics, s. r. o.   |
| 2017 | -----   | Hundai Motor Manufacturing Czech, s. r. o.   |
|      |   | Úřad městské části Praha 13 (City Office)  |
| 2018 | -----   | Úřad městské části Praha 13 (City Office)  |

Source: own processing according to Sdružení pro oceňování kvality, online, 2016b; BusinessInfo, online, 2017; ÚNMS SR, online, 2017c; Úrad pre normalizáciu, metrológiu a skúšobníctvo SR, online, 2018; Ministerstvo průmyslu a obchodu, online, 2018b

In 2018, the evaluation of organizations in the Excellence Program in the National Quality Award was started with a new methodology (an effort to fully harmonize individual programs with the international EFQM award) (Table 3), in which the names of the awards remained original (excellent organization, successful organization and a perspective organization), but the scoring was completely changed and therefore, this year it is no longer possible to compare Slovak and Czech businesses according to the model of our unified evaluation base. For this reason, in 2018, in Table 2, we only listed organizations by grade. As also shown in Table 2, the winner of the Slovak National Quality Award in 2017 and 2018 was no organization applying the EFQM Excellence Model.

Table 3: Differences in the Methodology of Evaluation of Organizations in the Excellence Program in the National Quality Award of the Czech Republic since 2018

| CR – Excellence Program (EFQM) (2013 – 2017) |  | CR – Excellence Program (EFQM) (since 2018) |  |
|--|--|---|--|
| Achieved number of points                    | Achieved award level   | Achieved number of points                   | Achieved award level   |
| 200 – 299 b                                  | Perspective Organization                                       | 200–399 b                                   | Perspective Organization   |
| 300 – 399 b                                  | Successful Organization  | 300–399 b                                   | Perspective Organization (+ international certification „Recognised for Excellence 3*)     |
| nad 400 b                                    | Excellent Organization (Recognition for Excellence (4* to 5*)) | 400–499 b                                   | Successful Organization (4*) (+ international certification „Recognised for Excellence 4*) |
|  |  | 500 – 1000 b                                | Excellent Organization (+ international certification „Recognised for Excellence 5*)       |

Source: own processing according to Sdružení pro oceňování kvality, online, 2016; Ministerstvo průmyslu a obchodu, online, s. 3, 2018a

In addition to assessing the achievement of the highest level of company excellence by applying the EFQM Excellence Model in Slovakia and the Czech Republic, we have decided to evaluate lower levels of achievement in order to provide a more detailed analysis: Award Finalist in SR and Excellent Organization in CR (Table 4). Appreciation of the organization's performance improvements in SR and Successful organization in the CR (Table 5).

Table 4: Achieving the highest level of excellence of organizations based on the application of the EFQM Excellence Model in the National Quality Award in the Slovak Republic and the Czech Republic in 2013 - 2018 (Winner in SR & Excellent Organization - 4\* in CR)

| Year | SR   | CR   |
|------|--|--|
|      | Award Finalist:  | Excellent Organization (Recognition for Excellence 4*):  |
| 2013 | Donghee Slovakia, s. r. o.   | Úřad městské části Praha 3 (City Office)   |
|      |  | Útvar odhalování korupce a finanční kriminality služby kriminální policie a vyšetřování (Corruption and Financial Crime Detection Unit of the Criminal Police and Investigation) |
| 2014 | Fakulta riadenia a informatiky Žilinskej univerzity v Žiline (Faculty of Management Science and Informatics, University of Žilina) | Krajský úřad Libereckého kraje (Self-governing Liberec Region)   |
| 2015 | CEIT Biomedical Engineering, s. r. o.  | Kermi, s. r. o.  |
|      |  | Zemědělská fakulta Jihočeské univerzity v Českých Budějovicích (Faculty of Agriculture, University of South Bohemia in České Budějovice)   |
| 2016 | -----  | Kaufland Czech Republic, v. o.   |

|      |       |   |
|------|-------|---|
|      |       | s.  |
| 2017 | ----- | -----                                     |
| 2018 | ----- | Not relevant according to new methodology |

Source: own processing according to Sdružení pro oceňování kvality, online, 2016b; BusinessInfo, online, 2017; ÚNMS SR, online, 2017c; Úrad pre normalizáciu, metrológiu a skúšobníctvo SR, online, 2018; Ministerstvo průmyslu a obchodu, online, 2018b

Table 5: Awarded organizations based on the application of the EFQM Excellence Model in the National Quality Award in Slovakia and the Czech Republic in 2013-2018 (Organization Performance Improvement in the Slovak Republic & Successful Organization in the Czech Republic)

| Year | SR   | CR  |
|------|--|---|
|      | Organization Performance Improvement Appreciation: | Successful Organization:  |
| 2013 | Mobis Slovakia s. r. o.                            | -----   |
| 2014 | -----  | -----   |
| 2015 | -----  | -----   |
| 2016 | -----  | MV – generální ředitelství HZS ČR, Institut ochrany obyvatelstva, Lázně Bohdaneč (Ministry of the Interior of the Czech Republic – General Directorate of Fire Rescue Service of the Czech Republic, Population Protection Institute, Lázně Bohdaneč)                           |
| 2017 | -----  | -----   |
| 2018 | -----  | První brněnská strojírna Velká Bíteš, a. s.   |
|      |  | Palivový kombinát Ústí, státní podnik (Fuel Complex Ústí, State Enterprise)   |
|      |  | Krajský úřad Moravskoslezského kraje (Self-governing Moravsko-Slezsky Region)   |
|      |  | Ministerstvo vnitra – generální ředitelství hasičského záchranného sboru ČR, Institut ochrany obyvatelstva ocenění (Ministry of the Interior of the Czech Republic – General Directorate of Fire Rescue Service of the Czech Republic, Population Protection Institute Awarded) |

Source: own processing according to Sdružení pro oceňování kvality, online, 2016b; BusinessInfo, online, 2017; ÚNMS SR, online, 2017c; Úrad pre normalizáciu, metrológiu a skúšobníctvo SR, online, 2018; Ministerstvo průmyslu a obchodu, online, 2018b

Another of the possible BE awards in the Slovak Republic and the Czech Republic, which we compared in the evaluation years, was the award for participation in the competition: the National Quality Award in the Slovak Republic and the so-called Perspective Organization in the Czech Republic (Table 6).

Table 6: Awarded organizations based on the application of the EFQM Excellence Model in the National Quality Award in Slovakia and the Czech Republic in 2013-2018 (Award for Participation in the Slovak Republic & Perspective Organization in the Czech Republic)

| Year | SR  | CR                        |
|------|---|---------------------------|
|      | Award for participation in the competition:           | Perspective Organization: |
| 2013 | PPS Group, a. s.                                      | -----                     |
|      | Stavebné bytové družstvo II. Košice (Building Housing |                           |

|      |                              |  |
|------|------------------------------|--|
|      | Cooperative II. Košice)      |  |
|      | WAGON SLOVAKIA Košice, a. s. |  |
|      | I.TRAN., s. r. o.            |  |
| 2014 | -----                        | Dům seniorů Kdyně (Seniors House Kdyně)                                      |
| 2015 | -----                        | Krajský úřad Královéhradeckého kraje (Self-governing Královéhradecký Region) |
| 2016 | -----                        | -----  |
| 2017 | -----                        | -----  |
| 2018 | -----                        | -----  |

Source: own processing according to Sdružení pro oceňování kvality, online, 2016b; BusinessInfo, online, 2017; ÚNMS SR, online, 2017c; Úrad pre normalizáciu, metrológiu a skúšobníctvo SR, online, 2018; Ministerstvo průmyslu a obchodu, online, 2018b

In order to evaluate the achievement of the highest level of excellence in the period 2013 - 2018, we have partially different procedures when comparing Slovak and Czech organizations that applied for the award of the national quality award by applying the EFQM model, although the principle can be evaluated as the same. It is a common element, which is the EFQM model, which as a starting point provides organizations with a methodology to comprehensively evaluate their activities and direct them towards achieving excellence. Of course, this assessment only analyzes organizations successful in the given quality contests - it was not possible to obtain information about the total number of contests in individual countries or reasons why other organizations did not participate. Nevertheless, we came to the opinion of positively evaluating the initiative of those organizations that participated in individual levels of competitions both in the Slovak Republic and in the Czech Republic, because they gained access to a highly effective management tool - to achieve a recognized award, but mainly to motivate and guide the way to and to achieve sustained and internationally comparable results of its activities.

## Conclusion

Exceptional organizations are characterized by the ability to achieve and sustain a unique level of performance that meets or even exceeds the expectations of all stakeholders. The present time places increasing demands on them to improve the performance and quality of their products. If they want to succeed in markets with strong competitive pressure, they must focus their attention towards achieving the status of so-called excellence. One possible way to achieve this is to continually - introduce innovations to which they should focus their attention. They are not just product innovations, but also process innovation, marketing and organizational innovation, and human resource management innovation.

The role of innovation lies in the ability to create and market new products and services that meet the growing demands of customers in terms of new product features, quality, reliability, durability, performance, design, but also eco-adaptability. The ever-increasing demands of customers for products can be characterized by favoring news, products bringing individuality, sold at an affordable price and at the same time available on the market, which are the bearers of technological, economic and social progress.

Currently, there is not yet a unified theoretical concept aimed at a comprehensive definition of how to achieve entrepreneurial excellence (Business Excellence), individual authors usually define some basic trends and concepts of management systems, which focus mainly on quality improvement. The introduction, maintenance and streamlining of these management concepts contributes to the creation and development of a successful and prosperous organization, leading to entrepreneurial excellence.

In terms of historical conditionality, internationally recognized models of excellence have evolved, which is characterized by the principle of self-evaluation. This continuous process of evaluating the success of the business strategy of the organization contributes to the continuous improvement of the quality of its performance and the possibility of achieving the highest recognition of excellence. Based on the historical cross-section, the EFQM model of excellence has been developed in Europe, the principles of which are applied both in self-assessment and in the valuation of organizations in most European countries (and many other countries), including Slovakia and the Czech Republic.

Both of our comparisons of the evaluation approaches of excellence in the Czech Republic and Slovakia based on the principles of the EFQM model are similar, although there are also differences in categorization, scoring and valuation levels. According to our findings, the application of models of excellence in the Slovak Republic was based on (and still is) on examples and experiences of institutions that introduced them and applied them in the Czech Republic. It is conditional on relatively much longer historical experience with their application in the Czech Republic, but also on other facts, among which we can include better education and thus also awareness of business entities in the Czech Republic compared to the Slovak Republic about the benefits of participating in the project, which makes its higher appreciation in CR resp. underestimation in the SR and not least in the Slovak Republic - unlike the Czech Republic - its charging. After inquiring among the companies, many work discourages the self-evaluation, but also so far absence of a link between the appreciation of the public - customers that the organization bears some of the aforementioned prices (the public's awareness of the issue is very low or none) and consequently, increasing its interest in products or service of organization. Rather, it is a conditional process, when companies achieving excellence or they have been awarded in the competition, produce quality products and services, and therefore customers are interested in them without being aware that the company that makes these products (or services) has received awards in the competition of excellence.

In conclusion, we are of the opinion, that with the involvement of companies in the competition for excellence, there are substantial benefits, in particular the internationally recognized process of evaluating company processes, allowing an international comparison of the fulfillment of compatible criteria, which are then assessed impartially and assessed by a professional external team of evaluators, added value and recommendations for improvement in those areas that have shown weaker results. If an organization does not have sufficient funds to pay a subscription fee, where participation in the competition is charged, it can also test and apply self-assessment on its own to obtain relevant information about the effectiveness of its business strategies - their strengths and weaknesses. Permanent evaluation of excellence thus inevitably contributes to optimal positioning of companies on national and international markets in a tough competitive environment.

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**Primary Paper Section: A**

**Secondary Paper Section: AE, AH, BC**

## **B PHYSICS AND MATHEMATICS**

|    |   |
|----|---|
| BA | GENERAL MATHEMATICS                                 |
| BB | APPLIED STATISTICS, OPERATIONAL RESEARCH            |
| BC | THEORY AND MANAGEMENT SYSTEMS                       |
| BD | INFORMATION THEORY                                  |
| BE | THEORETICAL PHYSICS                                 |
| BF | ELEMENTARY PARTICLE THEORY AND HIGH ENERGY PHYSICS  |
| BG | NUCLEAR, ATOMIC AND MOLECULAR PHYSICS, ACCELERATORS |
| BH | OPTICS, MASERS AND LASERS                           |
| BI | ACOUSTICS AND OSCILLATION                           |
| BJ | THERMODYNAMICS                                      |
| BK | LIQUID MECHANICS                                    |
| BL | PLASMA PHYSICS AND DISCHARGE THROUGH GASES          |
| BM | SOLID-STATE PHYSICS AND MAGNETISM                   |
| BN | ASTRONOMY AND CELESTIAL MECHANICS, ASTROPHYSICS     |
| BO | BIOPHYSICS  |

## DEVELOPMENT OF PROFESSIONAL COMPETENCE OF STUDENTS OF TECHNICAL UNIVERSITIES IN RUSSIA WHEN TRAINING IN A STUDENT DESIGN BUREAU

<sup>a</sup>VILIAM ĎURIŠ, <sup>b</sup>ANNA TIRPÁKOVÁ, <sup>c</sup>SERGEY G. CHUMAROV, <sup>d</sup>LIDIA N. VASILEVA

<sup>a</sup>*Department of Mathematics, Constantine The Philosopher University in Nitra, Tr. A. Hlinku 1, 949 74 Nitra, Slovakia*

<sup>b</sup>*Department of School Education, Tomas Bata University in Zlin, Faculty of Humanities, Štefánikova 5670, 760 01 Zlin, Czech Republic*

<sup>c</sup>*Department of Radio Engineering, Chuvash State University, 428015 Cheboksary, Russia*

<sup>d</sup>*Department of automation and management in technical systems, Chuvash State University, 428015 Cheboksary, Russia*  
email: <sup>a</sup>vduris@ukf.sk, <sup>b</sup>atirpakova@gmail.com, <sup>c</sup>chumarov@mail.ru, <sup>d</sup>oln2404@mail.ru

**Abstract:** The article substantiates the possibility of developing the professional competence of students of technical universities when studying in a student design bureau. An analysis is conducted of theoretical works and practical activities in the aspect of the problem being developed. The approaches of scientists to the definition and content of the concept of professional competence are considered. On the basis of the analysis of the professional standard 06.005 – Radio-electronics engineer, a number of professional competencies have been identified, the formation of which is carried out during training in the student design bureau. It is argued that the process of readiness for the implementation of training should include objective, motivational, informative, operational, evaluative and effective components. The results of the experiment to estimate the effectiveness of the formation of professional competence are given, indicating that training in the student design bureau contributes to the formation of students' professional competence. The generalised experience in the article aims to develop an approach to improve and further develop an effective methodology for the formation of general professional education in engineering.

**Keywords:** engineering education, vocational training, competence-based approach, student design bureau, research work, technical creativity, educational process

### 1 Introduction

Modern training of bachelors of science of technical universities, ready to carry out research, technological, organisational, managerial and design work and ensure the functioning of complex technical systems that are capable of developing fundamentally new technological approaches, is a pressing issue in education.

The concept of modernisation of Russian education for the period up to 2025 contains innovations that will affect such aspects of higher education as the formation of the personality of future graduates, taking into account personality-oriented vocational education, the motivational and needful sphere, inclinations and professional preferences, and the prospect of further growth in terms of implementing their ideas and systematically improving their qualifications [1].

One of the effective forms of training highly qualified specialists is the student design bureau (SDB), which is focused on the development of students' autonomy and responsibility for the results of their activities [2].

The purpose of the study is to substantiate the possibility of developing the professional competence of students of technical universities when studying at the SDB. The relevance of the investigation is the need to develop ways to improve the level of professional competence of students of technical universities and quality training of engineering personnel for enterprises and organisations.

Educational robotics as a factor in the development of network interaction in the system of level engineering training is considered in [2]. Based on the analysis of academic studies and practical experience, the article [3] considers the main approaches (student-centred, systemic, competence-based and integrative) of engineering education and training of engineering personnel for high-tech industries. The influence of the SDB on the quality of the educational process is reflected in the work of N.A. Logvinova, E.G. Fisochenko [4] and A.A. Samodurov [5]. The SDB as a factor in the formation of students' professional

competencies are analyzed in [6]. The development of an engineering orientation of high school students when studying in the field of radio electronics and automation was considered by the authors in [7]. A computer learning assisted tool called ISETL (Integrated System for Electronics Technology Learning) has been developed to facilitate the Electronics fundamentals understanding [8]. In [9] authors describe the research that used constructivist principles to help foster the development of assessment competence through a cycle of action/critical reflection/revised action within an assessment portfolio design. In [10] identified which competences should be developed in these engineering courses to contribute to the resolution of conflicts related to sustainability, as well as the means used by universities for their development. In [11] author presents a theoretically formulated model for development and growth of professional competence in students of technical universities.

However, to date the problem of the formation of professional competence of students of technical universities when studying in student design bureaus has not been sufficiently developed. The analysis of theoretical works and practical activities in the aspect of this problem showed that issues related to engineering education remain today an insufficiently studied area of scientific knowledge and practical activity, which made it possible to formulate a hypothesis for studying this problem: the formation of students' professional competence will be more effective if the studying process of future bachelors of science is based on the SDB.

### 2 Research methods

In the process of the research we used the following methods:

- theoretical (systematisation and generalisation, analysis of pedagogical and methodical literature, normative and program-methodical documentation, Internet resources; forecasting and design);
- diagnostic (questioning, testing);
- empirical (pedagogical observation);
- experimental (pedagogical experiment);
- methods of mathematical statistics.

The experimental basis of the study was The Federal State Educational Establishment of Higher Education "The Chuvash state university named after I. N. Ulyanov".

The study of the problem was conducted in three stages:

- in the first stage, a theoretical analysis of the existing methodological approaches in the psychological and methodological scientific literature was carried out, highlighting the problem, idea, purpose and methods of research and a plan of experimental research;
- in the second stage, an SDB-based training system was developed, and a complex of components of this system was developed and substantiated for training students of technical universities;
- in the third stage, experimental work was carried out, the conclusions analyzed, verified and refined, and the results were generalised and incorporated into the system.

### 3 Results of the research

Currently, the problem of the importance of modern engineering education is to develop ways of improving the level of professional competence. Professional competence is understood to be an integral characteristic, determining the ability of a specialist to solve professional problems and typical professional tasks arising in real situations of professional activity, using knowledge, professional and life experience and values and inclinations [12].

The following approaches of scientists to the definition and content of the concept of professional competence is shown in Table 1.

Table 1. Definition and content of the concept of professional competence

| Author                | Definition and content of the concept of professional competence   |
|-----------------------|--|
| L.N. Zhurbenko [13]   | An integrated set of fundamental and professionally significant knowledge of a specialist, ensuring its effective use in labour activity   |
| N.I. Zaprudskiy [14]  | The set of knowledge, skills and abilities, professionally significant qualities of a specialist, ensuring the ability to perform professional duties of a certain level   |
| E.F. Zeer [15]        | The combination of professional knowledge and skills, as well as ways to perform practical activities  |
| V.M. Monahov [16]     | The state allows to act independently and responsibly, to be able to perform functions related to the result of human labour   |
| Yu.P. Povarenkov [17] | The state of adequate performance of a professional task   |
| M.A. Choshanov [18]   | The gradual updating of knowledge, the study of new information for successful use in certain situations, the ability to apply this knowledge in professional activities, the ability among the mass of decisions to choose the most optimal; reasonably reject the erroneous decision |
| N.P. Churlyayeva [19] | Integrated characteristic of business and personal qualities of a specialist, reflecting the level of knowledge, skills and experience necessary and sufficient to achieve the goal of work, as well as the level of functional and professional literacy                              |
| L.V. Shmelkova [20]   | Integrative personality trait, expressed in the unity of theoretical, practical and motivational readiness for activity  |

Based on the analysis of the considered interpretations of the definition of the concept of professional competence, the following most general views of the researchers can be identified:

- professional competence is an integral characteristic of professionalism, representing both the quality of a person and the professional-personal quality based on fundamental scientific knowledge, practical skills, and skills certifying the readiness and ability of a specialist to successfully carry out professional activities;
- the level of formation of the professional competence of the individual is assessed relative to the norms and standards currently adopted in society;
- professional competence, as a rule, is expressed in the level of possession of professional knowledge and skills, in the motives, aspirations and value orientations of a specialist, and in his/her abilities to realise professional knowledge and skills in his/her work.

Consequently, the concept of professional competence is defined as the ability to solve a specific type of task, correlated with real-life production situations.

To solve the problem of the formation of the professional competence of students of technical universities at the Faculty of Radio Electronics and Automation, an SDB was created in which students are faced with the complex and at the same time interesting tasks of designing radio electronic systems and

communication systems in the direction of their professional activities.

The professional competence of students of technical areas of training is considered by this study's authors as an integrative property of the individual, based on the possession of a set of specific competencies. Analysis of the professional standard 06.005 – Radio-electronics engineer [21] allowed for identifying a number of professional competencies, the formation of which is carried out during training in the SDB:

- development and coordination of technical specifications for the design of technical conditions, programs and test methods for electronic devices and systems;
- development of structural and functional circuits of radio-electronic systems and complexes, schematic diagrams of devices using computer-aided design (CAD) tools, carrying out design calculations and a feasibility study of the decisions made;
- preparation of design and technical documentation, including manuals, test programs and specifications;
- adjustment, testing and commissioning of prototypes of electronic devices and systems.

The main goals of an SDB is: the creation of a set of conditions for the development of professional competence of undergraduate students; implementation of the system of continuous training "Electronics club" - "SDB" [22]; the transfer of basic knowledge and basic practical skills in the field of radio engineering; learning the basics of radio design; and the use of computers in the field of radio electronics and telecommunications [23]. SDB objectives include:

- improving the quality of training of future bachelors of science on the basis of the achievement by the students of the latest results of science and technology and the development of their collective creative skills;
- deepening and consolidating knowledge in the subjects of the professional cycle, instilling the skills of design and engineering activities;
- involving students in innovation activities.

For the formation of a competitive specialist, there is a need for the proper organisation of student research and training activities based on the following principles:

- interest in the study increases the opportunities for professional creativity and practical self-realisation;
- development of cognitive interest by solving engineering problems, which makes it possible to record the theoretical knowledge obtained [24];
- development of skills in working with information, along with the ability to conduct its search and processing;
- the formation of elements of research activities as a component of professional competencies.

Studying and solving problems of science and technology at the SDB level contributes to the development of professional competence. The basic training method in the SDB is based on the use of the project form of education. The final goal of this approach is to provide opportunities for students to take part in specific developments so that, by the time they graduate from the university, they have something to present to a potential employer.

The essence of the formation of professional competence of a technical university student when studying at an SDB consists in the specific direction of the formed competence in the professional activity of the future bachelor of science.

The process of readiness to implement the training includes the following components (defined by us on the basis of pedagogical observation, pedagogical experiment, own pedagogical experience):

- the objective component,

- the motivational component,
- the informative component,
- the operational component, and
- the evaluative and effective component.

The objective component is the predicted result of activity - the formation of professional competence. The motivational component is the motivation for activity, which includes an interest in a particular activity; this component can be internal, generated by the activity itself, and external, arising during the exchange of activities. The informative component is the unity of all the constituent elements of an object, its properties, internal processes and connections. This component is reflected in the work program in the SDB mode; in the degree of creative orientation of educational activities; in the formation of motivational attitudes and personality orientation; and in educating students. The operational component is that the student has theoretical and practical knowledge of the fundamentals of basic and applied sciences, ensuring the possibility of achieving results in professional activities as well as the possession of forms, methods and means of achieving results. The evaluative and effective component includes diagnostics of the level of formation of students' professional competence when training in the SDB, combines the assessment of the tutor and the student's self-assessment of the studying outcomes, establishes their compliance with the goals, identifies the core directions of improving the learning process, and sets tasks for further activities.

Let us give an example of a project being solved by students in the area of preparation of 11.03.01 "Radio Engineering" at an SDB. This task is carried out on the basis of studying the features of work and characteristics of specific elements and engineering devices on real-life models – e.g. an audio amplifier, direct-conversion receiver (DCR) or power source. Speaking, for example, about the DCR, the trainer recalls information about self-induction and capacity already acquired from the physics course.

For training purposes, considerable importance is attached to computer modelling and design and the use of application software packages e.g. Altium Designer [25] for modelling electronic circuits and designing printed circuit boards, with the subsequent formation of a conductive pattern for the manufacture of prototypes of devices using printed-circuit technique with laser printer and iron. For example, the first practical lesson is the manufacture of a prototype of a symmetric multivibrator with subsequent experimental study of its characteristics. Figure 1 shows a circuit of a multivibrator drawn in the schematic editor Altium Designer.

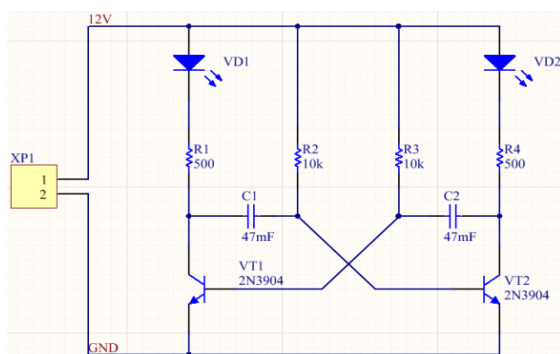
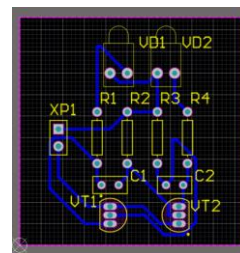


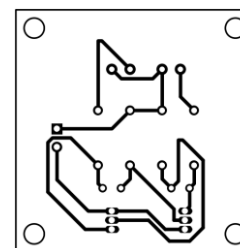
Figure 1. The circuit of a multivibrator

A symmetric multivibrator is a device with the pairwise equality of the resistances of the resistors R1 and R4, R2 and R3, the capacitances of the capacitors C1 and C2, as well as the parameters of the transistors VT1 and VT2. A symmetric multivibrator generates rectangular oscillations ("meander") with a duty cycle of 2 i.e. a rectangular signal in which the pulse duration and pause duration are the same. The pulse duration is  $\tau_1 = R2C1$  and  $\tau_2 = R3C2$ .

Next, a single-layer printed circuit board is routed in PCB editor (Figure 2a). Single-layer routing of the PCB greatly simplifies the process of its self-production by chemical method without metallisation of through holes. The components of the multivibrator correspond to the through-hole technology; this technology makes it easy to install components on the board and have access to the circuits of the multivibrator under study during the experiment. Surface mounting technology - due to its small size - as an initial experience has limited application. However, in subsequent classes the use of such technology is assumed, both in simple form and in conjunction with the through-hole technology. To build a PCB, it is necessary to prepare a file (Figure 2b).



(a)



(b)

Figure 2. Printed circuit board

The experimental work to assess the effectiveness of the formation of professional competence was carried out in Chuvash State University, while the experiment was conducted under normal conditions of training with respect to the homogeneity of the respondents. 43 students of the Faculty of Radio Electronics and Automation were respondents in the experiment. The students were randomized into two groups: Experimental group (22 students) and control group (21 students). While the control group students were taught in the classical way according to the curriculum of the Faculty of Radio Electronics and Automation, which is oriented to professional standard 06.005 – Radio-electronics engineer, the experimental group students took the curriculum using SDB. Classes in the SDB were held in the third year of undergraduate studies for one hour a week.

The tool for diagnosing professional competence in the study are the results of an oral survey, questionnaires and the performance of a design project.

To assess the effectiveness of the formation of professional competence, the following levels were identified: high, advanced, basic.

Indicators of the high level of development of the respondents' competence include: possession of the basic laws of natural science subjects and the method of theoretical and experimental research, allowing to logically defend the product of research; knowledge of information and communication technology tools and the ability to apply them in a work situation; and the knowledge of modern software packages and the ability to create software products for solving professional problems.

Indicators of the advanced level of development include: the ability to analyze the software of the field of study and the possession of theoretical and experimental research methods; knowledge of various ways of collecting, processing and presenting information, as well as the ability to bring

information into a convenient form for perception; and the ability to work with various software products, using them in solving educational and production problems.

Indicators of the basic level of development include: the ability to independently solve various problems of natural science subjects using methods of mathematical modelling; knowledge of software tools for automated receiving and processing of collected information; the ability to work with a personal computer, competently using specific software products in computer modelling.

Levels of formation of professional competence of students of the experimental and control groups are listed in Table 2.

Table 2. Levels of formation of professional competence of students of the experimental and control groups

| Subgroups    | Levels |          |      |
|--------------|--------|----------|------|
|              | basic  | advanced | high |
| experimental | 3      | 10       | 9    |
| control      | 10     | 8        | 3    |

We also verified the effectiveness of this method of study using statistical methods. To verify the dependence of the two quality variables  $A$ ,  $B$ , where  $A$  are groups of students and  $B$  are Levels of formation of professional competence of students, we used the statistical method of  $\chi^2$ -test of independence for the contingency table type of  $k \times m$ . It is assumed that variable  $A$  takes on  $k = 2$  levels: experimental and control group, and character  $B$  takes on  $m = 3$  levels: basic, advanced and high, while  $k > 2$  and  $m > 2$ .

The obtained data are arranged in a contingency table of  $k \times m$  type. The following null hypothesis  $H_0$  is tested: the variables  $A$ ,  $B$  are independent; against the alternative hypothesis  $H_1$ : the variables  $A$ ,  $B$  are dependent. The test criterion is a statistics  $\chi^2$  defined as follows:

$$\chi^2 = \sum_{i=1}^k \sum_{j=1}^m \frac{(f_{ij} - o_{ij})^2}{o_{ij}},$$

where  $f_{ij}$  are empirical frequencies and  $o_{ij}$  are expected frequencies. In the case that the tested hypothesis  $H_0$  is true, the test statistics  $\chi^2$  has  $\chi^2$ -distribution with  $r = (k - 1)(m - 1)$  degrees of freedom. The hypothesis  $H_0$  is rejected for a significance level  $\alpha$  if the value of test statistics  $\chi^2$  exceeds the critical value  $\chi^2_{\alpha}(r)$ .

By  $\chi^2$ -test of independence for contingency table  $k \times m$  we verified whether the value of the level of formation of professional competence of students depends on whether the student belongs to the experimental or control group. In our case, we calculated the value of the test criterion of  $\chi^2$ -test ( $\chi^2_{0.05}(2) = 6.972$ ). Since the calculated test criterion value exceeds the critical table value ( $\chi^2_{\alpha}(r) = 5.991$ ), we reject the hypothesis  $H_0$  at the significance level  $\alpha = 0.05$  and accept the alternative hypothesis  $H_1$ . This means that the level of formation of professional competence of students is statistically significant depending on which group the student belongs to. The test thus confirmed that the students of the experimental group achieved statistically significantly different (better) results in the levels of Formation of Professional Competence of students than the students of the control group. We have also illustrated the situation in the following figure (Figure 3).

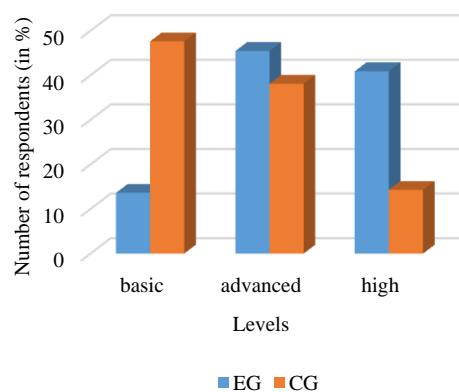


Figure 3. Results of experiment

The statistical results has confirmed that our method is effective and based on our results we can say that students' ability to solve tasks has really increased. These results really showed that it is possible to improve the students' abilities by our method.

#### 4 Conclusion

Research work in an SDB contributes to students' acquisition of the skill of working with scientific literature, experience in setting tasks, as well as the planning of an experiment and its implementation.

As such, a SDB plays an important role in the development of students' creative abilities, but also requires constant attention from the faculty to find new forms of its organisation. The trainer needs to competently organise the research work and use the appropriate educational environment for correctly directing the student to acquire knowledge.

A further perspective of the research problem will focus on solving issues related to the intensification of existing methods and technologies relevant to the development of students' professional competence in engineering education.

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**Primary Paper Section: B**

**Secondary Paper Section: BB, JD**

## DEVELOPMENT OF SPATIAL IMAGINATION WITH THE HELP OF DRONES

<sup>a</sup>RADEK NĚMEC

*University of Hradec Kralove, Faculty of Science, Rokitanskeho  
62, Hradec Kralove, 500 03, Czech Republic  
E-mail: <sup>a</sup> radek.nemec@uhk.cz*

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**Abstract:** This article deals with the improvement of spatial visualization using drones. Spatial imagination is one of the essential abilities for life. A person lacking this ability would not be able to orientate in space and would not be able, for example, to estimate the size of a room or how far an object is placed. The aim of the research was to improve spatial visualization with the help of drones. Drones represented an element defining certain distances, and the change in distance estimation using drones in free flight, drone programming, and displaying of distance without drone were analysed.

**Keywords:** spatial imagination, drone, distance estimation, estimation, distance, development, education.

### 1 Introduction

The development of spatial imagination is needed to ensure orientation in space, to find out how far away an object is placed, or how big various objects are. The article focuses on the distance estimation. There has been a great development of drones even as a hobby nowadays. The connection of spatial imagination and drones for the improvement of spatial imagination is described in the article.

### 2 Spatial Imagination

The concept of spatial imagination includes many things. Everyone will probably imagine the ability to orientate in space, for example, to estimate the size of a room, the amount of space between a person and a target, or how far away an object is placed. Spatial imagination is very useful and essential for everyday life. Pilots, designers, artists, but also mathematicians and physicists would surely not manage without spatial imagination. Before defining the concept of spatial imagination, terms related to it have to be described.

#### 2.1 Imagination

The term imagination means, for example, the ability [1].

Imagination is also understood as the ability to recollect and create ideas. Thus, the idea is an image created in mind and based on perception, intellectual activity or experience [2].

Another definition classifies imagination into cognitive processes associated with memory. Imagination is defined as the ability of our consciousness to create ideas, i.e. sensory images of something we do not perceive at the moment, or to recall past experiences [3].

Connection between the past and the present is thus one function of the imagination [3].

Imagination is also described as an active and constructive process of creating new thought images on the basis of perception and experience, as a mental operation with ideas. Idea is thus defined as a memory reproduction of perception, or a perception transformed by imagination or visualization [4].

Another definition of imagination is a mental construction that man creates in connection with past events (e.g. the image of natural scenery from last year's holiday), future phenomena (e.g. the idea of an engineer about a designed bridge), and phenomena that are not immediately perceived by his/her senses [5].

The image can also be defined as a subjective part of the mental depiction of reality, both of the objectively existing reality and

the phenomena that have not existed so far, but are originally created through ideas [2].

It can also be said that the concept of imagination in art is the creation of images and thoughts without the presence of a sensory stimulus. It forms sections of previous sensory experience into new units. [6].

Imagination is also a psychological reconstruction of an event or object [7].

Another definition understands imagination as a transient effect between sensory and abstract experience of reality. It includes creating new images, ideas, notions and their combinations. Imagination is a reflection of a social environment in which one gains knowledge and experience. Imagination of a person with a low level of knowledge and experience will differ from imagination of a person living in an environment rich in various stimuli [8].

Imagination is also the ability to imagine things that are not present and to combine images [9].

It is also a process of recollecting already experienced events and their application to new contexts [10].

Imagination can also be explained as the ability or skill to recollect previously seen objects, including their properties, place and spatial location; objects seen at a given moment even in a different position than they were initially perceived; objects in three-dimensional space seen in two-dimensional space; non-existing objects only on the basis of their verbal description [11].

Another definition states that images are not caused only by immediate perceptions, but also by perceptions that are not being perceived at the moment. That is why imagination is associated with memory, and when creating ideas, a person uses images and facts stored in memory [12].

A number of definitions proves that the concept of imagination is very extensive, and that imagination and memory are being used, a comparison of what was seen before.

#### 2.2 Space

Space is defined by means of three coordinates. Horizontal, vertical and front-rear axis. Thanks to these three axes, space is perceived as three-dimensional. The horizontal axis is used to see from left to right. The vertical axis is used to see up and down and the front-rear axis is used to determine what is in front and back.

##### 2.2.1 Spatial Perception

Depth perception is necessary for orientation in space. The vision uses several various techniques to perceive space.

Visual Techniques:

- a) "Focusing – to see objects placed in different distance clearly.
- b) Convergence of optical axes – it is important when we perceive something using both eyes, the object is first projected on each eye separately, and then the perception is combined into one image to achieve binocular vision.
- c) Size of an object – we are able to estimate it using our experience, however it is relative and depends on the size of retinal image.
- d) Overlapping – we are able to estimate depth and distance of an object thanks to the objects that overlap in different distances.
- e) Shading – helps us to understand another view of the object, because shadows on uneven surfaces of objects create a kind of relief.
- f) Different placement of objects in the field of sight – it is important where the object is located, whether objects

placed side by side are of the same size or if one is smaller – then we can assume that the smaller object is at a greater distance. It is about understanding figure and background.

- g) Perspective – our eye perceives two kinds of perspective, linear and aerial. The linear perspective is a convergence of vanishing points to one point and a continuous reduction of objects. The aerial perspective works with colour changes, closer objects are displayed in richer and darker colours than distant objects. With the distance of the object, the colour gradually fades and disappears.” [13].

In term of the development of space perception, this ability is developed in the first year of child's life. The development is influenced by visual and auditory perception, locomotion and object handling. Space in the vertical plane, i.e. what is up and what is down, begins to be perceived as the first one. Subsequently, space is perceived in front-rear plane, i.e. what is in front and what is in back. Space in the horizontal plane, i.e. what is on the right and on the left, is perceived as the last one. The right-left orientation is the most difficult. [14]

### 2.3 Spatial Imagination

The basic concepts of spatial imagination were defined in the above mentioned points. It is now possible to deal with a specific definition of spatial imagination. There are many definitions and some of them will be given here.

By spatial imagination we understand the intellectual ability (skill) to recollect:

- a) Previously seen – perceived objects in three-dimensional space and to recall their properties, location and spatial aspects
- b) Seen previously or at a given moment – perceived objects are in a position that differs from what it was or how they are actually perceived
- c) Object in space based on planar image
- d) Non-existent real object in three-dimensional space based on its verbal description [11].

Another definition states that spatial imagination is a set of abilities that relate to images of shape and interrelationships between geometric configurations in space [5].

Another definition says that spatial imagination is a set of partial abilities related to our ideas of space, of shapes and interrelationships between bodies, between the objects and us, and of spatial aspects between parts of our body [16].

Spatial imagination can also be understood as a set of abilities that are influenced by the properties of mental processes. For example, by perception, by intellectual activity with ideas, by recalling, generalization, use of memory etc. Good spatial imagination is very important for technical or designing field of thinking. People with a well-developed spatial imagination can quickly orientate in an unfamiliar environment, they e.g. interpret maps, plans and drawings correctly [17].

Spatial imagination can be also understood as spatial intelligence. Its core is formed by abilities that ensure accurate perception of visual world, that allow transforming and modifying original perceptions, and create ideas based on their own experience, even if there are no external stimuli [18].

Space imagination can also be a set of three important skills that complement each other. Those are the following abilities:

- a) Spatial orientation – location of man in the environment
- b) Visualization – ability to imagine the interrelationship of objects that are placed into certain positions
- c) Kinaesthetic imagination – ability to determine the resulting movement of different gears. [7].

Spatial imagination is also based on learning about the shapes of different objects, their placement and movement in some space.

As technology and computers evolve, it is more and more important to develop spatial imagination. [11]

Spatial imagination is therefore a very extensive concept that is not always precisely defined. However, it is a significant topic and it develops many essential abilities. [19 - 22]

### 3 Drones

Drones, or unmanned aerial vehicles, are systems that have been booming recently. Quadcopter or multicopter drones remotely controlled are most popular nowadays. They are used for both entertainment and commercial applications. Most models are sold for taking pictures or videos. [23] Figure 1.



Figure 1 – Drone [24]

Drones became very popular especially for the recreational use, i.e. taking pictures, shooting videos or just simple flying. In addition, various types of drone races have developed all over the world recently. The FPV Racing is the best known. A large number of smaller drones with high-resolution sensors is therefore produced. There is also great progress in the area of aviation safety. Drones also have different aerial modes. Drones are equipped with sensors that allow the drones to avoid obstacles, to follow the moving target object, and all that autonomously. [25]

Drones are no longer a privilege of several dedicated experts or enthusiastic amateurs, but also people with no experience with drones can get them. That is why, in better cases, drones often end up on trees, and in worse cases, on roofs of buildings or in power lines. It may even happen, and it happens that the drones injure passers-by or even the drone pilot. [26]

The precise definition of a drone is as follows: “Unmanned aerial vehicles, also known as drones, are aerial vehicles that do not carry a human operator, that are operated remotely or can fly autonomously according to predefined flight plans or more complex dynamic autonomous systems.” [27]

The term “drone” is not entirely correct for commercial purposes. Experts do not use this term, it is rather a slang term for abbreviated naming of these machines or for communication with the general public. This term can be most commonly found in the media, online discussions, hobby shops or e-shops. The correct name for drones is unmanned aerial vehicles (or whole systems). This designation is mainly used on continents outside Europe (North and South America, Australia, Africa, Asia). A better and more accurate term is used in Europe, the term Remotely Piloted Aircraft Systems. [25]

### 4 Using Drones in Education

There are several organizations around the world that use drones in education. For example, the Drobots Company organizes STEM Summer Programs For Kids & Teens, which includes Drone Summer Camps For Kids & Teens. [28]. The Company says: “Drobots Company was originally founded by a small group of parents, educators, visionaries and do-it-yourself engineers. The mission was and still is to inspire students to reduce time in front of a computer screen and instead utilize drone technology in a setting that promotes collaborative

project-based learning in a positive educational environment. Hence, the company trademark slogan, Where Technology Meets Fresh Air™.

The primary goal of any Drobots Company program is to mentor participants on how to become lifelong learners and instill a strong sense of curiosity, confidence and teamwork. Due to the exponential growth of the drone industry, kids and teens may now explore, learn and evolve along with the applications of today and the discoveries of tomorrow. Drobots fosters this new technological landscape with a unique curriculum and well-trained positively motivated instructors

At Drobots we create flexible experiences that shift students between the excitement and hands-on activities of our indoor activities and the freedom and exploration of the outdoors. Participants utilize imagination, hand-eye coordination and STEM applications to conquer challenges and missions – all in a team-oriented environment. Under the umbrella of a friendly competitive and gamified teaching and learning methodology, participants collaborate in a team setting to deconstruct challenges and then solve them.

The core foundation of our company and the programming we work diligently to develop is built upon creativity, exploration, technology and fun. Our commitment and passion is derived from the unlimited positive applications of innovative technology. Throughout all of our kids camps and teen programs students thrive under the supervision of an adult-led staff committed to the development of the individual and team.

Safety is our #1 priority and our rigorous hiring standards attract the best instructors in the country. At Drobots Company we understand that instructors with years of experience working with kids and teens is the key difference between a good experience and a GREAT experience. Our family of instructors embodies the passion and creativity that we strive to inspire in every participant.”

Examples of using drones in education are shown in the following pictures. Fig. 2, Fig. 3, and Fig. 4.



Figure 2 – Example of using drones in education [28]



Figure 3 – Example of using drones in education [28]



Figure 4 – Example of using drones in education [28]

#### 4.1 Drone Ryze Tello

Drone Ryze Tello is a mobile programming app that supports Scratch. Students can command Tello to perform corresponding movements by dragging coding blocks on their smart mobile device, students can also develop programming skills by playing games and completing levels. [29] Fig. 5.



Figure 5 – DJI Ryze Tello [29]

DJI Ryze Tello is an affordable drone made by the DJI Company. To develop the drone, the company has cooperated with the Ryze Techs and Intel Companies. However, price is not the only thing that attracts attention. It is a very small model and both children and adults will enjoy it and have a lot of fun. It weighs only 80 grams. The Tello application with a friendly user interface provides a complete control. Two effective antennas SmartSwitch 2 ensure stable and perfect transmission of image and all your instructions.

Despite its miniature size, DJI Tello can stay in the air up to 13 minutes. The Intel Movidius Myriad 2 VPU processor controls all computing as well as great image output. A situation, when the connection between the mobile phone and the drone is lost has also been considered – in such case, the FailSafe technology ensures a safe landing of a quadcopter.

Drone DJI Tello is programmable in Scratch – a coding system developed by the MIT Company. This software allows both children and adults to learn coding and enjoy fun at the same time. If you consider yourself a more advanced user, with the help of the Tello SDK, it is possible to directly develop software apps for the DJI Tello. Fig. 6.

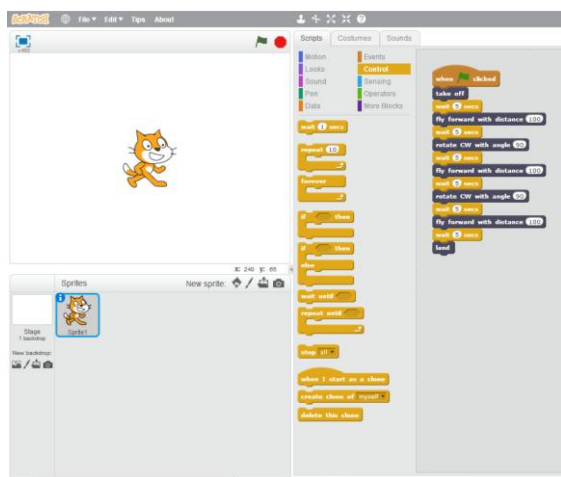


Figure 6 – Coding with Ryze Tello [29]

## 5 Development of Spatial Imagination with the Help of Drones

The aim of this article is to determine whether drones have an effect on spatial imagination.

### 5.1 Methodology

A pedagogical experiment was carried out as a method, using a pre-test and a post-test. Groups of students were divided into three groups. The first group participated in the experiment without drone. The second group took part in the experiment with drone which was controlled via joystick application on a smart mobile device, it means it was a free drone flight. The third group also participated in the experiment using a drone, but this time the drone was programmed.

The experiment was focused on distance estimation. Three random distances were marked on the ground and students were to estimate them in centimetres. Their estimates were recorded in the pre-test. Removal of random distances followed and five distances from 1 to 5 metres were drawn. Students of the first group (without drone) remembered those distances. Distances were marked again for the second group of students (free drone flight), but the drone was used to emphasize distances. The drone took off, flew 1 metre and landed. This repeated similarly for other distances up to 5 metres. The aim of using the drone was to inculcate distance estimation in students. The third group of students experienced the same experiment as the second group, but the drone was not controlled by joystick, it was programmed. First, a distance of 1 meter was set. The drone took

off, flew the given distance and landed. This process was the same for other distances. The goal of this method was to learn how to estimate distances with the help of drone. Installing the idea of distances of 1 to 5 metres was followed by a post-test. The post-test had exactly the same scenario as the pre-test. It means, three random distances were marked on the ground and the students were supposed to estimate the distance.

The pupils were selected on the basis of an expression of interest from a grammar school. All pupils were from one grade (Quarta) - 9th grade elementary school. It was an even distribution of girls and boys.

### 5.2 Results

To process the results, a relative difference of distance was used. If the differences are compared with the actual values, it is clear from the charts that there is a significant difference in dispersion of values (homogeneity of the set). There are significant differences between data without drone and with drone, as well as drone free flight or programmed drone flight. Figure 7. The Levene test for equality of variances was used. Table 1 a 2.

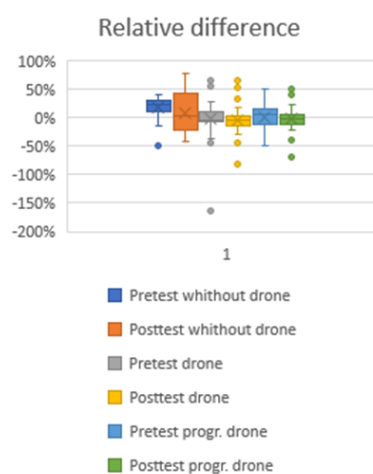


Figure 7 – Relative difference

Tab. 1: Levene Pre-test

| Variable | Levene Test for Equality of Variances<br>Mark. effects are significant at the level $p < .05000$ |           |              |              |          |              |              |
|----------|--|-----------|--------------|--------------|----------|--------------|--------------|
|          | SS effect  | DF effect | AS effect    | SS error     | DF error | AS error     | F            |
| Value    | 0,05<br>3224   | 2         | 0,02<br>6612 | 4,56<br>3445 | 135      | 0,03<br>3803 | 0,78<br>7256 |
|          |  |           |              |              |          |              | 0,45<br>7170 |

Tab. 2: Levene Post-test

| Variable | Levene Test for Equality of Variances<br>Mark. effects are significant at the level $p < .05000$ |           |              |              |          |              |              |
|----------|--|-----------|--------------|--------------|----------|--------------|--------------|
|          | SS effect  | DF effect | AS effect    | SS error     | DF error | AS error     | F            |
| Value    | 0,72<br>3634   | 2         | 0,36<br>1817 | 3,24<br>9600 | 135      | 0,02<br>4071 | 15,03<br>117 |
|          |  |           |              |              |          |              | 0,00<br>0001 |

## 6 Conclusion

One would not manage without spatial imagination. It is one of the essential skills. Analysing the effect of drones on spatial imagination and the effect of drones on distance estimation reveals significant differences between data obtained without drone and with drone regarding both free and programmed drone flight.

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#### Primary Paper Section: B

#### Secondary Paper Section: AM, IN

## **F MEDICAL SCIENCES**



|    |  |
|----|--|
| FA | CARDIOVASCULAR DISEASES INCLUDING CARDIO-SURGERY         |
| FB | ENDOCRINOLOGY, DIABETOLOGY, METABOLISM, NUTRITION        |
| FC | PNEUMOLOGY   |
| FD | ONCOLOGY AND HAEMATOLOGY                                 |
| FE | OTHER FIELDS OF INTERNAL MEDICINE                        |
| FF | ENT (IE. EAR, NOSE, THROAT), OPHTHALMOLOGY, DENTISTRY    |
| FG | PAEDIATRICS  |
| FH | NEUROLOGY, NEURO-SURGERY, NUERO-SCIENCES                 |
| FI | TRAUMATOLOGY AND ORTHOPAEDICS                            |
| FJ | SURGERY INCLUDING TRANSPLANTOLOGY                        |
| FK | GYNAECOLOGY AND OBSTETRICS                               |
| FL | PSYCHIATRY, SEXOLOGY                                     |
| FM | HYGIENE  |
| FN | EPIDEMIOLOGY, INFECTION DISEASES AND CLINICAL IMMUNOLOGY |
| FO | DERMATOLOGY AND VENEREOLOGY                              |
| FP | OTHER MEDICAL FIELDS                                     |
| FQ | PUBLIC HEALTH SYSTEM, SOCIAL MEDICINE                    |
| FR | PHARMACOLOGY AND APOTHECARY CHEMISTRY                    |
| FS | MEDICAL FACILITIES, APPARATUS AND EQUIPMENT              |

## INTERNATIONAL EXPERIENCE OF OPERATION OF MULTIDISCIPLINARY TEAMS WITH PSYCHOSOCIAL SPECIALIZATION IN AMBULATORY CARE CLINICS AND POLYCLINICS

<sup>a</sup>DANA MARTYKENOVA, <sup>b</sup>SERIK ZHOLDYBAYEV,  
<sup>c</sup>MARATBEK BAIROV, <sup>d</sup>AISULU ZHOLDYBAYEVA,  
<sup>e</sup>ZHANAR ALBAYEVA, <sup>f</sup>AKMARAL AKHELOVA,  
<sup>g</sup>KONSTANTIN VALOV, <sup>h</sup>AZIZA ALMAKHANOVA

<sup>a-e,g,h</sup> *Kazakh National Medical University named after S.D.*

*Asfendiyarov, 050000, 88 Tolebi Str., Almaty, Kazakhstan*

<sup>f</sup> *M. Auezov South Kazakhstan State University, 160012, 5 Tauke Khan Ave., Shymkent, Kazakhstan*

email: "bakitgul@list.ru"

**Abstract:** At the present stage of medical practice, focus on patients is the key to achieving the primary goal of a healthcare professional. In the system of medical and social care, an opinion was formed about the need for customer service cooperation since individual problems can only be solved by the joint efforts of different specialists working in the same team. An example of this approach is the outpatient psychosocial care that social and medical workers provide to old people with cognitive impairment. A multidisciplinary team is a group of specialists united to solve a problem according to jointly agreed principles.

**Keywords:** Psychosocial care, multidisciplinary team, old people, cognitive impairment, ambulatory care.

### 1 Introduction

The significance of the problem in question at the national level is due to changes in the modern demographic situation in the Republic of Kazakhstan associated primarily with the expressed processes of aging of the population. Currently, the proportions of people aged 65 years and older in Kazakhstan has exceeded 7%, thereby determining its inclusion in the group of "aging"

countries of the world. The proportions of the population of 60 years and older reached 11.2% by the beginning of 2015, with a predicted trend of further increase by mid-century to 25%. (1-2)

It is precisely in old age that vascular and primary degenerative diseases of the brain are most often diagnosed and lead to cognitive disorders of varying severity ranged from moderate to severe. Various aspects of this problem are of great interest to researchers in developed countries. The priority areas are the early diagnosis of the disease, the search for effective treatment options, as well as the solution of social and psychological problems associated with this ailment.

The main consequences of cognitive impairment in older people include impaired quality of life, loss of social functions, and ultimately home care addiction or hospitalization, which entails huge financial resources from the public health system.

### 2 Materials and Methods

In the system of general medical and social care, an opinion has been formed about the need for cooperation with social workers when caring for patients since individual problems can only be solved by the joint efforts of different specialists working in the same team. An example of this approach is the ambulatory psychosocial care that social and medical workers provide to old people with cognitive impairment.

A number of difficulties accompany a multidisciplinary approach. Sometimes experts disagree on the causes and solutions and set themselves different tasks. Good relations do not always develop between specialists, for example, due to differences in status, official authority, and language of communication. Multidisciplinary work requires effective decision-making, a clear distribution of roles and responsibilities. Therefore, a multidisciplinary team is a group of specialists united to solve a problem according to jointly agreed principles. It may include a general practitioner or internist, a nurse, a social worker and a medical psychologist (Figure 1).

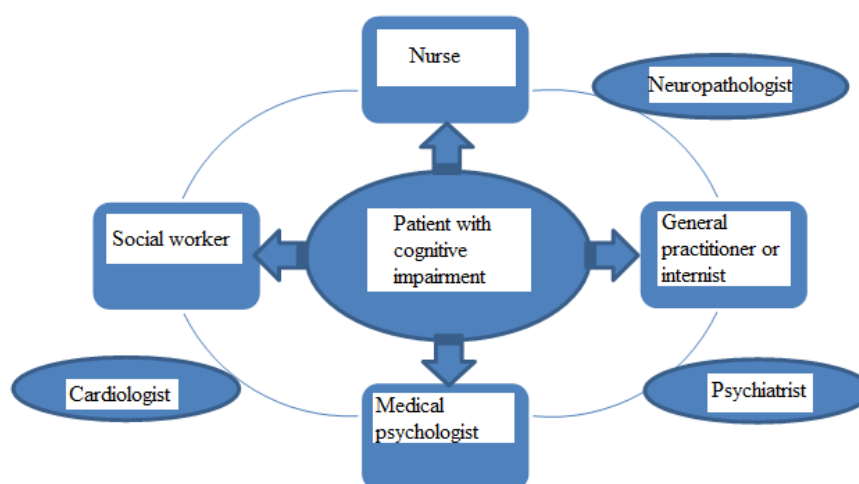


Figure 1. Example of Multidisciplinary Team Composition to Care for Old People with Cognitive Impairment in Ambulatory Care Clinics and Polyclinics

Various authors note that well-organized teamwork can free up the time of highly qualified doctors, and this will allow doctors to focus on caring for the most difficult patients. (3) We understand the multidisciplinary team of specialists as a group consisting of specialists of various professions, carrying out

activities based on the adoption of common professional values aimed at achieving an agreed goal based on complementarity, differentiation of joint and individual responsibility. (4) Given the multiplicity of factors affecting the effectiveness of the team, some researchers such as A. Grove (5) usually limit the number

of criteria by which effectiveness is evaluated. The authors as a whole distinguish two universal criteria:

- Productivity (most often the economic one expressed in the ratio of costs and achieved results);
- Satisfaction (with work, the membership of a professional group, etc.) understood as a comfortable state when working in a team.

In the studies of Western European and American authors, the focus of group work is on the results of joint professional activities, and in the works of Kazakh researchers - on interpersonal relationships, and above all their moral component. One of the most important characteristics of a multidisciplinary team as a highly organized working group is cohesion. Cohesion is the psychological unity of people in the most important issues of the life of the team, manifested in the attraction of participants to it, the desire to protect it and preserve it. Cohesion is due to the need for mutual assistance or support of each other in achieving certain goals, mutual emotional preferences, and awareness of the role of the collective principle when providing certain guarantees. The degree of cohesion depends on the size of the group, social homogeneity (with heterogeneity, groupings arise) of its members, success achieved, and the presence of external danger. In the studies of V.V. Avdeyev (6), it is shown that in close-knit groups, communication is closer and self-esteem is higher, but there are self-confidence, loss of criticality, a sense of reality, unanimity, a sense of invulnerability, and information filtering. The conditions ensuring socio-psychological compatibility of team members are:

- Compliance of personal capabilities of each member to the structure and the content of his/her activities, which ensures its normal course, lack of envy in relation to the successes of others;
- The proximity or coincidence of moral positions creating the basis for the emergence of mutual trust between people;
- The homogeneity of the main motives of activity and individual aspirations of team members contributing to better mutual understanding;
- The possibility of a real mutual complement and coherent combination of the abilities of each member in a single labor and creative process;
- A rational distribution of functions between team members, in which none of them can succeed at the expense of the other.

K. A. Bruffee distinguishes the following team advantages: higher job satisfaction than in an impersonal working group; more effective professional growth of the employee; faster and more effective organization of constructive feedback; more effective stress management; faster training; faster structural changes. (7) J. Brenn (8) points out that teamwork contributes to greater tolerance; it is better to build a corporate culture in a team. Therefore, the priority of the organization of work in teams in modern Western European studies is becoming obvious. S. N. Tidor (9) names 40 signs of an ideal team. We will name some of them that are of the greatest importance in the context of our study:

- The optimal distribution of functions;
- Vertical linkages and formalization of relations are minimized;
- Mutual openness and the free exchange of information;
- The prevalence of horizontal linkages over vertical ones;
- Complete interchangeability and complementarity due to wide professionalism;
- The dominance of motivation to achieve success and a willingness to take risks.

In order for the team formation process to go most efficiently, the process of psychological adaptation to each other must go through a group of specialists. It is important to emphasize that creating a comfortable psychological microclimate in a team is an interactive process that requires the participation of all team members and the time needed to complete it. Let us turn to the

stages of the formation of a multidisciplinary team. At the first stage (orientation), a search and formation of a psychological community between the team members occur, primarily through the mutual influence of team members on each other. The most important task for team management at this stage is to form a high level of psychological security in the team. If this happens successfully, the participants are actively involved in the work of the team, which significantly increases its effectiveness. The main elements in going through this stage are the following: the acquaintance procedure, the formulation of rules of conduct in a team and principles of work, the formation of trust in a team. At the second stage (differentiation), each of the team members decides for himself/herself the question of his/her own professional individualization in the team, how exactly will he/she strengthen the team. It becomes important for team members to emphasize differences in their views between them and to defend their point of view inside the team. The most important elements during this stage are the organization of communication in a team, the position of cooperation instead of competition, willingness to learn from each other. At the third stage (mature team), support and cooperation within the team expand and deepen, it begins to function as a single organism capable of developing common solutions and putting them into practice. The effectiveness of the team at this stage reaches its maximum level. The key issue for the team at this stage is maintaining a high level of interconnection between the participants, awareness of group autonomy and the pleasure of working together. Therefore, the analysis of team-building showed the following. Teams are a dynamically developing form of organization of joint professional activity. Western European history has almost a hundred years of organizing the work of teams, and during this period enormous experience has been accumulated in the field of team management, organizational, methodological and psychological-pedagogical conditions for their operation and development. The authors show that work in a multidisciplinary team makes it possible:

- To rely on a wider experience than the opinion of one specialist, to analyze the facts more deeply; use the most effective channels of information transfer, and save time;
- To show the efficiency of leadership in decision-making due to the flexibility of social relations within the team itself.

The tasks of forming and developing teams are increasingly becoming part of the practice of integrated medical, psychological, pedagogical and social assistance. (10) Modern multidisciplinary teams in the system of comprehensive social assistance and rehabilitation in psychiatry in Western Europe are a group of independent experts in various fields of knowledge, each of which is guided by a separate personal work plan and specific tasks. Specialists in this type of teamwork in concert but practically not together. According to A.B. Shmukler and O.V. Nemirinsky (11), in the phrase "multidisciplinary team" the semantic strength is attributable to both the word "multidisciplinary" and the word "team." The multidisciplinary team implies the work of specialists in different and, as a rule, related areas in it. For example, social workers, teachers, doctors, and psychologists. However, a simple combination of specialists with different competencies does not result in a team. In order to form a team, it is necessary, within the group, to reach an agreement on the goals (priorities), means (methods and approaches), and the role and responsibility of each team member. All this seems to us possible only in specially organized pedagogical conditions. The number of members of the group is important. As our practice shows, the number of multidisciplinary teams of more than 15 people is losing their synergistic properties. A multidisciplinary team is characterized by an emphasis on a certain order of interaction and on reaching an agreement.

### 3 Results and Discussion

At the present stage, employees without higher medical education, freeing up the time of clinicians, can successfully

perform most of the functions performed at the primary health care level. Therefore, primary care doctors spend about 17% of the time on providing preventive care, most of which could be delegated to other members of the multidisciplinary team. Primary care physicians spend about 37% of their time on the treatment of chronic diseases, and most of this time is education, lifestyle counseling and patient adherence. Trained team members who do not have a higher medical education can also successfully perform this. (12)

The multidisciplinary approach has found its application in a number of countries, for example, a study was conducted in Canada to find out how multidisciplinary medical teams help optimize the organization of care for elderly patients with cognitive dysfunctions. This study searched in Ovid, Medline, MEDLINE In-Process, and other non-indexed bibliographic databases using keywords such as "multidisciplinary or interdisciplinary help," "cognitive impairment," and "old people." Of the 4,554 articles submitted, 34 were suited, including the methodological base of Arksey and O'Malley. 29% of authors provided information on tools that inter-professional teams used to achieve positive results when working with old people. They emphasized the importance of communication, the availability of strategies and the mandatory organization of the educational process for staff in order to optimize inter-professional cooperation when working with old people having cognitive impairment. The review revealed gaps in knowledge about the processes that teams use to work together to care for old people with cognitive problems, and how to best take into account the interests of old people and their families for organizing teamwork. (13)

Another study by Canadian scientists revealed the nature of interdisciplinary work in medical organizations and their impact on the effectiveness of assisting old people and job satisfaction among health workers. Interviews were conducted in two medical organizations, where old people with cognitive impairments are registered. The analysis of interviews with 22 participants revealed satisfaction with teamwork and awareness about the factors of and obstacles to effective collaboration. The participants indicated that team relationships affected the assistance provided and job satisfaction. The participants also identified trust and cooperation, information exchange and a common goal as the most important factors for effective teamwork. In addition, the participants identified the importance of leadership since it has a stronger effect on the activities of the entire organization's teamwork. Researchers noted that additional studies are needed to understand the complexity of organizing collaboration given various factors that can affect the quality of care such as cultural and social differences, work in several organizations, etc. (14)

A number of authors believe that the increase in the number of cases of mental health disorders in the population has led to an increase in research interest in studying the direct effects of various factors on cognitive functions in old age. A study conducted in Croatia was aimed at determining the psychosocial patterns of age-related changes in cognitive function in the elderly. Prerequisites for age-related changes in cognitive function were age, education, socialization, and physical condition. The study revealed that intellectual, social and physical activity has a positive effect on cognitive function in old age. (15) This study showed that identifying factors that inhibit the occurrence of cognitive dysfunctions in old age is of great importance for public health in general and determines action plans for multidisciplinary teams including a sociologist, psychologist, general practitioner, and nurse.

Other researchers believe that multidisciplinary teamwork while improving patient safety, has not yet become common practice in most medical organizations. There is no clarity as to what teamwork actually means, with terms such as collaboration, coordination, and networking being used interchangeably. For example, in France, a study was conducted in which qualitative research of the activities of multidisciplinary teams carried out

over the past 20 years was analyzed. It was proven that full-fledged multidisciplinary teamwork was largely absent in the provision of medical care, and it was found that it was influenced by a number of factors such as organizational issues that impede inter-professional interaction, a representation of teamwork and leadership. In this connection, it was concluded that future strategies to optimize the work of multidisciplinary teams should include policies and structural changes for the development of health systems. (16)

Members of a multidisciplinary team must perform the following functions:

- A district doctor who coordinates the work of the team, assesses the problems and needs of elderly patients, prescribes and adjusts treatment, performs medical procedures, and, as necessary, involves teams of other specialists (psychiatrist, cardiologist, neuropathologist, etc.).
- A nurse who provides support to the patient and his/her family performs nursing procedures, teaches the patient's relatives the basics of caring for an elderly patient with cognitive impairment.
- A social worker who provides the patient and his/her family with access to legal and social services, assists in disability registration (preparation of documents and consultations), etc., helps the patient's family, provides family members with access to social services.
- A psychologist, who provides psychological assistance to the patient and his /her family members, advises team members and provides psychological assistance for them if necessary. (17)

When a team performs its functions, it is important to have an idea of the interaction algorithm of team members between themselves and with patients. Hence, key points that a multidisciplinary team should pay attention to are the following:

- Defined goals that need to be explicit, measurable and operational.
- A developed algorithm of interaction between team members during the provision of medical, psychological, and social support;
- High interdependence of team members and common interests;
- Mutual respect, high trust and mastery of teamwork skills;
- Clear awareness about and distribution of roles of participants in the process of support and treatment of patients;
- Individual responsibility of each specialist;
- Clear criteria for admission to treatment, discharge from hospital, frequency and options for medical interventions throughout the work with the patient;
- Effective professional and administrative support (meeting room, agreed time for regular meetings, materials, and equipment for presenting cases, decision registration system, presiding officer, professional requirement to attend meetings, medical and rehabilitation protocols enshrining types of treatment and care for patients);
- Interconnection including the type of communication (for example, instant messaging and informal face-to-face meetings of clinical team members) and processes (for example, feedback and conflict resolution);
- Training team members in their functions. (18-20)

Joint inter-professional work, to a greater extent, is developing as a mechanism for responding to the challenges of the healthcare system by reducing the cost of medical services, improving the quality of medical care, improving work and increasing the satisfaction of staff and patients in healthcare organizations. (21)

It is necessary to support the idea of managing some chronic diseases in primary care, the integration of general practitioners and other health professionals in multidisciplinary teams. Despite numerous discussions about patient-centered teamwork,

there is not enough practical information for primary care providers about how such teams function. There is a large amount of literature on the joint work of specialists in the industrial and military fields, and more recently, on teamwork in hospitals. (22)

#### 4 Conclusion

Studies of the effectiveness of the organization of work of multidisciplinary teams in primary health care are ongoing in many countries at present. (23-25) International experience has repeatedly shown the effectiveness of multidisciplinary teams using the example of numerous studies, but, at the same time, these studies show that there are unfinished research questions. (26-27) There is a need to continue creating new methods and development models in this area in accordance with the specifics of each country. An important step towards implementing the State Health Development Program of the Republic of Kazakhstan "Densaulyk" for 2016-2019 is the integration of all health services for the needs of the patient in view of modernization and priority development of primary health care.

Currently, in the Republic of Kazakhstan, there are social workers and psychologists who participate in work with old and senile people. Nevertheless, problems remain with organizing the interaction between medical personnel, psychologists and social workers, while assisting elderly patients with cognitive impairment.

Therefore, an extension of the period of active longevity, the full social functioning of a person in adulthood and old age due to the complex interdisciplinary impact on the cognitive aspect of health is one of the urgent tasks of psychosocial care.

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**Primary Paper Section:** F, A

**Secondary Paper Section:** FH, FL, AE

## **G AGRICULTURE**

|    |  |
|----|--|
| GA | AGRICULTURAL ECONOMICS                             |
| GB | AGRICULTURAL MACHINES AND CONSTRUCTION             |
| GC | PLANT GROWING, CROP ROTATION                       |
| GD | FERTILIZATION, IRRIGATION, SOIL TREATMENT          |
| GE | PLANT CULTIVATION                                  |
| GF | DISEASES, PESTS, WEEDS AND PLANT PROTECTION        |
| GG | ZOOTECHNICS  |
| GH | NUTRITION OF FARM ANIMALS                          |
| GI | FARM ANIMAL BREEDING AND FARM ANIMAL PEDIGREE      |
| GJ | BDISEDAISES AND ANIMAL VERMIN, VETERINARY MEDICINE |
| GK | FORESTRY   |
| GL | FISHERY  |
| GM | FOOD INDUSTRY                                      |

# STUDYING THE INTERACTION OF PROBIOTIC STRAIN *B. SUBTILIS* AND CONIFEROUS-ENERGY SUPPLEMENT AND THEIR INFLUENCE ON THE MANIFESTATION OF ANTIMICROBIAL PROPERTIES AND BODY WEIGHT ACCUMULATION IN EXPERIMENTAL ANIMALS

<sup>a</sup>NATALIA ALEXANDROVNA MIKHAYLOVA, <sup>b</sup>SERGEI ALEXANDROVICH LAZAREV, <sup>c</sup>VIKTOR ANATOLYEVICH RYZHOV, <sup>d</sup>VASILY PAVLOVICH KOROTKY, <sup>e</sup>ANNA VIKTOROVNA AIDAKOVA, <sup>f</sup>NIKOLAY PETROVICH BURYAKOV

<sup>a</sup>Federal State Budgetary Scientific Institution «I. Mechnikov Research Institute of Vaccines and Sera», Malyy Kazenny pereulok., 5a, Moscow, 105064, Russia

<sup>b</sup>Federal State Budgetary Scientific Institution «I. Mechnikov Research Institute of Vaccines and Sera», Malyy Kazenny pereulok., 5a, Moscow, 105064, Russia

<sup>c</sup>Science and Technology Center «Khiminvest», Nizhne-Volzhskaya naberezhnaya, 6/1, Nizhny Novgorod, 603001, Russia

<sup>d</sup>Science and Technology Center «Khiminvest», Nizhne-Volzhskaya naberezhnaya, 6/1, Nizhny Novgorod, 603001, Russia

<sup>e</sup>LLC SINAPS, Nobel st., h. 7, 57, ter. Skolkovo Innovation Center, Moscow, 121205, Russia

<sup>f</sup>Federal State Budgetary Educational Institution of Higher Education «Russian Timiryazev State Agrarian University», Timiryazevskaya St., 49, Moscow, 127550, Russia

email: woodnn@yandex.ru

**Abstract:** The work discusses the influence of the coniferous-energy supplement (further referred to as the CES) on the growth properties of probiotic *B. Subtilis*. The results were assessed visually by the nature of growth: not growing, isolated colonies observed, or confluent growth. The obtained data show that in the range of dosages between 0.25 and 1.0 g, the CES had no inhibitory action on the growth of the culture of strain *B. Subtilis* and even increased the antagonistic properties of *B. Subtilis*. With increasing the content of the CES in the complex, the bacterial growth was suspended and was inhibited at all. Throughout the study, all animals remained alive. In all groups, the rabbits actively ate the feed, reacted to external stimuli, and showed interest towards people. The combination of strain *B. Subtilis* and the CES made by the LLC STC Khiminvest (Nizhny Novgorod, Russia) showed high antimicrobial properties (in the *in vitro* tests), and a positive trend in the dynamics of the body weight growth in the laboratory animals.

**Keywords:** antimicrobial properties, coniferous-energy supplement (CES), laboratory animals, strain *B. Subtilis*.

## 1 Introduction

Currently, due to the threat of the development of bacteria resistance to antibiotics, the World Health Organization (WHO) recommends limiting their use in agriculture. Antibiotics received by animals in feed additives circulate in the organism for a long time, and their residual quantities are found in food products of animal origin (milk, eggs, meat) [1]. Eating such food products may be compared to uncontrolled antibiotic therapy, which results in the formation of antibiotic resistance in the pathogens, and, consequently, in dysbiotic and immunosuppressive disorders in the human organism [2].

Animal breeders widely use antibiotics for preventing and treating epizootic diseases, stimulating the growth of the animals, improving the feed quality, and preserving it for business purposes [3].

The RF legislation has established the standards for the content of the most widely used antibiotics in milk and meat, and the products of processing them, including poultry meat, eggs, fish, and seafood [4]. However, the range of the preparations used in the food industry is constantly extending, therefore, the content of many of them in food products remains not normalized. The existing monitoring measures cannot determine the content of all used antibiotics.

These circumstances indicate the need for developing the methods for monitoring antibiotics and for searching for efficient

alternatives to antibiotics. One such area is the development of new pre- and probiotic preparations [5]. Prevention and treatment of infections in farm animals with efficient bio preparations is a more physiological and safe approach to obtaining high-quality and environmentally friendly products.

In the world of veterinary practice, preparations created based on probiotic strains of bacteria of genus *Bacillus* have become widely used [6]. They are safe for the macroorganisms even in high concentrations (except for *B. Anthracis* and *B. Cereus*), produce antibiotics (bacitracin, bacilizin, bacillomycin, bacillin, gramicidin, iturin, obutin, proticin, petrin, subtilin, doximycin, trypanotoxin, fluvomycin, endosubtilysin), enzymes of various classes (hydrolases, oxidoreductases, transferases, lyases, lygases), amino acids (alanine, valine, isoleucine, leucine, lysine, methionine, etc.), vitamins (B6, B12, riboflavin, thiamin, nicotinic and pantothenic acids); they are technologically simple in production and stable during storage [7, 8]. Choosing the most functional strains of the bacteria of genus *Bacillus* will allow creating efficient biological products for livestock breeding, and to abandon the use of antibiotics. In this aspect, strain *B. Subtilis* obtained at the microbiological laboratory of the SRIVS n.a. I. I. Mechnikov is of great interest. The strain shows a broad spectrum of antagonistic activities against opportunistic pathogenic bacteria and fungi, low adhesiveness, immunomodulatory properties; it produces hydrolytic enzymes that help improve the digestive processes [9].

For normalizing the physiological processes in animals and for improving their growth and productivity, feed additives based on recycled forest biomass are also currently used. They are inexpensive, environmentally clean, and safe [10, 11]. The CES made at the LLC STC Khiminvest (Nizhny Novgorod, Russia) is used as a feed supplement and is intended for the replenishment of nutrients and energy in the diet of agricultural animals. [12, 13]. It makes the organisms of farm animals saturated with water-soluble vitamins (C, B1, B6, PP, etc.), fat-soluble vitamins (A, E, D, etc.), carbohydrates (glucose, fructose, galactose, sucrose, maltose), minerals (phosphorus, calcium, iron, magnesium, etc.), and amino acids (arginine, methionine, lysine, etc.) [14, 15].

Based on the identified properties of strain *Bacillus Subtilis* and the CES, studying their mutual influence and expediency of developing a veterinary biological product is of great interest.

This work was aimed at studying the interaction of the probiotic strain and the coniferous supplements and their influence on the manifestation of antimicrobial properties and body weight gain in laboratory animals.

## 2 Materials and methods

The material for the study was the CES made at the LLC STC Khiminvest (Nizhny Novgorod) and the biomass of probiotic strain *Bacillus Subtilis*.

The antagonistic activity was determined by the method of deferred antagonism [16] relative to the test strains of opportunistic pathogenic bacteria: *Escherichia coli* ATCC 25922, *Pseudomonas aeruginosa* 9022, *Staphylococcus aureus* 29213, *Shigella Sonnei* 170, *Proteus mirabilis* 24a from the collection of the FSBEI SRIVS n.a. I. I. Mechnikov.

In the experiments, 20 female rabbits of the Soviet chinchilla breed with a weight of 2 – 2.5 kg were used. The monitored parameters were survival rate, appearance, behavior, and the dynamics of body weight gain.

The animals were divided into four groups five individuals in each, which within 60 days received orally the following: Group

1 — *B. Subtilis* at the dosage of  $1 \times 10^9$ ; Group 2 — the CES at the dosage of 1 g; Group 3 — *B. Subtilis* at the dose of  $1 \times 10^9$  and the CES at the dosage of 1 g (further referred to as "the Complex"); and group 4 — reference. To study the dynamics of weight change, the animals were weighed weekly for two months.

### 3 Results and discussion

At the initial stage, the influence of various dosages of the CES (0.25 to 7.5 g) on the growth properties of *B. Subtilis* 1719 was studied (Table 1). For this purpose, nutrient agar and the CES were poured into Petri dishes and gently stirred. *B. Subtilis* was planted on the solidified agar, and the biomass was spread on the surface with a spatula. The cups were incubated in a thermostat at 37 °C for 24 hours. The results were assessed visually by the nature of growth: not growing, isolated colonies observed, or confluent growth. For the reference, the CES was not added to one dish.

Table 1. CES interaction with strain *B. Subtilis*

| No. | Nutrient medium | CES  | <i>B. Subtilis</i> | Result                         |
|-----|-----------------|------|--------------------|--------------------------------|
|     | ml              | g    | ml                 |                                |
| 1   | 20              | 7.5  | 0.1                | Not growing                    |
| 2   | 20              | 5    | 0.1                | Isolated colonies are observed |
| 3   | 20              | 2.5  | 0.1                | Isolated colonies are observed |
| 4   | 20              | 1    | 0.1                | Confluent growth               |
| 5   | 20              | 0.5  | 0.1                | Confluent growth               |
| 6   | 20              | 0.25 | 0.1                | Confluent growth               |
| 7   | 20              | -    | 0.1                | Confluent growth               |

The obtained data showed that in the range of dosages between 0.25 and 1.0 g, the CES had no inhibitory action on the growth of the culture of strain *B. Subtilis*. With increasing the content of CES in the complex, the bacterial growth was suspended and inhibited at all.

The antagonistic activity of the complex preparation against opportunistic pathogenic bacteria was assessed in comparison with monostrain *B. Subtilis* (Table 2).

Table 2. Antagonistic activity of strain *B. Subtilis* and the studied complex against opportunistic pathogenic bacteria

| The name of the test culture |                                    | Test cultures growth inhibition, mm ( $M \pm m$ ) |              |
|------------------------------|------------------------------------|---|--------------|
|                              |                                    | <i>B. Subtilis</i>                                | Complex      |
| 1                            | <i>Escherichia coli</i> ATCC 25922 | $19 \pm 1.5$                                      | $21 \pm 2.5$ |
| 2                            | <i>Pseudomonas aeruginosa</i> 9022 | $21 \pm 2.5$                                      | $22 \pm 1$   |
| 3                            | <i>Staphylococcus aureus</i> 29213 | $18 \pm 2.5$                                      | $21 \pm 1$   |
| 4                            | <i>Shigella Sonnei</i> 170         | $19 \pm 2$  | $20 \pm 3$   |
| 5                            | <i>Proteus mirabilis</i> 24a       | $16 \pm 1.5$                                      | $18 \pm 2.5$ |

The obtained data testified that the source probiotic strain *B. Subtilis* had high antagonistic activity against opportunistic pathogenic bacteria. It was also evident that the CES, due to its properties, enhanced the antagonistic properties of *B. Subtilis*.

Throughout the study, all animals remained alive. In all groups, the rabbits actively ate the feed, reacted to external stimuli, and showed interest towards people. The results of weighing the rabbits are shown in Table 3 (the average result per group). The rabbits' body weight had positive dynamics in all groups.

Table 3. The dynamics of rabbits' body weight (kg)

| Time, days | Group of animals that received |             |                 |                   |
|------------|--------------------------------|-------------|-----------------|-------------------|
|            | Group 1 <i>B. Subtilis</i>     | Group 2 CES | Group 3 Complex | Group 4 Reference |
| 1          | 2.61                           | 2.44        | 2.68            | 2.41              |

| Time, days | Group of animals that received |             |                 |                   |
|------------|--------------------------------|-------------|-----------------|-------------------|
|            | Group 1 <i>B. Subtilis</i>     | Group 2 CES | Group 3 Complex | Group 4 Reference |
| 8          | 2.68                           | 2.52        | 2.75            | 2.49              |
| 15         | 2.74                           | 2.60        | 2.88            | 2.53              |
| 22         | 2.88                           | 2.74        | 3.04            | 2.55              |
| 29         | 3.02                           | 2.81        | 3.24            | 2.69              |
| 36         | 3.19                           | 2.97        | 3.37            | 2.79              |
| 43         | 3.18                           | 2.99        | 3.49            | 2.87              |
| 50         | 3.34                           | 3.18        | 3.63            | 2.97              |
| 57         | 3.40                           | 3.28        | 3.80            | 3.08              |
| 61         | 3.48                           | 3.31        | 3.83            | 3.15              |

Table 4. The dynamics of rabbits' body weight (%)

| Time, days | Group of animals that received |             |                 |                   |
|------------|--------------------------------|-------------|-----------------|-------------------|
|            | Group 1 <i>B. Subtilis</i>     | Group 2 CES | Group 3 Complex | Group 4 Reference |
| 61         | + 33.33                        | + 35.66     | + 42.91         | + 30.71           |

Table 4 shows that the use of veterinary preparation ensures the highest live weight gain in the animals, compared to the reference group.

### 4 Conclusion

Thus, the combination of a probiotic strain of *B. Subtilis* and the CES made by the LLC STC Khiminvest (Nizhny Novgorod, Russia) has shown high antimicrobial properties (in the *in vitro* tests), and a positive trend in the dynamics of the body weight growth in the laboratory animals. This combination may be recommended for further study as a symbiotic veterinary biological product.

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**Primary Paper Section: G**

**Secondary Paper Section: GH, GI, GJ**

# I INFORMATICS

IN INFORMATICS

# INNOVATIVE ALGORITHM OPTIMIZED FOR MULTIPLE ROUNDS AND STATELESS ASSIGNING OF TASKS NON-DUPLICATE FOR THE SAME SUBJECTS

<sup>a</sup>PETR VOBORNÍK, <sup>b</sup>RADEK NĚMEC

University of Hradec Králové, Rokitsanského 62, 50003 Hradec Králové, Czech Republic  
email: <sup>a</sup>petr.vobornik@uhk.cz, <sup>b</sup>radek.nemec@uhk.cz

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**Abstract:** Optimization of selection of tasks or questions assigned to different subjects from a larger set of tasks is a problematic topic, often solved not only in schools. The article presents the principles and original algorithmic procedures of the new tool that approaches the solution in a completely innovative way. This tool directs pseudorandom value generators to maximize the efficiency of the tasks that are entered in electronically form. The multiplatform open source implementation of this algorithm can be directly linked to LMS Moodle, it can be used alone or integrated into an own application, for multiple rounds and stateless assigning tasks or questions randomly selected from multiple options so as to avoid premature duplicate selection in different rounds for the same subjects. The principles used in this algorithm and presented in the article may also be an inspiration not only for the implementation of future learning applications but also for further development of the theory of selection functions, whether in this or an entirely different science branch.

**Keywords:** Tasks chooser, task assignment, random numbers, Moodle, External tool, eLearning tool, examination, LTI.

## 1 Introduction

Optimizing the selection of tasks or questions generated from a larger set of tasks for different subjects, e.g. students but not only for them, is a frequently solved problem not only at schools. It is not rare that a simple random selection is used, whether in the form of a draw or any automatically processed software. There are procedures for the teaching phase (see [1], [2], [3]) and tools (e.g. see *Universal Testing Environment* [4], *SuperMemo* [5], *Anki* [6], *Dril* [7] etc.) to select the questions in order to maximize the memorizing effect. However, a suitable and universal tool is missing for the final testing when it is necessary to specify objectively and sometimes assign repeatedly the task according to various parameters to a large group of people. We are going to present our solution to this problem.

### 1.1 Current Solutions and Their Disadvantages

Moodle is a great learning management system (LMS). Apart from other things, it enables assigning work or test tasks to students or collaborating groups of students, submitting the solutions and individual evaluation. This functionality is provided by the *Assignment activity* (module) which is part of the basic installation of Moodle. This activity can be used both for assigning homework and for an assignment of exam tasks (collection and evaluation), i.e. tasks assigned, elaborated and submitted within one block under the teacher's supervision. Homework, like any other modules, can also be made available or hidden to different groups of students, thus making possible to create multiple task assignments for the whole class. [8]

However, what is the procedure in case an original and unique assignment for each student is to be created? It is of course possible to create a separate *Assignment activity* with individual work for each student and make it visible only to them. Nevertheless, this solution has a number of disadvantages, such as laborious and difficult preparation and course arrangements (many copies of the activity will be created), loss of advantageous collective grading, confusion in grading records, degradation of computer facilities to a test paper, absence of random choice, also creating individual assignments of exam tasks for particular students may not always be objective, etc.

Another option is to use other Moodle activities. For example, the *Quiz activity* allows the teachers to work with random elements and select only a few of them from a large question bank for each student [9]. The *Quiz activity* is primarily designed as a quick exam and provides tasks of only certain types (e.g. multiple choice, short text answer question, numeral response,

etc.). The advantage is that the quiz answers are scored automatically. However, the type of task "elaborate a project on the theme ... in application ..., upload and submit it here" is not available, and it would not even fit into the overall quiz concept.

However, there is one module (activity) that allows you to avoid the problem of the absence of some function. Its name is *External tool*. It enables to set up and configure external web services called via a URL, while it sends additional parameters via the LTI<sup>1</sup> protocol using the POST method<sup>2</sup>. Thanks to this it is possible for each potential request to either create your own or use an existing online service that can process it based on input data. These are secured by the OAuth<sup>3</sup> protocol and, in addition to their own defined parameters, they contain the identifiers of the course and the student who used the link [10]. Whereas it is a built-in Moodle component, time availability and current visibility for students can be easily managed right here [11, p. 82].

This module could therefore be used as a solution, but no such online tool has been available so far that would meet the system requirements.

## 2 System Requirements

For the purpose of assigning individual, but randomly chosen and combined tasks, the following list of requirements of functions was compiled that the tool should support for their selection.

- 1) Select tasks randomly and evenly from the whole range of available tasks.
- 2) The task should be assigned to individual student permanently to see the same assignment when the page is reloaded, after repeated login or when reviewing the assessment even a few days later. The teacher must also have the possibility to reproduce this exact assignment.
- 3) Multiple round assignment:
  - a) If the assignment has multiple rounds (e.g. several exam dates), the student should never be given the same assignment if there are some tasks that have not been assigned to him/her yet.
  - b) The assignment (and evaluation) of previous rounds should still be available to the student.
- 4) Selection of multiple tasks:
  - a) The selection could include not only one (1) of the potential tasks, but also a combination of multiple tasks of the given count (1 to N).
  - b) For the selection of multiple tasks (2 to N), the same limitations (no recurrence, and back availability) should apply as for the selection of one single task.
  - c) It should be possible to sort the tasks into groups and then specify in given assignment settings how many tasks are to be chosen from each group.
  - d) It should be possible to display the selection of multiple tasks in the overall text of assignment in both random and predetermined order.
- 5) Text of the assignment should be able to include random elements (words, characters and numbers).
- 6) The access to a given set of questions should be password-protected. Without a password the tasks will not be selected or displayed.
- 7) The system should be in compliance with the GDPR<sup>4</sup> parameters, i.e. save all data about all its use (e.g. history of tasks assigned to one student) anonymously, encrypted, or preferably not to save them at all, but the requirements 2 and 3b should be met.

<sup>1</sup> LTI – Learning Tools Interoperability [10]

<sup>2</sup> POST method is used to send data to a server which is stored in the request body of the HTTP request [28]

<sup>3</sup> OAuth – Web Authorization Protocol [29]

<sup>4</sup> GDPR – General Data Protection Regulation [35]

### 3 Results

One of the currently most versatile technologies, namely .NET with the C# language was chosen to create a system that would meet all requirements. It can be connected to Moodle as an *External tool* and at the same time, it can work independently and provide an API<sup>5</sup> for use of other applications. The .NET Standard, i.e. a type of project that can be compiled into libraries and applications available for the widest range of target systems<sup>6</sup>, was used as the basic class library because it manages the entire process of setting tasks. The ASP.NET Core technology, a highly cross-platform which provides a web interface, was chosen for the development of the application part. It can be used on web servers running operating system the Windows Server or various distributions of Linux [12].

#### 3.1 Algorithm of Selection

The main goal is to randomly select tasks that will not be repeated for the given student in following rounds. If a quality generator of pseudorandom values is used instead of a purely random generator, an arbitrarily long line of numbers generated by it depends solely on the default value of the generator, the so-called *seed*. If we relate this value to the student in some way, then it would always be possible to reproduce a previously generated set of pseudorandom values for that student. His/her ID, login or e-mail address can be used, but only in combination with another hidden value (available only to the task setter), so that the student cannot see the task in advance.

The second essential parameter is the round number (*round*), which defines how many times the task has been selected for the student in order to choose a different work for the new round, and at the same time to see the same assignment in the already completed round, as when the page with the tasks for that round was first loaded.

The basic procedure is shown in diagram, see Fig. 1.

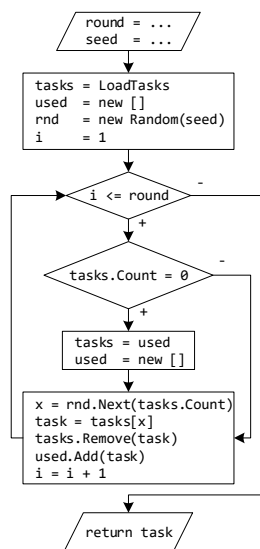


Fig. 1 – Basic schema of how the selection function works for the *round* and the initial value *seed*

The input parameters are the *seed* (a text is converted to an integer by the hash<sup>7</sup> function) and the *round* (an integer from 1 up). The algorithm then retrieves a list of available *tasks* from a file or a database, prepares the second empty list *used* to record the tasks used in the previous rounds, creates a new generator of

pseudorandom values *rnd* with an initial *seed* value, and sets the round counter *i* to 1.

The next steps are repeated according to the required number of the rounds, i.e. if *round* is equal e.g. six, then the task selection will be done six times and the last selected one will be returned. In each round, one task is randomly chosen from the loaded set of tasks, it is removed from this set (*tasks*) and added to the set of already used tasks (*used*). If this round was the last, this task is returned as a result of the entire selection process. If it is not, the selection from the currently shortened list (*tasks*) of loaded tasks is repeated.

If the list of loaded tasks (*tasks*) is empty and the object task has not been selected yet, all tasks will be returned to the possible selection (each of them has been used once in previous rounds), and the list of used tasks (*used*) will be emptied (so far none of the tasks was chosen twice).

Of course, it is ideal if the number of possible tasks exceeds the number of rounds. However, this procedure can ensure the required functionality even if the opposite is true (the number of rounds is higher than the number of tasks, even several times).

#### 3.2 Selection of Multiple Tasks

The given solution applies so far only to cases where the algorithm was supposed to select exactly one task from several possible. However, the System Requirements in point 4 also state the possibility of selecting multiple tasks, and according to 4c it should be possible to sort the tasks into categories and limit the number of selected tasks so that a specific number of tasks is chosen from each category.

To select more than one task without further limitations, it is enough to repeat the current procedure, as if the second and following tasks were selected in the next round. However, if there is still a selection restriction by different categories, it greatly expands the possibilities of task definition. These tasks may not always be completely independent, but together they can form a more complex assignment. The following mathematical problem demonstrates this possibility (Tab. 1).

|  |  |
|--|--|
| Calculate required values for the triangle of known following data and draw it in the given way. |  |
| A) Category A (value declaration) – choose 1 of tasks  |  |
| 1) $a = 5, b = 3, \gamma = 30^\circ$   |  |
| 2) $a = 10, \beta = 25^\circ, \gamma = 40^\circ$   |  |
| 3) $a = 4, b = 2, c = 7$   |  |
| B) Category B (what is to calculate) – choose 2 tasks  |  |
| 1) area of the triangle $S = ?$  |  |
| 2) perimeter of the triangle $O = ?$   |  |
| 3) size of missing angles $= ?$  |  |
| 4) length of the sagitta for the $a$ side  |  |
| C) Category A (drafting) – choose 1 of tasks   |  |
| 1) draw this triangle with the inscribed circle  |  |
| 2) draw this triangle with the circumscribed circle  |  |

Tab. 1 – Categorized set of tasks for the selection of possible assignment of 4 tasks (1+2+1)

Thus, up to 36 different assignments  $(3 \cdot \binom{4}{2} \cdot 2)$  with 4 tasks (1x from 3 in A, 2x from 4 in B, 1x from 2 in C) can be generated from the set of tasks in Tab. 1.

Modifying the algorithm to support tasks selection from categories is not complicated at all. Repeat the selection in the required number for each desired category separately. So, before we select a random task, we filter the list *tasks* into an auxiliary list, e.g. with the help of method *Where* of the LINQ<sup>8</sup> tool.

The next step was to establish a log format, i.e. a mini-language (such as [13] or [14]) that would allow you to easily, clearly and

<sup>5</sup> API – Application Programming Interface

<sup>6</sup> .NET Standard libraries can be added to project running on OS Windows, Android, iOS, MAC OSx, Linux... [31]

<sup>7</sup> hash is one-way (irreversible) computationally efficient function mapping binary strings of arbitrary length to strings of fixed length, it is called the hash-value [19]

<sup>8</sup> LINQ (Language Integrated Query) is the part of the .NET Framework that provides a generic approach to querying data from different data sources [32]

intuitively, but also comprehensively and uniquely define the number of tasks to be selected from which category. At the same time, this format should be easily programmable. [4, pp. 148-168]

If it were not for categories, a simple number would be sufficient, which is also the first possibility to define the number of selected tasks. With categories, however, there are situations where it might be important to have the possibility to define the following cases.

- A certain number of tasks from a specific category, a different number of tasks from a different category
- A selection of a specific number of tasks from several different categories
- A selection of a specific number of tasks from each category

Similarly to the SQL [15] language, an effort was made here to design this mini-language so that its notation would be an analogy of a classic sentence expressing the exact tasks number requirements. Instead of words, separators have been used that are commonly used in such cases and whose choice should therefore be intuitive. These characters, instead of whole words, shorten the total length of the notation and also facilitate programming of such a definition. These are the following characters (sorted by their priority):

- : – separator of total number of questions from closer specification
- , – separator of uniform requirements on different categories
- / – symbolizes “from” to specify entered number of tasks from a particular category
- | – the phrase “or” to select from several possible categories
- \* – wildcard character “any previously not mentioned category”

Several particular cases of defining the number of selected tasks using the above-described characters are shown in Tab. 2.

| Notation      | Meaning   |
|---------------|---|
| 1             | 1 task from all possible (default choice for selection)                               |
| 3             | 3 tasks from all possible regardless of cat.  |
| 1/A           | 1 task from category A  |
| 1/A,2/B,1/C   | 1 task from category A, 2 from B, 1 from C (see Tab. 1)                               |
| 4/A B,2/C     | 4 tasks from categories A or B, 2 tasks from category C                               |
| 1/*           | One task from each category   |
| 1/A,1/D,2/*   | 1 task from category A, 1 from D, and 2 from all other categories                     |
| 5:1/*         | 5 tasks in total, maximum one (or none) from each category                            |
| 6:1/A,1/B,1/* | 6 tasks in total, 1 from A, 1 from B and remaining 4 tasks, one from other categories |

Tab. 2 – Demonstration of notification of various requirements for the number of tasks, total and categorized in its own intuitive mini-language

Each task can then be labelled with an attribute to determine which category or categories it belongs to (e.g. “a,b,c”). Thanks to categories and number definition, some tasks can be omitted (filtered) from the selection. If random change of tasks order is off, some categories can also be used as headings of the following tasks section if necessary.

### 3.3 Random Elements

A significant number of tasks is or can be defined by just changing one word or parameter value to create a completely new tasks, even of the same type.

For example, an assignment “Create a presentation in [Sway,PowerPoint] on topic [computers,animals,your favourite sport,your favourite serial story].“, where only one of the comma-separated values in each brackets is always selected and inserted in a sentence. Thus, a single task equals  $2 \times 4 = 8$  in a chosen environment and on a given topic, and there would be no problem to add more of them.

The situation is even easier with numerical values. If in Tab. 1, for example in category A, at least one of the values (side length or angle size) of each variant was randomly generated in the range of just 10 numbers (e.g. for A1:  $\gamma = [30-39]$ ), the number of variants (of different assignments) will increase from 3 to 30 for category A, and the total number of possible assignment variants will increase from the original 36 to 360.<sup>9</sup>

A similar possibility of entering random values into test questions has already been implemented e.g. in the *Universal Testing Environment* (see [4, pp. 48-53], [16] and [10]). To choose tasks, support for selecting random words (parts of the text from the list of options), integers (defined from-to), characters (determined by the first and last possible characters in ASCII code<sup>10</sup>), and XML elements have been used for the system. In the future, it would be possible to add also support for further use of already selected values (repeated list of values, or support for basic calculations with chosen random numbers<sup>11</sup>).

For the selection of random values, a new pseudorandom number generator is created in the system with an initial value derived from the *seed*, so that any changes (adding, deleting or changes in specification or range of values) would not affect the main generator designated for the tasks selection. Whereas the primary task of the generator is to choose tasks and random values are just a supplementary option, the non-recurrence of the assignment cannot be guaranteed in their case and everything is left to random choice. However, the principle of reproducible assignment is applied here (see the requirement No. 2).

Thanks to random values, the student may be assigned a task that he/she or classmates have previously solved, but the finished solution or correct result known from the previous assignment cannot be used as some of the parameters of the task may differ. At the same time, this is a good way how to prevent the students from cheating and copying the solutions.

### 3.4 Generator of Pseudorandom Values

The functionality of the entire system is absolutely dependent on the generator of pseudorandom values. The selection algorithm is built in such a way that in fact it is possible to use any pseudorandom value generator, either as an implementation of some classical ones (see [17, pp. 10-40]), a library of generator from third parties (e.g. [18]), or more advanced cryptography techniques can be used (e.g. such as a multilevel hash series used for encrypting by *perfect cipher* in [19]).

For standard use, it seemed logical to use the integrated *.NET Framework* generator – class *Random* (see [20, pp. 52-60] and source code [21]). Its properties have been tested independently many times (e.g. see [20, pp. 54-57], [22], [23]) and its suitability for the use in this project was then tested for the following aspects.

- The generated series of numbers must be theoretically infinite.
- The generated series of numbers must be statistically uniform.

<sup>9</sup> In task A-3 it is of course not possible to select numbers completely randomly, one of the 10 pre-set triplets of values have to be selected

<sup>10</sup> ASCII – American Standard Code for Information Interchange

<sup>11</sup> E.g.  $[a=1-10] * [b=1-10] = \{a*b\}$

- The generated series of numbers must be fully dependent only on the default *seed* value, and if it is the same, the entire series of numbers and its each member must also be the same independently of the hardware, operating system and version of the development environment on which is the application compiled or run.

### 3.5 Implementation

Class libraries handling the entire algorithm of selection have been developed separately (.NET Standard) so that they can eventually be linked to any type of project or application. For testing the generator, three “one-line” applications were then created: console (.NET Framework) for Windows, console (.NET Core) for Linux and mobile (Xamarin [24]) for OS Android. A web application (ASP.NET Core) was created for use via web interface and to link to the LMS Moodle via the *External tool* module.

The web application supports three interfaces to query tasks that can be used: via URL parameters, via POST (hidden), and via POST parameters from Moodle *External tool* (LTI). However, this last variant works in such a way that the parameters are read, translated into their POST form and the request is redirected to the second version of the interface (similar to [10]). The Moodle user login combined with a secret part of the password which can be set in the *External tool* module, is used as a *seed* here.

Tasks sets can currently be retrieved from separate XML files with a structure that enables both writing and processing of all required properties. In comparison with the original requirements, the option of basic multilevel settings of conditions under which the tasks are to be selected, has also been added. The same format for defining the tasks set is also planned for the eventual extension of the application to support their database management via the web administration interface, where XML sets will be saved as DB type XML<sup>12</sup>.

The web application is stateless and it does not save anything itself (thus fulfilling the GDPR conditions). It only processes incoming requests and hands back the generated task assignment either in HTML form or as plain text. However, it supports the possibility of logging activation (e.g. when debugging the set of tasks or setting a communication), when into the text file, individual lines are recorded with dates and times of the incoming request and its form is transformed into the final URL version.

All source codes of all libraries, projects and applications were placed on GitHub<sup>13</sup> under the MIT<sup>14</sup> license, where it can be studied in detail, downloaded and tested, or further developed or included into your own application.

### 4 Use in Practice

This version as well as the previous one of the algorithm and web application has already been successfully used in practice several times. In the first version, the system connected to Moodle via the *External tool* was first used in December 2016 for random selection of one task from more possible ones for the exam in *Database Systems* course for a total of 26 students. 13 tasks were added in turn: 1<sup>st</sup> round/group 5, 2<sup>nd</sup> round/group different 5, 3<sup>rd</sup> and next rounds (replacement/correction of the exam) previous 10 + 3 new tasks.

The Moodle *External tool* was not used directly, but only as an interface that mediated communication with the web application for the tasks selection. The *External tool* was set up to get the text with the task in the HTML format based on the user login name. Although it would work like that independently, it was

hidden from the students, and the task with a wider description was displayed to students through the *Assignment activity* within its text, as a nested *iFrame*<sup>15</sup> referring to the URL of the *External tool*. It read the task text and included it into the text of assignment, and it was not noticeable without examining the source code of the page. In addition, the task text was protected by a special HTML element against marking and copying.

Since the following school year (2017/18), the system was further developed, and new features described in this article were added. At the same time, it has been used in more subjects (Programming 1, Application Software etc.) at the *Faculty of Science on University of Hradec Králové*, but also at the *Secondary school “Podorlické vzdělávací centrum Dobruška”*.

By the end of summer term of the school year 2018/19, the system was also used for the collective assignment of question for the final state examinations at the Department of Informatics.

### 5 Conclusion

The article introduced innovative principles and original algorithmic procedures of a new cross-platform open source tool for multiple round and stateless selection of tasks or questions randomly chosen from multiple options, avoiding premature duplicate selection in different rounds for the same subjects. This tool works with directing pseudorandom value generators to maximize the efficiency of tasks entered electronically. The result thus meets all the requirements and fulfils all the objectives stated in the introduction.

The tool, in its current versions, has been successfully used in practice for several years for exams at secondary school and university. It was also newly tested for assigning questions during state final examinations. Its potential does not end there, it could equally well be used also for assigning questions for secondary school leaving exam or driving tests. However, it can also help during preparation for all these exams.

Thanks to the transparency of open source codes placed on GitHub [25] and possibility of reconstruction of the entire draw process at any time and by anyone, this project could replace not always transparent systems for the draws public contracts, or may find use in lottery. Random values are also needed in modelling and simulation, cryptography, evolutionary algorithms or games.

The development of the system, both of the selection algorithm itself and other functions for tasks sets, as well as applications providing this library with a user or administration interface, has not finished and will continue in line with the findings from its use in practice. GitHub also provides the opportunity to participate in development to any other developers who can, based on the current version, create a new development branch, and either use their improvements themselves, provide them as a basis for further development in their independent branch, or offer them for reconnection with the main development branch of the project. [26]

Principles used in the main algorithm and presented in this article can also be an inspiration not only for the implementation of future educational applications (e.g. [27]), but also for the further development of the selection function theories whether in this or a completely different field.

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<sup>12</sup> Microsoft SQL Server offers for table attributes as one of the possible XML data types, with advanced content processing capabilities [33]

<sup>13</sup> all source codes of this project are available at <https://github.com/PetrVobornik/TasksChooser> [25]

<sup>14</sup> MIT is a short and simple permissive license with conditions only requiring preservation of copyright and license notices. Licensed works, modifications, and larger works may be distributed under different terms and without source code. [34]

<sup>15</sup> iFrame – an inline frame is used to embed another document within the current HTML document [35]

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#### Primary Paper Section: I

#### Secondary Paper Section: IN



## J INDUSTRY

|    |   |
|----|---|
| JA | ELECTRONICS AND OPTOELECTRONICS                                   |
| JB | SENSORS, DETECTING ELEMENTS, MEASUREMENT AND REGULATION           |
| JC | COMPUTER HARDWARE AND SOFTWARE                                    |
| JD | USE OF COMPUTERS, ROBOTICS AND ITS APPLICATION                    |
| JE | NON-NUCLEAR POWER ENGINEERING, ENERGY CONSUMPTION AND UTILIZATION |
| JF | NUCLEAR ENERGY  |
| JG | METALLURGY, METAL MATERIALS                                       |
| JH | CERAMICS, FIRE-PROOF MATERIALS AND GLASS                          |
| JI | COMPOSITE MATERIALS   |
| JJ | OTHER MATERIALS   |
| JK | CORROSION AND MATERIAL SURFACES                                   |
| JL | FATIGUE AND FRACTURE MECHANICS                                    |
| JM | STRUCTURAL ENGINEERING  |
| JN | CIVIL ENGINEERING   |
| JO | LAND TRANSPORT SYSTEMS AND EQUIPMENT                              |
| JP | INDUSTRIAL PROCESSES AND PROCESSING                               |
| JQ | MACHINERY AND TOOLS   |
| JR | OTHER MACHINERY INDUSTRY  |
| JS | RELIABILITY AND QUALITY MANAGEMENT, INDUSTRIAL TESTING            |
| JT | PROPULSION, ENGINES AND FUELS                                     |
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# MANAGING BUSINESS PROCESSES OF ENERGY EFFICIENT TECHNOLOGIES IN CONSTRUCTION

<sup>a</sup>LARISA GERASIMOVA, <sup>b</sup>NATALYA PARASOTSKAYA,  
<sup>c</sup>TATIANA MEZENTSEVA

<sup>a</sup>*Moscow State University of Civil Engineering (National Research University), Yaroslavskoye Highway, 26, Moscow, Russia, 129337, email:22969@mail.ru*

<sup>b</sup>*Chamber of Commerce and Industry of the Russian Federation, Ilyinka Street, 1, Moscow, Russia, 109012*

<sup>c</sup>*Financial University under the Government of the Russian Federation, Leningradskiy Avenue, 49, Moscow, Russia, 125167*

**Abstract:** The methods of cost formation in technologies of improving energy efficiency in construction have been reviewed in the article. The technologies related to energy design have been analyzed. The methods of managing energy consumption by innovative materials, technologies, and space planning solutions have been demonstrated. The most rational solutions of energy consumption control have been suggested.

**Keywords:** energy design, costs, technologies, materials, management.

## 1 Introduction

Increasing the energy efficiency is currently regarded as a way of finding measures and instruments, as well as implementing them to create the conditions for satisfying the demand for all the necessary products and services at a minimal cost. This applies to both economic and social costs, which are required to obtain the required energy. The preservation of the natural environment in harmony with stable development at the regional, state, and global levels is required when estimating these costs [1, 2].

At the moment, the efforts are made to build structures with due consideration for the principles of energy consumption savings in construction. Energy sources that can be independently renewed are often considered in projects.

Energy efficiency belongs to the characteristics that are sufficiently important for achieving an economic result. It accounts for the total cost of energy resources spent on

production. The amount is taken as a ratio of the useful effect of the energy resources to these costs [3-5].

As such, the construction organizations consider the use of innovative energy design technologies to improve energy efficiency and ensure the desired effect in reducing production costs and obtaining economic benefits.

## 2 Materials and Methods

Such general scientific methods of research as synthesis, analysis, generalization, and abstraction ones were used in the study.

## 3 Results

The use of energy saving business processes in construction technologies, also known as energy design, requires an integrated approach, where the financial interests of the property owners and project investors are to be taken into account, alongside with compliance with the legislation [6, 7].

Most of the instruments used in energy design of buildings ensure a lower level of energy consumption. In this case, the cost does not increase significantly.

It must be noted that the cost of building one square meter of energy efficient structure is currently higher than the standard one, approximately by 7 – 9 %. As such, all the additional costs of such construction can pay off in about eight years. It must be noted that there is no need to lay pipes for heating inside the building, or erect boilers and tanks to save fuel.

When business processes of energy design are used in the construction technologies, an energy-oriented building is formed, which reflects the interaction between the main elements and systems of the building, taking into account lighting, heating, and ventilation in different seasons. It is important to note that the functional purpose of the building, its shape and orientation in space also influence the costs formation (Figure 1).

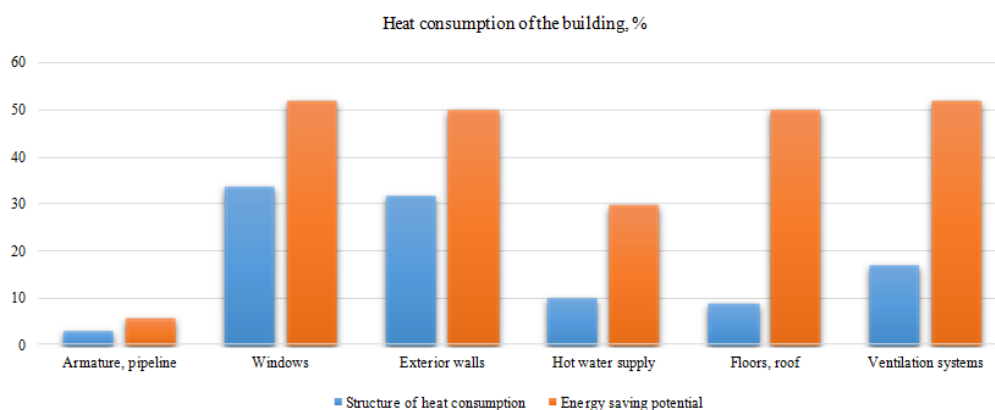


Figure 1: Energy saving potential and structure of heat consumption of a building

For example, savings on heating and air conditioning for public and residential buildings can be from 40 %. This is relevant when using business processes improving the ventilation in the summer and also helping retain heat in the winter [8, 9].

The costs of the organization associated with energy efficiency will directly depend on the selected business process of energy design and space-planning solutions. They are included in the limits and objectives of the project, which indicates the key points of its commercial parameters and technical specifications from the customer.

The priority areas of energy design, which is able to increase the energy efficiency of the building (minimizing heat loss in buildings), should be taken into account while solving these tasks. These include (Figure 2):

- use of efficient thermal insulation in the construction and restoration of structures;
- reduction of heat loss by using recuperators that allow providing heat recovery of exhaust air into the building;
- use of modern window systems, balcony and entrance doors that do not allow the infiltration of heated air;

use of boiler plants with high efficiency, as well as devices for monitoring the thermal regime in each separate flat and individually controlled radiators; creation of an inseparable contour of thermal insulation; and

opting for a thermal insulation system that is able to operate for a long time – for example, the modern plastering systems used for thermal insulation of facades allow reducing heat losses almost twice by using external walls.

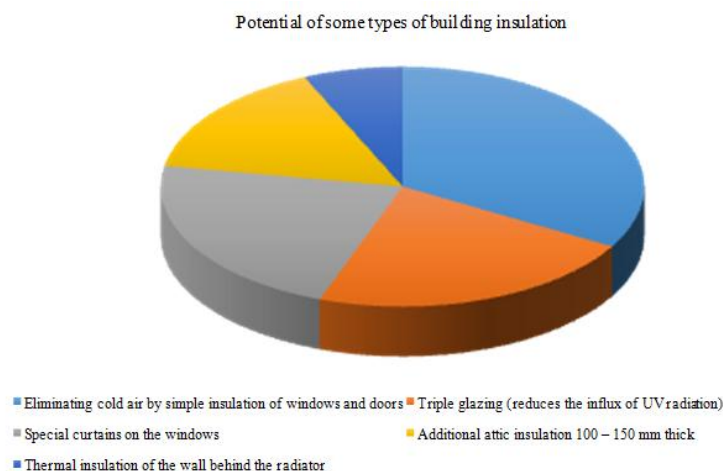


Figure 2: Measures for the insulation of the building envelope and their potential for heat saving

In this case, the criterion of efficiency is the energy consumption during construction, use and subsequent liquidation of the structure. The efficiency criterion includes the consumption of heat and electricity, gas, as well as other sources of heat able to create comfortable living conditions. The level of safety of the applied technologies for environment should be taken into account [10-12].

It must be noted that the energy consumption throughout the entire life cycle is taken into account when applying an energy efficient approach to construction: from the production of building materials to the utilization of a building that has outlived its resource.

This is based on ISO 14044-2006 Environmental management. Life cycle assessment. Requirements and guidelines, and another standard based on it – GOST R ISO 14044-2007 Environmental management. Life cycle assessment. Requirements and guidelines.

Reducing the amount of energy consumed at each construction stage, from the materials production to subsequent operation, leads to reducing the amount of primary fuel used on a global scale and, accordingly, reducing the negative impact on the environment due to emission of greenhouse gases and other harmful substances [13]. Therefore, the cost of the subsequent building operation should be estimated during planning.

When a developer selects a business process of energy design, a management accounting specialist needs to verify its validity. It is not always rational to use cheap materials. One should make sure they are environmentally friendly and reliable. It should also be checked whether the expensive materials are worth the money spent.

This is due to the fact that materials for construction play a very important role. For example, as thin as possible joints should be formed when using aerated concrete blocks. This minimizes heat loss through the solution. When compared with other full-bodied materials, the price of aerated concrete is several times lower, which allows saving up to 80 % on material costs.

The proposals for taking environmental characteristics relating to the energy efficiency of a building into account have become increasingly relevant recently. Manufacturers are increasingly ceasing to use lead stabilizers on window frames. Some switch to safer materials, while material costs also vary. The use of special types of glue is also aimed at reducing heat loss. It is almost reduced to zero when used efficiently. Energy

performance testing often includes elevators in buildings. Energy loss of these mechanisms amounts to about 15 %.

As such, the elevator should be evaluated after its installation rather than at the stage of its manufacture. Although this approach affects the cost, the information is more relevant [14, 15].

The above areas differ in degrees of costs. To determine the specific solution, the estimated costs should be compared with the final result of the energy efficiency.

The business processes of energy design under consideration have their advantages and disadvantages. The developer must clearly understand the relation between the construction method and the project cost (Table 1).

Table 1: Energy savings from using energy design instruments

| Energy design instrument  | Cost savings, taking economic and technical characteristics into account   |
|---|--|
| Heat recuperators   | Return of 50 – 90 % heat difference from air exchange  |
| Heat pumps  | Reducing energy consumption twice in comparison with solid fuel boilers and up to four times in comparison with electric heating |
| Solar collectors  | Energy savings on heating (depending on the region) – 20 – 80 %  |
| Thermal insulation of envelope  | Reducing energy consumption up to 50 %   |
| Windows: low emission coatings (reflect infrared radiation); multi-chambered windows; electrochromatic or gas chromatic glazing | Reducing energy consumption for: heating by 25 – 40 %; cooling by 5 – 30 %   |
| Control of energy consumption in the building   | Saving heat and electricity up to 30 %   |

Besides, it must be taken into account that many technical solutions have strong influence on both the scope of work and the complexity of the building construction process. This also includes the amount of materials spent on construction. For example, the wall thickness can vary several times depending on the selected technologies and materials (Table 2).

Table 2: Thickness of the exterior walls built using different technologies

| Technology                                  | Wall thickness, mm |
|---|--------------------|
| Solid stone materials (bricks + insulation) | 480                |
| Combined stone materials                    | 300 – 310          |
| Solid wood materials                        | 250                |
| Frame structures                            | 240                |

As such, with the same perimeter of the structure, the useful space will differ significantly. If these are stone materials, the wall thickness will be about 480 mm; if frame technologies are used in the building construction, the walls will be 240 – 250 mm thick.

This means that if the outer perimeter of the two above-mentioned buildings is the same, the inner area will be different. This allows to increase the price of a building with a larger residential space.

However, the energy efficiency must be found first, after which the cost of one square meter can be estimated.

It must be noted that various choices of planning solutions can lead to a difference in the materials consumption up to 1.5 times. These results should be correlated with the results of the energy audit, as well as with the total of the financial characteristics.

The cost of heating is the most important factor that significantly affects the cost of maintaining the property.

Electricity or gas are often used in Russia for heating buildings.

At the same time, buildings from various types of wood do not meet the modern standards of thermal insulation. The walls must be 500 – 590 mm thick for wooden structures to meet new standards.

These buildings are comfortable for living, but their heating is too expensive. For example, if a laminated timber house with an area of about 110 square meters is insulated using the energy design technologies, the savings will be 10 % or more per heating period if the gas is used, and about 75 % if the electricity is used. As such, investments will pay off in a year in case of electricity and in six years in case of gas.

Automatic temperature adjustment in individual rooms also helps save heating resources. The automation allows saving on heating several times. However, it is only efficient if the building complies with the energy saving standards.

As such, the total costs related to the creation of the energy efficiency in buildings are determined using the following factors:

wall thickness, their insulation;  
space-planning solutions;  
use of the energy efficient equipment in the building: boilers, ventilation, and other. Ventilation with recuperation allows heating the air in the house due to the warm air passing through this system; and  
landscape solutions. At least, it is required to provide a live fence from the wind by planted trees.

The energy efficiency is estimated with due consideration for the purpose of the structure depending on the energy consumption category assigned (Figure 3). These include industrial and residential buildings. If the building is expected to be supplied with several kinds of resources, then calculations should be made for all of them.

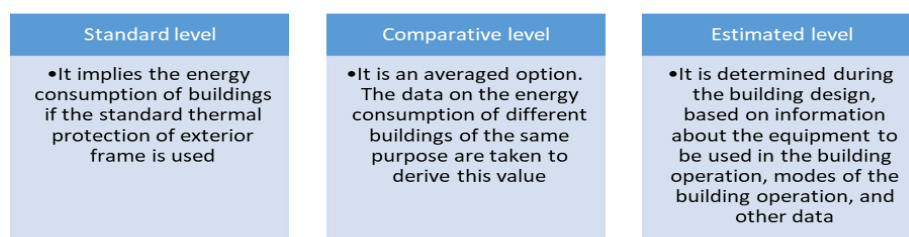


Figure 3: Methods for calculating energy consumption for buildings for various purposes

The documents relating to the building project must contain information about the consumed thermal energy (kW per m<sup>2</sup> per year) required for creating the conditions for subsistence of all buildings.

The return on investment should be calculated to understand whether the project implementation is relevant from a financial point of view, taking the applied business processes of energy

design into account. Both absolute savings and relative savings are taken into account when calculating the payback period. It is advisable to make a comparison with other options to see a clear difference.

An example of the energy costs for the components of a building made using different technologies is shown in Figure 4.

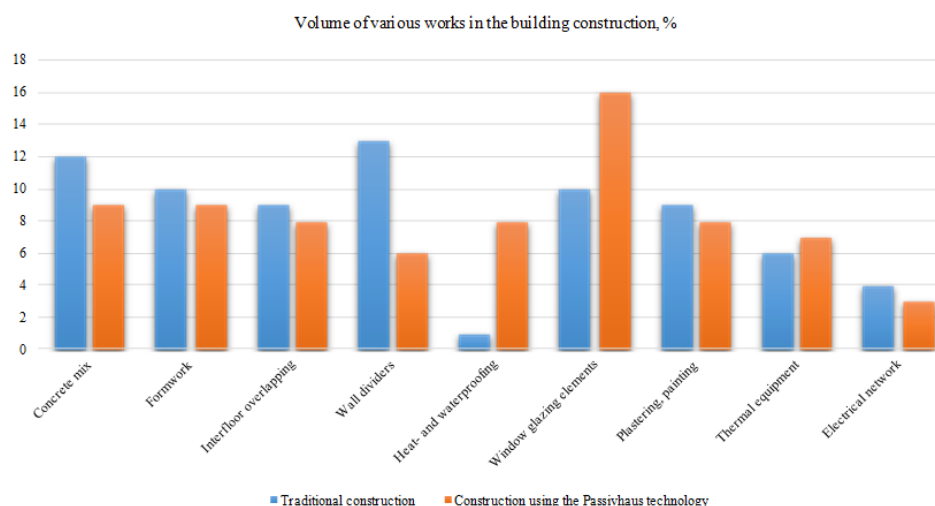


Figure 4 – Energy costs for the building construction using traditional technology and Passivhaus technology.

Some works are the same in both options. For example, excavation – 1 %; armature – 5 %; roof – 4 %; floors and cladding – 7 %; tinning-forging works – 5 %; and sanitary network – 4 %.

The cost of building a house without the cost of improvement, consultancy fees, and the price of the land where the building is located for the construction, is higher by about 7 – 9 % for Passivhaus than for traditional technologies. This amount can pay off within 5 – 7 years of operation.

#### 4 Conclusion

It can be summarized that the ideas about improving energy efficiency are now becoming more common. In case of residential buildings, the flats where modern features of energy saving are taken into account are very popular among buyers.

As such, there is a need for a mechanism for managing energy costs, which could enable an optimal selection of construction technologies that will increase energy efficiency.

In conclusion, it must be noted that the use of the energy design principles allows to create buildings with a low level of energy consumption and comfortable living conditions at the same time.

This can be achieved with a slight increase in the building cost by minimizing the works of the heating and air-conditioning systems (they can be completely discarded in some cases). The total cost of the construction is higher than the standard, but it reduces the cost of connecting some functional systems and using other innovative solutions.

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# DESIGN OF CONSTRUCTIONAL OPTIMISATION DETERMINED FOR MIXER TRUCK GEARBOX

<sup>a</sup>SILVIA MALÁKOVÁ, <sup>b</sup>PETER FRANKOVSKÝ, <sup>c</sup>DANIELA HARACHOVÁ, <sup>d</sup>VOJTECH NEUMANN

*Faculty of Mechanical Engineering, Technical University of Košice, Letná 9, 042 00, Košice, Slovakia*

*email: <sup>a</sup>silvia.malakova@tuke.sk, <sup>b</sup>peter.frankovsky@tuke.sk, <sup>c</sup>daniela.harachova@tuke.sk, <sup>d</sup>vojtech.neumann@grob.de*

This work is a part of these projects VEGA 1/0290/18 "Development of new methods of determination of strain and stress fields in mechanical system elements by optical methods of experimental mechanics", APVV-16-0259 "Research and development of combustion technology based on controlled homogenous charge compression ignition in order to reduce nitrogen oxide emissions of motor vehicles" and VEGA 1/0110/18 "Research and development in the field of exploitation engineering and rapid prototyping for the innovation of experimental vehicle and transport equipment components".

**Abstract:** When designing and constructing machines, it is very important to ensure that machines that are subjected to different types of stresses and different operating conditions, bear the loads to which they are subjected and also withstand operating times. The transmission by gear wheels are the most commonly used transmission mechanisms in practice. The paper deals with the analysis of the mixer truck gearbox damage that occurred during the operating time. The result of the optimization is a change in the geometrical parameters of the gear wheels. The constructional optimisation of this gearbox is designed to eliminate the failure rate.

**Keywords:** gearbox, spur gear, optimization, strength calculation of gearing, safety factor.

## 1 Introduction

Gearing are the most commonly used transmissions mechanisms in practice. Gear wheels appear in history in the form of jewelry in the past, for 2000 years BC. Already 300 years BC, primitive forms of gearing were used, especially in water mill drives for pumping water or lifting heavy loads. Great development occurred in the development of windmills, which were among the largest machines in the period (9th to 18th century). Later, the first theoretical works on gearing by Leonardo da Vinci (1452 - 1519) appear in which the wear of the sides of the teeth has already been mentioned. The need to devote more attention to the gear geometry was related to the increasing demand for gears to operate at ever higher speeds and higher loads [1].

The gearbox is a technical implementation of the gear mechanism in the form of a separate machine subsystem. It represents the most widespread and most important type of gear mechanism, we encounter in all areas of technology. Stepped gearboxes are mainly used to drive vehicles and wherever machine workpieces need to be driven at different speeds at different loads [2, 3]. The transmission mechanism transmits and optionally distributes the energy supplied from the drive machine to the working machine.

Due to the characteristics of most types of engines (in particular combustion piston) transport and mobile machinery, the stepped gearbox must fulfill the following functions:

1. Change the value of the gear ratio to match the speed and force modes of input and output, that is, to vary the driving power on the wheels and the speed of the vehicle in a relatively wide range with relatively low torque and engine speed.
2. Change the sense of the gear ratio as needed to reverse the movement.
3. Enable gearbox neutral, in which the input and output shafts are open and the engine can operate with a stationary vehicle.

The gear mechanism consists of master gear or planet gear. The gear mechanism consists of several main parts, which include shafts on which other important parts of the gearbox are mounted, namely gears or sprocket, carriers that are connected to each other and the frame by kinematic pairs (gearing and bearings) and temporarily connected by control elements [4].

When designing and constructing machines, it is very important to ensure that machines that are subjected to different types of stresses and different operating conditions, bear the loads to which they are subjected and also withstand operating times [5 - 7]. In today's modern day, thanks to computational technology to incorporate CAD programs, we can achieve, in a very short time, the development of structures, their analysis, and calculations.

The paper describes the analysis of the existing damaged gearbox on the basis of which structural modifications were designed to maintain the required characteristic parameters. The purpose of this design modification is to eliminate the failure of a given gearbox during operation.

## 2 Characteristics of gearbox

The gearbox is mounted on a mechanical mixer of truck (Fig. 2) determined for prepare of the concrete before use. It is a single-stage gearbox with helical gearing. The original gearbox operates in 8-hour dual-shift operation 5 days of week. The failure occurs at approximately three-month intervals. The gearbox did not meet the current load condition. Drawing documentation is not known, so values for this particular gearbox are given on the label:

- power  $P_1 = 7.5$  kW,
- input speed  $n_1 = 1450$  min<sup>-1</sup>,
- output torque  $M_{k2} = 156$  Nm,
- output speed  $n_2 = 480$  min<sup>-1</sup>,
- gear ratio  $i = 3.15$ ,
- weight  $m = 113$  kg,
- quantity of oil  $Q = 0.5$ l.

## 3 Damage of helical gearing

Gear wheel classification due to cause of damage is of very importance because it allows to determine the operating conditions from which the damage occurred. Damage of gear wheels are very different [8-11].

For dimensioning of the gear wheels, those failures that are fatigue and seizing at higher speeds or at high slip speeds are important. Damage to gear wheels due to damage is divided into two groups:

- tooth surface damage,
- damage to gear wheels by fracture of teeth [12].

There, the surface parts of the teeth between the pinion and the gear wheel contact each other when the gears are rotated. The actual contact area is smaller because the contact of the two tooth surfaces with the specified roughness occurs only between the highest projections of the uneven surfaces. These surfaces produce large pressures and the material surface is deformed from the load. Therefore, the contact area increases, the temperature increases and the surface tension and the surface of the tooth flanks are large. This can lead to different types of tooth damage [13].

In the case of strength calculation, the bending and contact resistance is normally considered. In the case of the gear wheels with hard toothed edges, the fatigue fracture is the limiting state, especially in case of cemented and surface hardened teeth. The fatigue wear of the surface layer (pitting) tends to be the ultimate condition for gear wheels with heat-treated condition and soft teeth. Due to the severity of the break-out accident, higher reliability is often required, which is due to the level of fatigue fracture safety. Therefore, the load-bearing criteria cannot be clearly defined. In addition to fatigue damage, damages caused by unsuitable ratios can also arise, especially during lubrication,

impact stress and also caused by material errors, structural and technological errors [14-18].  
The gearing of the gearbox is shown in Figure 1.



Figure 1. The gearing of the gearbox.

The helical pinion is designed as part of the input shaft. All pinion teeth are damaged (Figure 2). The teeth are only damaged in the part of the contact with gear wheel. A fatigue fracture in the foot of the tooth, which resulted in complete abrasion of the teeth, occurred on the pinion. The tooth profiles were completely abraded.



Figure 2. The pinion damage.

The helical gear is pressed on the shaft (Figure 3).



Figure 3. Gear wheel pressed on the output shaft.

The gear wheel is damaged by breaking of the tooth element. On each tooth there are signs of damage to the sides of the tooth by seizing, which can occur during overloading for several hours or even minutes. The physical and chemical properties of the lubricating oil play an important role in its formation. On the gear wheel, a fatigue fracture of the tooth part occurred and the abrasion that can be seen in Figure 4.



Figure 4. Damage to the teeth of gear wheel.

The pinion is more damaged than meshing gear wheel. This damage could have occurred for the following reasons:

- one-time overload,
- there was no regular check (in the time of increased noise),
- there was no proper lubrication or proper lubricant was not used,
- fragments of damage teeth that remained in the gearbox after previous damage could cause complete damage.

The cause of the fracture is ultimately due to the influence of external or internal stresses, which in this case only exceeded the breaking strength or fatigue limit of used material. If the material is brittle, it breaks and creates a crack or fracture. The effects that lead to failure are diverse, may be inappropriate construction, unsuitable material, improper transport, or due to time change in material properties (fatigue).

#### 4 Design of gearbox constructional optimisation

Due to the extent of damage and the unsatisfactory condition of the gearbox, it has been proposed to solve this problem by designing a new gearing that will meet the operating characteristics of the particular gearbox.

The design was based on data on the gearbox label where the ratio number is  $i = 3.15$ . To maintain the required ratio number, the number of teeth of the new pinion  $z_1 = 35$  and the number of teeth of the new gear wheel  $z_2 = 110$  were selected. For the new gearbox we have to keep the gear ratio  $i = 3.15$  and the axial distance  $a = 100$  mm.

In practice, the pinion of the hardened material and the meshing gear wheel of unhardened material are most often chosen. The pinion gearing must be of hardened material because the pinion must bear more loads and thus the gearing is then more stressed to the touch and bend.

Steel 15 241 was chosen for the pinion gear material. It is a noble premium steel suitable for surface hardening, for which the tensile strength is  $R_m = 980\text{MPa}$ , the slip stress is  $R_s = 850\text{MPa}$ , the limit, the fatigue limit of the contact in contact  $\sigma_{HLimb} = 1160\text{MPa}$  and the bending fatigue limit  $\sigma_{FLimb} = 528\text{MPa}$ . For pinion teeth, the hardness in the core of the tooth is  $JHV = 315$  and the hardness of the side of the tooth is  $VHV = 600 \sim 675$ , according to [13].

For the gear wheel material, a steel of 12 050 was chosen for which the tensile strength is  $R_m = 640\text{MPa}$ , the slip stress is  $R_s = 390\text{MPa}$ , the limit, the fatigue limit of the touch at  $\sigma_{HLimb} = 520\text{MPa}$  and the bending fatigue limit  $\sigma_{FLimb} = 410\text{MPa}$ .

The first step was to design the gear module according to [13]. According to this standard, the modul of bending is determined by:

$$m_n = f_F \cdot \sqrt[3]{\frac{K_F M_{kl}}{\psi_m z_1 \sigma_{FP}}} \quad (1)$$

where  $f_F$  is the bending coefficient for bevelled teeth,  $M_{kl}$  is the input shaft torque,  $\psi_m$  is the tooth width coefficient,  $z_1$  is the number of pinion teeth,  $\sigma_{FP}$  is the permissible bending stress for the disappearing load.

The modul value of the contact stress was determined by the relationship [11]:

$$m_n = f_H \cdot \sqrt[3]{\frac{K_H M_{kl} (i+1)}{\psi_m z_1^2 \cdot i \cdot \sigma_{HP}^2}} \quad (2)$$

where  $f_H$  is the coefficient for bevelled teeth subjected to contact,  $M_{kl}$  is the input shaft torque,  $\psi_m$  is the tooth width coefficient,  $z_1$  is the number of pinion teeth,  $i$  is the ratio number,  $\sigma_{HP}$  is the permissible contact voltage for the disappearing load.

In the design of the modification, the standard [13] was used, which in the first step calculated the normalized modul value for the pinion in bending ( $m_n = 1.15\text{mm}$ ) and in contact ( $m_n = 1.06\text{mm}$ ). Based on this calculation, a normalized module value of  $m_n = 1.25\text{mm}$  was selected. To maintain the original axial distance of  $a = 100\text{ mm}$ , helix angle of  $\beta = 25^\circ$  was proposed.

The second step was the complete strength check of the pinion and the gear wheel according by STN 014686 [13]. According to this standard calculation is based on the control of bending strength and contact stress. For calculations, the load input values were used as indicated on the original gearbox label.

In bending strength calculation, the fatigue fracture of the teeth, starting from the root transition area on the active side of the teeth, is monitored as a limit state. According to this standard, the bending capacity can be proved by calculation the safety factor for bending failure in the root, for which [13] applies:

$$S_F = \frac{\sigma_{Flimb} \cdot Y_N \cdot Y_\delta \cdot Y_X}{\sigma_F} \geq S_{Fmin} \quad (3)$$

where  $S_F$  - safety factor for bending failure in the root,  $\sigma_{Flimb}$  - bending fatigue life for the intended way of load (MPa),  $Y_N$  - coefficient of durability,  $Y_\delta$  - coefficient of nick sensitivity,  $Y_X$  - coefficient of dimension,  $\sigma_F$  - bending stress in the critical cross section of root (MPa),  $S_{Fmin}$  - the minimum value of the factor:  $S_{Fmin} = 1.4$ .

In contact stress calculation, the progressive surfaces fatigue damage (pitting) of the teeth is monitored as a limit state. According to this standard, the contact capacity can be proved by calculation the, for which applies:

$$S_H = \frac{\sigma_{Hlim} \cdot Z_N}{\sigma_H} \cdot (Z_L \cdot Z_R \cdot Z_V) \geq S_{Hmin}, \quad (4)$$

where  $S_H$  - safety factor against fatigue damage of tooth side,  $\sigma_{Hlim}$  - fatigue limit in contact (MPa),  $Z_N$  - coefficient of durability,  $Z_L$  - coefficient of lubricants,  $Z_R$  - roughness coefficient of tooth side before meshing,  $Z_V$  - coefficient of peripheral speed,  $\sigma_H$  - Hertz stress in pitch point (MPa),  $S_{Hmin}$  - the minimum value of the factor:  $S_{Hmin} = 1.1$ .

Fatigue limit values for gearing materials in accordance with this standard are given for grinding teeth sides. The influence of roughness of untreated and hardened teeth on their load-bearing capacity is taken into account in the strength calculation by the roughness coefficient of tooth side before meshing. The load-bearing capacity of the teeth in the bend reduces manufacturing deficiencies, such as the decarburized surface and cracks in the

area of the tooth's root that may occur during quenching. These effects should be avoided in the manufacture of gears, since the calculation according to standard does not take into account such deficiencies.

This standard specifies the values of the durability of materials covered for  $5 \cdot 10^7$  load cycles. For other load cycle values, the standard sets the reduction factor.

The results of the gearing strength calculation and the basic geometric parameters of gearing are shown in Table 1.

Table 1. Some parameters of strength calculations.

| Parameter                            | Pinion | Gear    |
|--------------------------------------|--------|---------|
| Number of teeth                      | 35     | 110     |
| Pressure angle ( $^\circ$ )          | 20     |         |
| Helix angle ( $^\circ$ )             | 25     |         |
| Normal module (mm)                   | 1.25   |         |
| Rotation speed ( $\text{min}^{-1}$ ) | 1450   | 460     |
| Torque (Nm)                          | 49.44  | 150     |
| Pitch diameter (mm)                  | 48.273 | 151.715 |
| Centre distance (mm)                 | 100    |         |
| Material of the gear                 | 15 241 | 12 050  |
| Safety factor $S_H$                  | 1.48   | 1.33    |
| Safety factor $S_F$                  | 3.82   | 2.48    |

The calculated safety factors of bending and contact for the pinion and gear wheel are for the required service life of 10,000 hours is satisfactory.

The pinion was designed as part of the input shaft (Figure 5).

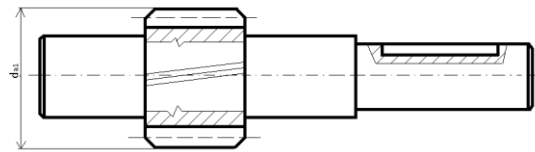


Figure 5. Designed input shaft with pinion.

The gear wheel is designed as a separate wheel and is pressed onto the output shaft (Figure 6). The shaft and gear wheel have been selected with system of limits and fits an H7 / r6 to transmit the transmitted torque.

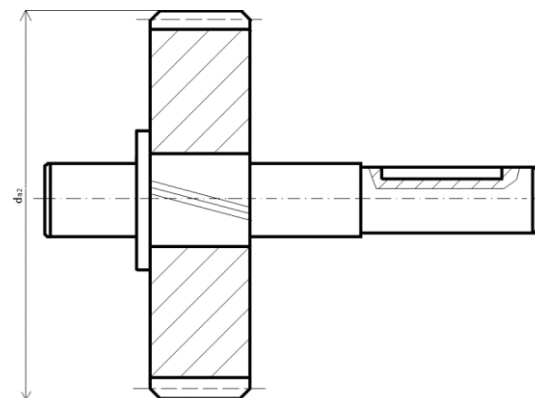


Figure 6. Designed input shaft with pinion.

In Figure 7 is a CAD model of a transmission gearbox with structural modifications to eliminate operational failure.

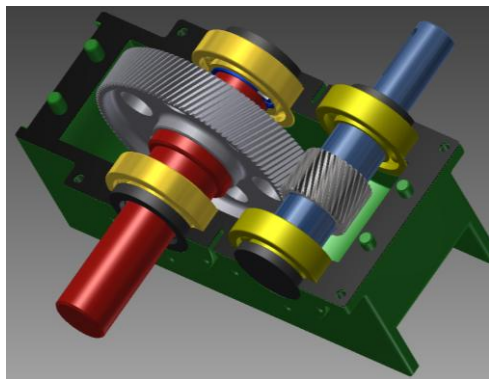


Figure 7. 3D gearbox model with designed changes.

#### 4 Conclusion

When investigating the damage to a particular gearbox, it was found that the appropriate heat treatment was not applied to the original gearing, because on the pinion all the damage was devastating - total tooth breakage. The teeth of the pinion do not meet the condition of hard surface and tough core. A new material and a new heat treatment for the pinion and gear wheel were selected. For pinion it was 15 241 steel and for gear wheel 12 050 it was steel, hardened and cemented. Since the bearings were not damaged, the design modifications involved the replacement of the entire gear set with a suitably selected material and heat treatment. At the same time, new numbers of teeth were selected but the ratio number was kept. The standardized module value was calculated and designed according to the standard. The helix angle of the teeth was chosen to maintain the original axial distance.

Subsequently, the geometric parameters of the new gear were calculated and the safety factors calculated according to STN 01 4686. Because the pinion is designed as part of the shaft, only the dimensions of the gearing are changed, all other shaft parameters are retained. The gear wheel is designed as a separate and on the output shaft is fixed by pressing. The interference fit was designed and strength checked. All designed parameters are suitable for a specific gearbox so that it can operate in a fault-free state for the required service life.

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#### Primary Paper Section: J

#### Secondary Paper Section: JO, JQ, JR, JT

## BASIC CONTEXT OF DESIGN METHODOLOGY FOR TESTING WOOD-BASED ELEMENTS

<sup>a</sup>JOZEF ŠVAJLENKA, <sup>b</sup>MÁRIA KOZLOVSKÁ

*Technical University of Košice, Faculty of Civil Engineering,  
Department of Construction Technology and Management  
Vysokoškolská 4, Košice, Slovak republic  
email: <sup>a</sup>jozef.svajlenka@tuke.sk, <sup>b</sup>maria.kozlovska@tuke.sk*

The article presents a partial research result of the VEGA project-1/0557/18 "Research and development of process and product innovations of modern methods of construction in the context of the Industry 4.0 principles".

**Abstract:** Timber-based constructions are increasingly becoming increasingly popular within Slovakia. This provides the ability for many manufacturing and manufacturing companies to offer different wood-based construction systems. In the framework of the offer in Slovakia, most frequently realized are panel, column and log-based construction systems based on wood. While the manufacturers and implementation companies themselves declare the thermal properties of their products only on the basis of computational methods, there is a need to verify the thermal-technical properties of the offered structures even in laboratory conditions. Therefore, the aim of this manuscript is to present a selected context of the methodology for verifying the thermal-technical properties of selected structural variants for assessment under laboratory conditions.

**Keywords:** Methodology, Thermal-technical properties, Wood, Wood construction

### 1 Introduction

Wood as one of the oldest building materials is by no means obsolete for use in construction. In recent decades, wood as a building material has become increasingly popular for architects, designers and potential investors. The great potential of this building material is due to developments in both production and the construction of timber buildings [1]. Separately or in combination with concrete, glass or steel, wood can be adapted to all types of construction projects: new buildings or renovations, residential or tertiary use, low-rise or high-rise buildings. Especially through prefabricated and solid wood products, which also represent cross-glued laminated timber products, modern timber construction is an interesting and sustainable construction technology [2]. Statistics on the proportion of timber buildings show that the construction of wooden buildings is becoming increasingly important. Possible ways of producing and constructing wooden buildings are diverse. At the beginning of the planning process, the main issue for the investor is the choice of building technology and materials for its construction. With this investment decision, it is not enough to take into account only economic criteria such as construction, operation and maintenance costs or financing costs [3]. They are also building-physical, technical and environmental criteria that affect the overall success of the building. In accordance with the trend of efficient management of energy resources, the energy performance of buildings is increasingly discussed [4,5]. It is therefore important to address this issue. Certain thermal-technical parameters are declared within the framework of the wood-based construction systems offered, but they are most often derived from theoretical calculations. That is why we chose to design and analyze selected contexts for the purpose of this article, which should be taken into account when checking the structural parts of wooden buildings in laboratory conditions in terms of thermal and technical properties.

### 2 Energy efficiency and heat protection of buildings

Requirements for energy efficiency and thermal protection of buildings are constantly changing, and the legislative requirements of individual countries at both regional and global levels are being tightened. This is also evidenced by the European Union (EU) Directive on energy efficiency in buildings, which defines that in the EU Member States all new buildings will have to meet almost zero energy consumption by the end of 2020. Nearly zero consumption should mainly be mediated by renewable energy. energy sources at the site or its surroundings [6]. Thermal protection also has a significant impact in reducing energy consumption in residential buildings. This is often associated with the heat transfer coefficient, which expresses the degree of thermal insulation properties of

structures. It indicates what amount of heat is lost over 1 m<sup>2</sup> of building surface area at the unit temperature difference of the surrounding environment, ie. between the external and internal environment. Its mark is "U" and unit W / (m<sup>2</sup>.K). For passive houses, this value should be less than or equal to 0.10 W / (m<sup>2</sup>.K) for roofs and walls.

In terms of thermal protection, wood is a very good thermal insulator. For example, the coefficient of thermal conductivity of spruce wood is 0.18 W/m<sup>2</sup>.K. Another advantage of wood-based structures is that their walls achieve the desired thermal properties in a much smaller thickness than silicate-based masonry structures. For example, to achieve a thermal resistance of R = 3 m<sup>2</sup>.K/W, a wall thickness of about 170 mm is sufficient when using a conventional sandwich shell construction, and a wall thickness of at least 400 mm in combination with a thermal insulation plaster is required for a lightweight ceramic wall. In the legislation of the Slovak Republic, the classification of houses according to the Energy Standard [7] is defined as follows:

Low-energy house:

- the annual heat demand for heating is less than 70 kWh/m<sup>2</sup> of floor space.

Energy passive house:

- the annual heat demand for heating is less than 15 kWh/m<sup>2</sup> of floor space
- uses passive solar gains and heat recovery by forced ventilation.

Zero House:

- a house with zero energy consumption,
- uses only renewable energy sources.

### 3 Construction systems of wood constructions

Current wood-based construction methods are very diverse and can be individually tailored and combined. In principle, the current wooden buildings for housing can be divided according to the nature and nature of the vertical load-bearing structures into massive, skeletal and elemental structures [8]. The individual groups differ considerably from each other by the used construction method, appearance and possibilities of production of their structural elements. The foundations of the massive buildings are log buildings, which are still being built today, but nowadays they have also come up with modern massive buildings. Skeletal and elemental building groups have evolved from timber-framed buildings and represent wickerwork. The classic wooden construction methods can be supplemented by so-called. hybrid methods developed in recent years that combine wood as a building material with other building materials.

#### 3.1 Massive log buildings

The term "massive structures" is used to refer to constructions whose load-bearing structure is made of solid wood, either solid or cross-sectioned, or bonded to one another according to the product system. Massive structures are characterized by the separation of supporting elements and insulating parts. The carrier is not reduced to the individual supports, as is the case with light wood timber systems. Nowadays, because of the increased demands on thermal protection, solid wood-bearing load-bearing walls are supplemented with thermal insulation layers. The traditional representative is log buildings [8].

Log buildings belong to the original methods of realization of houses, which are basically all massive wood buildings. The construction of log buildings is based on massive logs (logs), beams, or horizontal stacked (stacked) beams connected by carpentry joints in corners. However, there are also logs with vertical beams, or a combination of vertical and horizontal beams [8,9].

### 3.2 Modern massive buildings

Modern solid timber wooden buildings are becoming a current trend that tries to get as close to nature as possible while maintaining a functional and modern design. According to Kobl [11], they have been created by the introduction of new construction systems, also thanks to the industrial manufacturing capabilities of large-scale elements. The structural systems are predominantly composed of solid wood construction elements, or rarely of wood-based panels (e.g. OSB and particle boards), solid or composite cross-sections. The main part of these elements is formed by closed, in particular massive plate cross-sections, or so-called. box components assembled in planar structural members. These elements always form the main bearing of the system - the so-called. supporting core. A characteristic feature of these systems is the carrier system exclusively operating the flat, which uses a reinforcement plate to transfer the load. A common feature is the construction of an additional insulation system on the outside of the structure [11].

### 3.3 Skeletal structures

The supporting structure of skeletal structures is according to Vaverka et al. [8] assembled from rod members which transfer the applied load to the foundation without the interaction of walls or stiffening casing. They have more than 3000 years of tradition, and from the constructional point of view, they can be used for the construction of frame, column and modern skeleton structures.

#### 3.3.1 Half-timbered buildings

The historical structures of the timbered buildings can be included among the first buildings that have evolved from the historical skeletal system of buildings as the first skeleton system buildings. The architecture of half-timbered buildings has been extended in all regions of Europe, where it was necessary to limit the consumption of wood for construction. Alternative use of rather short deciduous wood elements was also preferred. A large number of timbered buildings, which are still preserved in many historic towns, but also in rural areas are mainly in Central and Eastern Europe, but also in the Netherlands, northern Germany, Denmark and Anglo-Saxon countries. Four- and more-storey buildings of this type have been preserved from the past, and multi-storey, but also commercial, half-timbered buildings have been shown to have a long tradition in Central Europe. In the territory of present-day Slovakia such constructions were made in mountain and spa areas [8,11].

#### 3.3.2 Modern skeletal structures - heavy skeletons

The influence of American construction methods has been reflected in the construction of the half-timbered buildings by omitting the horizontal and oblique reinforcement elements (struts and rails) with the modern skeletal structures. To preserve the massive elements of the construction, these structures are also called heavy wooden skeletons - TDS. In addition to struts and cross members, horizontal elements (threshold and skid) were excluded from the structure, eliminating the unfavorable planting of the structure caused by volume changes in the transverse direction of the wood. In the case of non-settling of the lower threshold, it is also necessary to provide structural protection of the columns anchored directly on the base in order to avoid degradation of wood due to possible permeable moisture [10,11].

#### 3.3.3 Pillar systems - light wooden skeletons - frame structures

The concept of timber-frame construction is based on the use of posts in the supporting structure. As mentioned in the historical review of columnar structures, they have evolved from timber-framed timber houses in North America and have gradually expanded to Europe, where they have been modified over time to form a variety of systems under the frame structure name. The term frame structures does not relate to the static action of the house, rather it is based on the construction of the individual

frame walls of the rectangular shape formed by the lower and upper frame and the vertical posts. Also due to the use of small cross sections of the wicker elements, the name light wood skeleton - LDS [8] has also been used for these buildings in some countries.

### 4 Context of the methodology of testing construction systems on the wood basis for thermal technical characteristics

As already mentioned above, there are many variations in the text of wood-based construction systems, and the combination of them in terms of design solutions implements the aces in practice. That is why it is important to check their design and other properties. On the basis of already realized research, the requirements to create a methodology of investigation and verification of thermal-technical parameters of structural parts of selected construction systems of wooden constructions under laboratory conditions emerged. Such verification of thermo-technical properties with an important basis for analyzes and possibilities of innovation of individual construction systems. In addition, such screening and real measurement can also be used to confront the computational methods most commonly used in practice to declare the properties of individual wood-based structural systems.

In the following part of the text, selected parts of the methodology are presented, which can be used as a basis for the methodology for use in laboratory conditions. The methodology is devoted to the measurement of thermal-technical parameters of wood-based structural systems in the so-called climate chamber that allows to simulate indoor and outdoor temperature and humidity conditions.

#### Design of boundary conditions of measurement and requirements for the examined structural parts of the structure

Data on the thermal performance of structural components are needed for various purposes, including, for example, expert judgment on compliance with regulations and specifications, design guidelines, research on material properties, construction, and simulation model validation. In general, there are many different designs of test methods and devices. The variety of structures to be tested can be so great and the requirements of the test conditions so diverse that it could be a mistake to limit the test method more than necessary and limit the measurement to a single possible arrangement [12]. Therefore, such measurement methods cannot be clearly predefined.

Before designing boundary conditions, it is essential to define the purpose for which the measurement is being performed. Another essential aspect is the definition of boundary conditions can be designed either as so-called stationary or so-called non-stationary. As mentioned above for the choice of stationary conditions, it is necessary to be aware of the purpose of the measurement and the data outputs that need to be achieved during the measurement. Therefore, definite marginal values cannot be clearly stated. As far as non-stationary conditions are concerned, this philosophy is similar but it is possible to use long-term observations of environmental climatic conditions when choosing non-stationary conditions. It is ideally based on ten-year observations of the temperature and humidity characteristics of the environment for a given climate area [13]. When measuring the thermo-technical properties of structures in the so-called it is essential to define the size and location of the sample to be tested. Typically, the verified sample is placed between a warm and a cold chamber in which ambient temperatures are known. These temperature and humidity environments reproduce the agreed or defined boundary conditions on a sample between two gaseous media, typically atmospheric air.

By measuring the correct dimension of the measured area, it is possible to avoid measurement errors and avoid misinterpretations of measured values. The measured area is defined as follows:

- a) for a warm chamber protected device from center to center of the measuring chamber, provided that the sample thickness is greater than or equal to the chamber nose width, if the sample thickness is less than the chamber nose width, the area shall be determined by the inner chamber of the measuring chamber,
- b) for a calibrated hot chamber test apparatus, the inner chamber of the measuring chamber.

The size of the measured area determines the maximum sample thickness. The aspect ratio of the measured area to the specimen thickness and the width ratio of the area to be protected and the sample thickness are determined by similar principles to that of a hot chamber enclosure. The sample size may also limit the possibility of verifying the representative design time on which the tests are to be performed. This may cause difficulties and errors in the interpretation of the results. Measurement errors in the heat chamber test method are partly proportional to the circumference of the measured area. The relative impact of this error decreases as the area to be measured increases. In a warm chamber protected apparatus, the minimum dimension of the measured area is given by a larger value of three times the sample thickness or 1 m x 1 m. The minimum sample size for a calibrated hot chamber test device is 1.5 m x 1.5 m. Errors due to the circumference of the measuring chamber of the test chamber with the protected chamber are caused by lateral loss of heat flow along the sample surface due to imbalance between the measured and condensed area or due to the occurrence of irregularity. Errors around the circumference of the test chamber with a calibrated hot chamber are due to losses at the edges of the sample, which include a failure to uniformly heat flux at the edges of the sample [12].

The above-mentioned basic contexts are combined within a wider range of contexts, depending on the purpose of the measurement and the method of obtaining data from the measurements through various temperature, humidity and other measurement sensors. The data recording interval is determined by the measurement accuracy. The set of measuring devices is concentrated in a recording device called the so-called data bus for long-term continuous data recording.

## 5 Conclusion

In the presented article, the basic connections between energy efficiency of buildings as such and their energy savings are presented. As far as timber-based constructions in Slovakia are concerned, there are several construction systems that are currently being applied in the construction market. This article also defines the basic features of the most frequently implemented wood-based design variants. However, the main idea of this article was to evoke contexts that need to be taken into account when developing the methodology for testing the thermal-technical properties of real structural parts of wood-based structures in laboratory conditions. From the analysis of available standard documents, it is necessary to define, before the actual measurement, especially the boundary conditions depending on the required information that will be examined. Also an important element is the design of the sample size to be examined and the positioning of the measuring sensors according to the requirements for the resulting parameters of the structural components under consideration.

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## Primary Paper Section: J

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