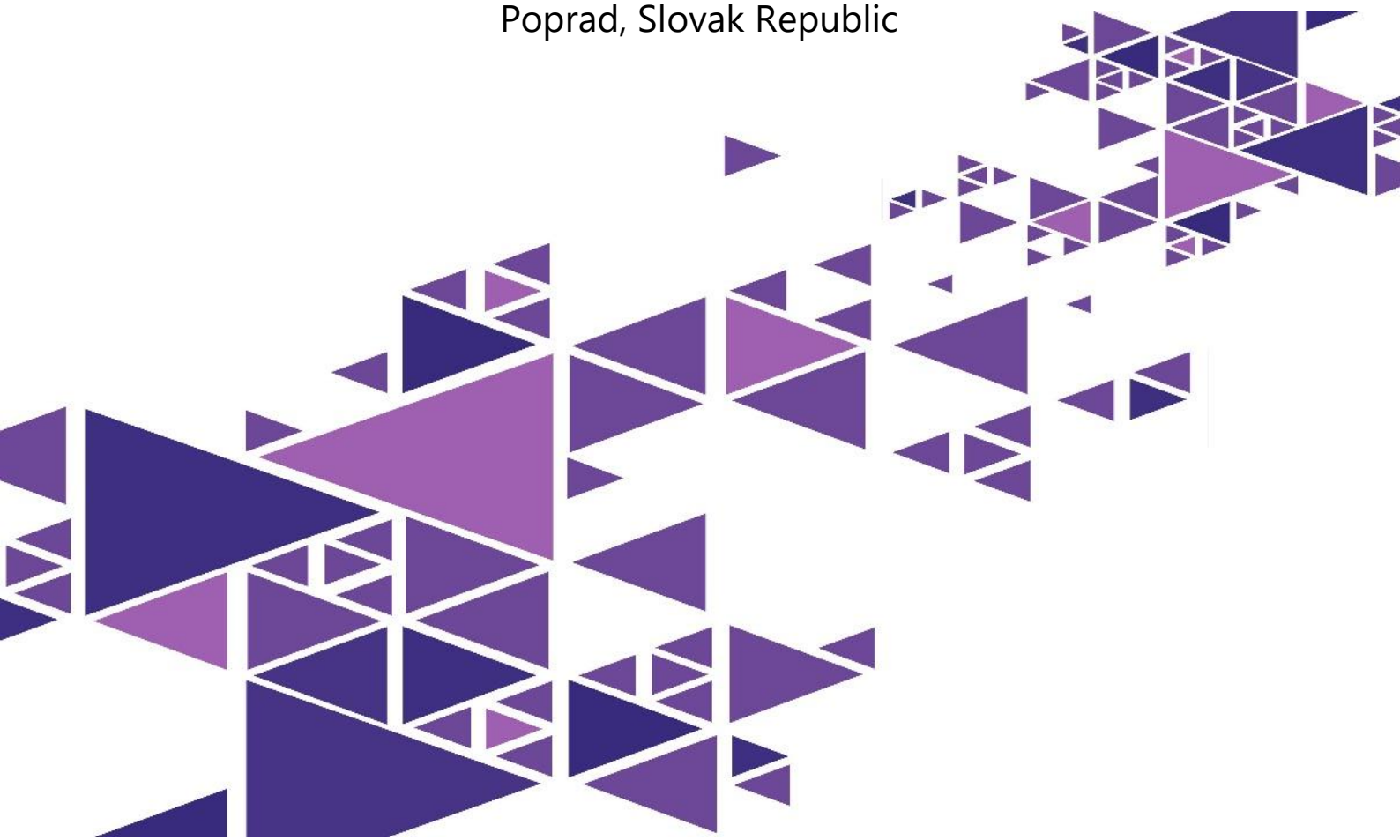
THE POPRAD ECONOMIC AND MANAGEMENT FORUM 2019

Peter Madzík (editor)

Conference Proceedings from International Scientific Conference

17th – 18th
October 2019

Poprad, Slovak Republic



Faculty of Education
Catholic University in Ružomberok

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2nd PEMF2019 conference is devoted to presentation of actual problems, trends and challenges from the area of theory and practice concerning management of entrepreneurial and non-entrepreneurial subjects, area of tourism and integrating area of humans´ life quality in a modern town/village/region. Exchange of actual theoretical and practical knowledge resulting from the area of holistic management is required and a wider public platform will contribute to fulfilment of the idea of meaningful cooperation of theory and practice, higher quality of university programmes of studies, networking and mutual positive enrichment of experts from practice, scientific and pedagogic workers and last but not least students as well.

The conference is divided into three topical areas:

Session A: Management of production in the context of changes in the macro and microenvironment

- current issues and trends in development of production management,
- fourth industrial revolution (Industry 4.0) and its impact on changes in lifestyle, work and relationships,
- factor of national and organizational culture in the global world,
- synergy effects in the context of shifting the management paradigm.

Session B: Human potential development

- current issues and trends in human resource development,
- management and development of human potential, management of work performance, personnel marketing, personnel audit, knowledge management, social and emotional maturity, corporate culture,
- personnel activities in the enterprise, education and development of human potential, social care for employees, information systems in personnel work,
- change, resp. the disappearance of traditional professions and the emergence of new, highly specialized professions.

Session C: Tourism – history, present time and future

- current questions and trends in the field of tourism development and the use of new forms of marketing communication,
- the tradition of business in tourism in Slovakia or other countries,
- the development potential of Poprad's tourism in the dimensions of the High Tatras region, the Sub-Tatran region and the Polish cross-border region,
- cooperation of the private and public sector in the field of tourism,
- the potential of sacral monuments and monuments of UNESCO in the context of tourism development.

Conference website:

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Foreword

The International Scientific Conference has been organized since 2008 by the Department of Management, which is the part of the Faculty of Education of the Catholic University in Ružomberok. This is the second time, when it is organized under the integrated name **The Poprad Economic and Managerial Forum 2019**. During the history of the Management Department three conferences were organized:

- International Scientific Conference - **The Messages of John Paul II. in economics, management and human life** (1st - 9th year in 2008 - 2016)
- International Scientific Conference - **A knowledge-based organization in the period of globalization and internationalization** (1st - 6th year in 2009-2014)
- International Scientific Conference - **Marketing Trends in the Knowledge Society** (1st - 4th year in 2011-2014)

During this period, the external environment that formed the university education changed significantly and this influenced the strategic decision of the Department of Management to organize one integrated conference from 2017 - the Poprad Economic and Managerial Forum. That is why, under this name on 19-20 October 2017, the 10th anniversary conference of the Poprad Economic and Managerial Forum 2017 (PEMF 2017) was held and was aimed at the actual challenges "Trends in Quality of Work, Production, Service and Life". The conference was held under the auspices of the Ministry of Education, Science, Research and Sports of the Slovak Republic under the auspices of the Rector of the Catholic University, the Dean of the Faculty of Education f the Catholic University and in coordination with the city of Poprad.

The second year of Poprad Economic and Management Forum 2019 (PEMF 2019) followed the successful first year of the international scientific conference Poprad Economic and Management Forum (2017) and was aimed at the presentation of current problems, trends and challenges in the field of theory and practice of business and non-business entities management in the upcoming era of the Fourth Industrial Revolution, in the area of human potential and tourism development. The conference was held on 17 and 18 October at the Department of Management in Poprad.

The conference programme was divided into three topical areas:

- **Tourism – history, present and future**
  - current topics and trends in the field of tourism development and the use of new forms of marketing communication,
  - tradition of business in tourism in Slovakia,
  - development potential of Poprad tourism in the dimensions of the High Tatras region, the Sub-Tatran region and the Polish cross-border region,
  - cooperation of the private and public sector in the field of tourism,
  - potential of sacral monuments and monuments of UNESCO in the context of tourism development
- **Human potential development**
  - current issues and trends in human resource development,

- management and development of human potential, management of work performance, personnel marketing, personnel audit, knowledge management, social and emotional maturity, corporate culture,
- enterprise personnel activities, education and development of human potential, social care for employees, information systems in personnel work,
- change, resp. disappearance of traditional professions and emergence of new, highly specialized professions

- **Management of production in the context of changes in the macro and micro environment**
  - current issues and trends in development of production management,
  - Fourth Industrial Revolution (Industry 4.0) and its impact on changes in lifestyle, work and relationships,
  - factor of national and organizational culture in the global world,
  - synergy effects in the context of shifting the management paradigm,
  - use of new forms of marketing in the supply and demand chain,
  - environmental macro-environment factor,
  - innovation and quality - the pillars of business competitiveness and meeting the expectations of a broad spectrum of interest groups.

In defining the thematic focus of the 2nd year of the PEMF2019 conference, we followed our accredited study programs for the 1st and 2nd period of study, scientific and publishing activities. The conference program was devoted to the presentation of current problems, trends and challenges in the field of theory and practice of business and non-business management, tourism and integrating the quality of human life in a modern city / village / region. Lectures, discussions and networking contributed significantly to the exchange of up-to-date theoretical and practical knowledge in the field of holistic management and created an effective space for advancing the approach and mutual cooperation between academia and practice. The resulting ideas are further elaborated and particular results in the form of project proposals and solutions are already known. The wider common platform thus contributed to the idea of meaningful cooperation between theory and practice, to the improvement of study programs at universities, to networking and to the mutual positive enrichment of practitioners, researchers and pedagogical staff and, last but not least, students. Positive action of the organizers of the conference was to ensure the participation of some students of the Department of Management, who thus gained not only professional knowledge, but saw and heard personalities from practice, other universities and their own teachers and thus had the opportunity to experience the atmosphere of international scientific conference.

Poprad, 2019 October

Anna Diačiková

Chair of Organizational Committee of PEMF 2019
Department of Management
Faculty of Education
Catholic University in Ružomberok

Session A

Management of production in the context of changes in the macro and microenvironment

Business development analysis in the member states of the European Union

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Abstract

Private business forms the basis of every developed open economics. This article discusses the analysis of its development in the member countries of the European Union. The largest part of the number of private enterprises is made up of small and medium-sized enterprises, so we are dealing with them. They play a very important role, for example, in offering jobs or in creating added value. The aim of this article was to analyze business development through the development of small and medium-sized enterprises in the member states of the European Union between 2010 and 2018. For example, in the field of innovation, we found the difference between the old and the new EU member states, we assumed that even in the area of small and medium-sized enterprises development, the situation would be the same. We examined the similarities in the development of the number of enterprises in EU countries by cluster analysis of time series. Our assumption has not been confirmed and division into clusters does not match the division into old and new EU member states. Evolution of the number of businesses is obviously not directly related to innovation and many other factors also affect it.

Keywords: small and medium enterprises; European Union; development; cluster analysis of time series.

JEL Classification: C00, O10

Article Classification: Research article

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1 Introduction

Business is the driving force of a market economy. Small and medium-sized enterprises (SMEs) are an important part of the national economy, job creation, added value or foreign trade. Newly created SMEs generate new jobs, new SMEs that are emerging as a means of commercializing new technologies or innovative ideas are often the carriers of positive structural changes in the economy, increasing its productivity and contributing to economic growth. SME development increases the intensity of competition on the market, acts against monopolistic tendencies, has the potential to reduce social and regional polarization (Jeck, 2014). Small and medium-sized enterprises are now considered to be a major element of a revitalizing economy (Korenková, 2018). Small and medium-sized enterprises are characterized by transparent organizational structure, enabling direct management and information flow without significant impact of negative aspects. Small and medium-sized enterprises (SMEs) have significant potential when they perform several important functions (eg social, economic, export-import, etc.). The importance of these companies is not only at national level, but at the level of transnational (Huttmanová, 2009). With the advancing process of globalization, small and medium-sized enterprises are still more confronted with international competition. On the other hand, globalization also provides SMEs with other opportunities and possibilities for doing business on foreign markets. There is even a direct link between the degree of involvement of SMEs in international relations and their performance. Businesses engaged in international relations are more competitive and more efficient than those that do not engage in international activities. The innovation activities of these enterprises represent one of the main prerequisites for their competitiveness on international markets (Fabová, 2014).

2 Material and methods

The aim of this paper was to analyze the development of entrepreneurship through the development of the number of small and medium-sized enterprises in the Member States of the European Union between 2010 and 2018.

2.1 Data sources

Data was obtained from Eurostat (2019). The methodology of SME breakdown and definition can vary from country to country. We used the EU definition of SMEs in our contribution. This is mainly due to the subsequent comparison, for which we need a unified methodology for all countries. According to the above definition, in the SME category we classify all enterprises with 0 to 250 employees and turnover or balance sheet total less than 50 mil. euros. SMEs can be broken down even more in so-called micro-enterprises (with less than 10 workers and turnover or balance sheet total less than 2 million euro), small enterprises (10 to 49 employees and turnover or balance sheet total less than 10 million euro) and medium-sized enterprises (50 to 249 workers and turnover or balance sheet total less than EUR 50 million). Within the European Union, SMEs account for more than 99% of the total number of enterprises. The situation is similar in the Slovak Republic. In the Eurostat databases, we can find an extremely large difference between 2008-09 and 2010-18 in the number of micro-enterprises. However, it has an artificial cause, since there have been some methodological and legislative changes since 2010, which in turn affected overall statistics. Therefore, for the purpose of data research,

we chose the time period 2010-18 to make the data fairly comparable across all EU countries and all categories of SMEs.

2.2 Clustering of time series

The data on the number of small and medium-sized enterprises in the 28 European Union countries in 2010-2018 are themselves time series. Our goal is to find out whether there are groups of countries with similar developments in the number of micro-enterprises with 0-9 employees, small enterprises with 10-49 employees and medium-sized enterprises with 50- 249 employees in that period. The number of such enterprises varies considerably from country to country, for example, in Spain, the number of micro-enterprises ranged from 2.2 million to 2.4 million while in Malta it ranged from 23 thousand to 29 thousand. Thus, there can be considerable differences in scale, but also similarity in terms of development in that period (Figure 1). Large differences as well as similarities can be observed in various countries except micro enterprises, both in small enterprises (Figure 2) and in medium-sized enterprises (Figure 3).

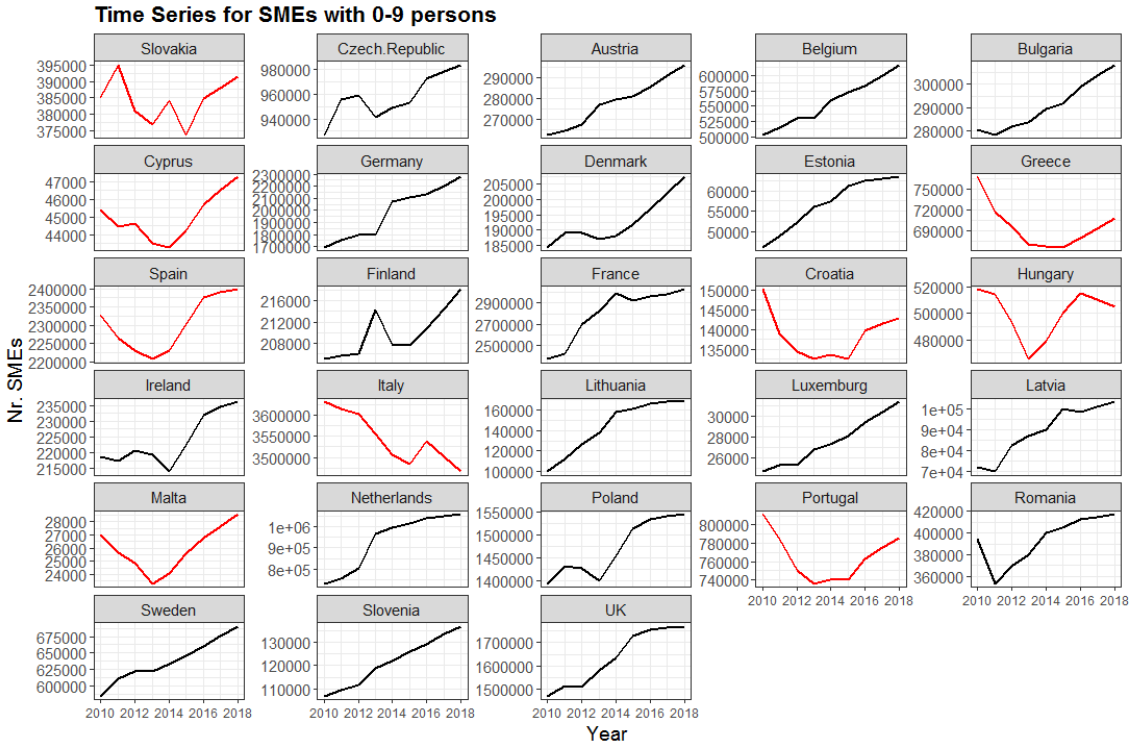

Figure 1 Time series for SMEs with 0-9 persons for EU Member States for 2010-2018. The time series is color coded according to the cluster.; source: own processing

Many tools have been developed for the analysis of time series, and clustering of time series is currently the most popular one. Aghabozorgi (2015), in his review article, explored applications of cluster analysis of time series in various research areas and notes that this method provides valuable information. Most cluster time analysis techniques depend on the choice of distance between clustered objects. Unlike the cluster analysis of non-timely data, some of the typical invariances of the time series need to be taken into account. The first is the invariance of the shift, where the two time series are similar but shifted. The second is the noise invariance, which occurs when time series have a similar shape but different complexity. The last, third, is the scale invariance that occurs when two time series differ in length but could resemble if one is either shortened or extended. There are currently a number of time series clustering algorithms such as Dynamic Time

Warping (DTW), Dynamic Time Warping Barycenter (DBA), K-Spectral Centroid Clustering (KSC), and *k*-shape clustering (Paparrizos and Gravano, 2015).

Figure 2 Time series for SMEs with 10-49 persons for EU Member States for 2010-2018. The time series is color coded according to the cluster.; source: own processing

The last of these methods, which we have decided to use, has been applied by J. Yang et. al (2017) in analyzing potential patterns in energy spending in 11 buildings in Singapore over a 4-month period and found that this method provides better results than DTW.

K-shape clustering, in addition to grouping time series into clusters based on similarity, creates new time series from the time series found in these clusters, allowing the cluster to characterize. Like the *k*-diameter method, it is an iterative method. In contrast to other clustering methods, the shape-based distance (SBD) proposed by Paparrizos and Gravano (2015) is used in the *k*-shape clustering to determine the centroid of each cluster and the clustering of members into clusters, calculated by (1).

$$SBD(\vec{x},\vec{y}) = 1 - \max_{w}\left(\frac{CC_w(\vec{x},\vec{y})}{\sqrt{R_0(\vec{x},\vec{x}).R_0(\vec{y},\vec{y})}}\right) \quad (1)$$

When calculating SBD, a cross correlation coefficient is used $CC_w(\vec{x},\vec{y})$, which is a measure of similarity between two sequences (time series) $\vec{x} = (x_1, x_2, \dots, x_m)$a $\vec{y} = (y_1, y_2, \dots, y_m)$, $R_0(\vec{x},\vec{x})$ resp. $R_0(\vec{y},\vec{y})$ are auto-correlations of sequences $\vec{x}$ respectively $\vec{y}$. To take into account the scale of time series inverters, time series are standardized so that the average of the time series values is 0 and the standard value of 1. In each iteration step, the objects in the cluster and the cluster centroids are updated as long as the similarities of all objects with the new centroid are not maximized.

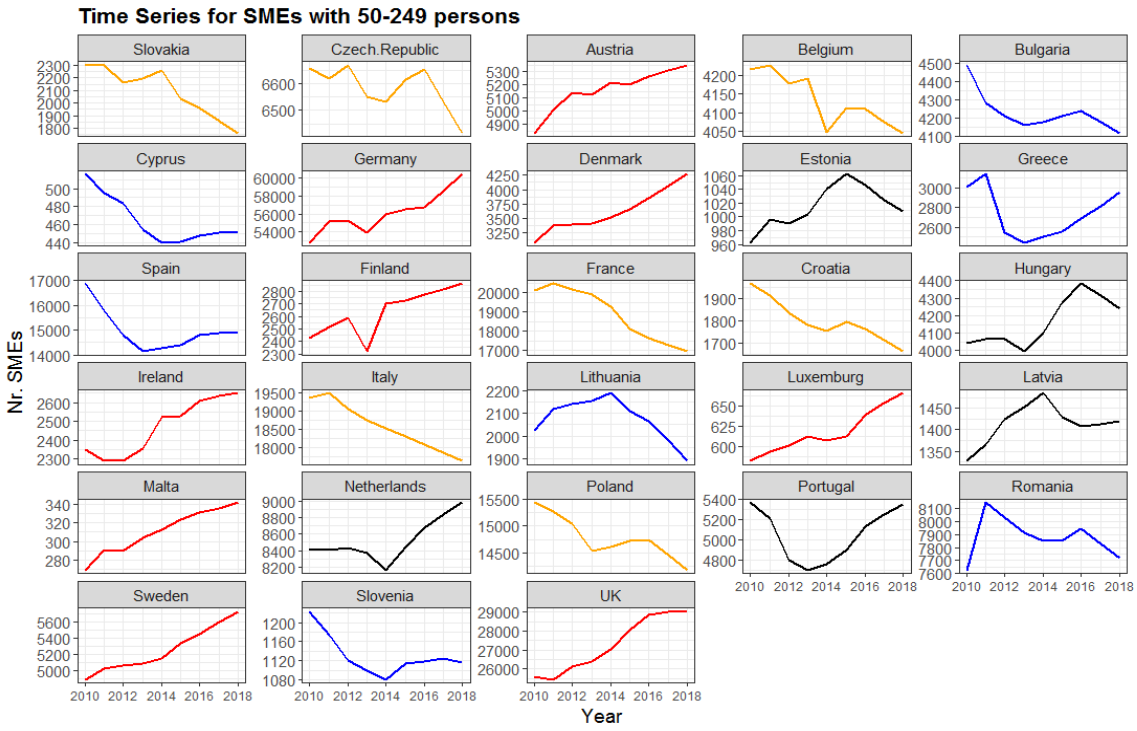

Figure 3 Time series for SMEs with 50-249 persons for EU Member States for 2010-2018. The time series is color coded according to the cluster.; source: own processing

The value of *k* is not known in advance, but it is determined that for several different values of *k*, a clustering procedure is performed and the optimal value of the number of bursts is selected based on internal validity. Several studies, e.g. Aghabozorgi et.al (2015) showed that there is no best index of internal cluster validity. Therefore, we used seven clustering validity indicators (CVIs) that are directly available in the dtwclust library (Sarda-Espinosa, 2018): silhouette (Rousseeuw (1987); maximized), Dunn's Index (Arbelaitz et. al (2017); maximized), Calinski - Harabasz index (Arbelaitz et al (2013), maximized), score function (Saitta et. Al (2017); maximized), COP index (Arbelaitz et. Al (2013); minimized), Davies - Bouldin index (Arbelaitz et. al (2013); minimized), modified Davies-Bouldin index (Kim and Ramakrishna (2005); minimized). All calculations were performed in R (R CoreTeam, 2018) using dtwclust libraries (Sarda-Espinosa, 2018), ggplot2 (Wickham, 2009).

3 Results

The position of small and medium-sized enterprises of knowledge-intensive services and their dynamics of growth in the EU economy and within it in Slovakia can be monitored through performance indicators such as employment, number of enterprises and added value (Benešová, 2015). Innovation is also a very important indicator for SMEs. The ability of enterprises to innovate is one of the key factors for positive structural change. The purposeful use of new (progressive) knowledge in all business activities is positively reflected in the growth of labor productivity, growth in value added in production and increased competitiveness (based on production quality), not only at company but also at national level (Jeck, 2014). In a knowledge-based society, innovation is the driving force of the economy on all levels and in all types of organizations (Hudáková, 2018). Actually is the business performance connected not only with financial indicators but also with innovations and ability to react flexible to customers' needs (Vráblíková, 2017). In many of these indicators, we could expect large differences

between the old and the new member countries, as many of the so-called "new" countries are among the new ones. former Eastern Bloc.

3.1 Innovation developments

To illustrate, we compared the difference in innovation. We investigated innovations in product or process. Figure 4 shows a comparison of developments between the original and the new EU countries. We have seen developments for the years 2010 to 2017 because the 2018 innovation data is not yet available. For the purposes of our article, we considered the original countries those countries that joined the EU in the 20th century (until 1995). The original (old) countries include Belgium, Denmark, Germany, Ireland, Greece, Spain, France, Italy, Luxembourg, the Netherlands, Austria, Portugal, Finland, Sweden and the United Kingdom. New countries are those that joined the EU in the 21st century (after 2004). Bulgaria, the Czech Republic, Estonia, Croatia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Romania, Slovenia and Slovakia.

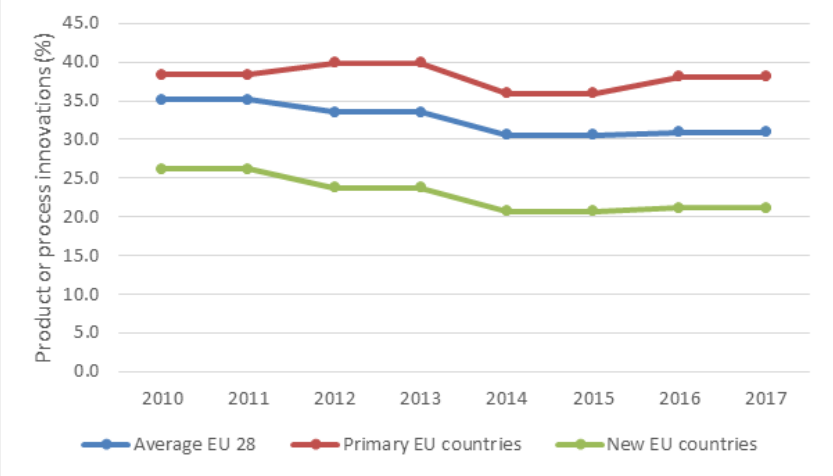

Figure 4 Product or process innovations (percentage of SMEs); source: own processing based on Eurostat (2019)

Figure 4 shows that in all years in the original Member States, innovation is above the EU average and in the new Member States is below the EU average in all years. From these findings, it is clear that there are still significant differences between the original and the new Member States in the development of SMEs and their innovation activities, while SMEs in the new Member States are still lagging behind. Slovakia, whose innovation activities and innovation performance of SMEs belong to the imaginary "tail" within the EU countries, is no exception. A very similar finding was also expected when analyzing the development of SMEs.

3.2 Analysis of SME development

From the values of indicators of internal validity (Table 1) for micro-enterprises, it follows that the six indicators reach the optimal values for the double-cluster solution and one (COP) for the three-cluster solution, so we are inclined to the double-cluster solution. Likewise, the double-cluster solution seems to be the best for small businesses. In the case of medium-sized enterprises, the four-cluster solution seems to be the best solution.

Table 1 Seven Cluster Validity Indicators; source: own elaboration

CIVs	Number of clusters 2	3	4	5
SMEs 0-9 employees				
Sil	**0,58**	0,26	0,17	0,25
SF	**0,55**	0,55	0,54	0,41
CH	27,68	**33,56**	11,97	6,04
DB	**0,51**	1,07	0,90	2,28
DBstar	**0,51**	1,77	1,60	2,53
D	**0,31**	0,02	0,02	0,08
COP	0,21	0,17	**0,16**	0,21
SMEs 10-49 employees				
Sil	**0,54**	0,44	0,40	0,33
SF	**0,57**	0,55	0,53	0,51
CH	**41,17**	24,38	19,58	19,70
DB	**0,74**	0,65	0,61	0,92
DBstar	0,74	**0,71**	0,81	1,00
D	**0,41**	0,14	0,17	0,15
COP	0,35	0,19	0,18	**0,15**

CIVs	Number of clusters 2	3	4	5
SMEs 50-249 employees				
Sil	0,32	**0,40**	**0,40**	0,37
SF	**0,52**	0,47	**0,52**	0,49
CH	**38,84**	20,43	21,65	18,46
DB	1,19	0,86	**0,43**	0,98
DBstar	1,19	0,97	**0,47**	1,16
D	0,07	0,06	**0,16**	0,13
COP	0,48	0,36	0,17	**0,14**

(Sil - Silhouette, SF - Score Function, CH - Calinski - Harabasz Index, DB - Davies - Bouldin Index, DBstar - Modified Davies - Bouildin 'Index, COP - COP Index) for k - shape aggregation for each of types of businesses. The optimum value is boldly highlighted.

The evolution of the number of micro-enterprises in EU countries over the period 2010-2018 can be divided into two groups. The first, less numerous, consists of 9 countries (Slovakia, Cyprus, Greece, Spain, Croatia, Hungary, Italy, Malta and Portugal) and is characterized (Figure 5) by an increase in the number of enterprises after 2013, while in the second larger group with 19 countries, it can be said that there is a steady upward trend in the number of micro-enterprises.

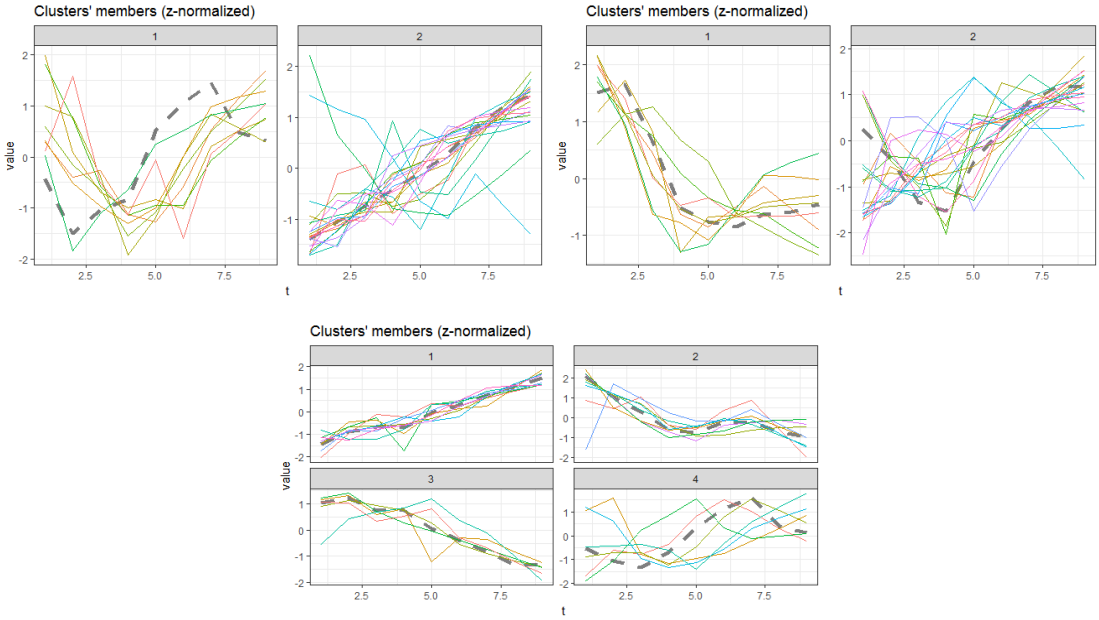

Figure 5 The result of clustering with a double-cluster solution for the development of the number of SMEs with 0-9 employees (top left), SMEs with 10-49 employees (top right) and a four-cluster solution for SMEs with 50-249 employees (bottom left). There is time on the horizontal axis (0 - 2010, 9 - 2018) and on the vertical axis there are standardized values in the time series.; source: own processing

Countries in terms of the development of small enterprises are divided into countries (Slovakia, Czech Republic, Bulgaria, Cyprus, Spain, France, Italy, Portugal), where the number of enterprises in this class declined sharply until 2014, followed by a very slight increase and for countries where there has been a significant increase in the number of small businesses after the decline to 2013.

The most difficult situation is with the development of the number of medium-sized enterprises, where there are up to four different patterns of development. In the first group of nine countries (Austria, Germany, Denmark, Finland, Ireland, Luxembourg, Malta, Sweden) there is a growing trend in the number of medium-sized enterprises throughout the period. In the second group of countries (Bulgaria, Cyprus, Greece, Spain, Lithuania, Romania, Slovenia) a gradual stabilization occurred after the initial decline, while in the third group of countries (Slovakia, Czech Republic, Belgium, France, Croatia, Italy, Poland) the decline did not stop. In the last, fourth group of countries (Estonia, Hungary, the Netherlands, Latvia, Portugal), the gradual increase in the number of medium-sized enterprises halted around 2016.

4 Discussion

In this article, we analyzed the development of entrepreneurship through the development of the number of small and medium-sized enterprises in the European Union Member States between 2010 and 2018. We have examined the number of enterprises in each country for the time period using cluster analysis of time series. Countries have entered the EU at different times and with different economic situations and performance. The gap between the old and the new Member States can also be seen today in several indicators, for example in the area of innovation. We assumed that such tendencies would be reflected in the analysis of the development of the number of SMEs. However, this assumption was not confirmed. The created clusters did not correspond to the division into new and old EU member states in either of the monitored SME categories. There are many reasons for such a result. The size development of enterprises in individual categories may not be directly related to innovation. For example, the development of medium-sized enterprises (50 to 249 workers) and the increase in the number of employees will paradoxically cause a decline in the number of enterprises in that category if the company reaches more than 249 employees. For example, policy decisions or other factors can affect the number of businesses in each country. This, however, goes beyond the scope of this article, nor was it our aim to examine all possible causes of this phenomenon.

References

Aghabozorgi, A.S., Shirkhorshidi, T.Y. (2015) "Time-series clustering – a decade review", *Information Systems*, Vol. 53, pp. 16–38.

AlexisSarda-Espinosa (2018) "*Time Series Clustering Along with Optimizations for the Dynamic Time Warping Distance. R packageversion 5.4.0*." Available at: https://CRAN.R-project.org/package=dtwclust

Arbelaitz, O., Gurrutxaga, I., Muguerza, J., Perez, J. M., Perona, I. (2013) "An extensive comparative study of cluster validity indices." *Pattern Recognition*, Vol. 46, No. 1, pp. 243–256.

Benešová, D. (2015), "Vývoj a dynamika rastu malých a stredných podnikov poznatkovo intenzívnych služieb." *Studia commercialia Bratislavensia*, Vol. 8, No. 32, pp. 503–513.

Eurostat. (2019) "*SMEs - annual enterprise statistics by size class - industry and construction*." Available at: http://ec.europa.eu/eurostat/web/structural-business-statistics/structural-business-statistics/sme#

Fabová, Ľ. (2014) "Medzinárodná spolupráca MSP v inovačnej činnosti ako spôsob zvyšovania inovačnej výkonnosti." *Journal of knowledge society (international scientific journal)*, Vol. 1/2014, No. 2, pp. 72–79.

Hudáková, J. (2018) "Startups support in Slovak republic." In: *Klímová, V., Žítek, V. (eds.) 21st International Colloquium on Regional Sciences*. Conference Proceedings. Brno: Masarykova univerzita, Czech Republic, doi:10.5817/CZ.MUNI.P210-8970-2018-18

Huttmanová, E. (2009) *"Súčasný stav, možnosti podpory a rozvoja malých a stredných podnikov na Slovensku."* In: *Rastislav Kotulič (ed.) Zborník vedeckých prác katedry ekonómie a ekonomiky ANNO 2009*. Prešovská univerzita v Prešove, Slovakia pp. 111–118.

Jeck, T. (2014) "Malé a stredné podniky na Slovensku a v Európskej únii: bariéry, financovanie a inovačné správanie*." Working papers.* Vol. 67, pp. 3–26.

Kim, M., Ramakrishna, R. S. (2005) "New indices for cluster validity assessment." *Pattern Recognition Letters*, Vol. 26, No. 15, pp. 2353–2363.

Korenková, M. (2018) "*Podnikateľské minimum."* Univerzita Konštantína Filozofa v Nitre, Nitra, Slovakia.

R Core Team (2018) *"R: A language and environment for statistical computing."* R Foundation for Statistical Computing, Vienna, Austria.

Rousseeuw, P. J. (1987) "Silhouettes: a graphical aid to thei nterpretation and validation of cluster analysis." *Journal of computational and applied mathematics*, Vol. 20, pp. 53–65.

Saitta, S., Raphael, B., Smith, I. F. (2007) "A bounded index forcluster validity." In: *International Workshop on Machine Learning and DataMining in Pattern Recognition* (pp. 174-187). Springer Berlin Heidelberg.

Vrábliková, M. (2017), "The business performance measurement as a tool of creation of innovative intentions." In: *International Scientific Conference on the Poprad Economic and Management Forum.* Poprad, Slovakia.

Wickham, H. (2009) *"ggplot2: Elegant Graphics for Data Analysis."* Springer-Verlag New York.

Yang, J., Ning, Ch., Deb, Ch., Zhang, F., Cheong, D., Lee, S. E., Sekhar, Ch., Tham, K. W. (2017). "k-Shape clustering algorithm for building energy usage patterns analysis and forecasting model iaccuracy, improvement." *Energy and Buildings*, Vol. 146, 27–37.

Sale and production forecasts in the dynamic changes of a trade

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Abstract

The dynamic changes of a trade caused by variable offers and demands strongly support ambitions of usage or development of forecast methods, which are able to solve specified dynamic challenges. Solution of these tasks, as a prediction of a future status, is not only depended of the behaviour of the system in the past, but there are composed of many kinds of inputs information, which can have a big influence for formation of their future behaviour. The paper deals with the analysis of forecasting methods for the sale of selected products from a large retail chain that can be significantly influenced by pricing policies. It gives great uncertainty, where classical approaches failed because of the fact that the products are in advertisement newsletter from time to time and it definitely changes trends and predictions of sales of these products. If data of such sales are analysed, then the forecasting can be made in two levels – non-catalogue (no-discount), i.e. classic sale and catalogue (discount) sale. If these two levels of sales are expressly set, then it is possible to predict the sales of items in these two levels. Trending methods, smoothing methods were used to predict these two modes, because the management of this multiple store was interested in globalizing these sales modes and then ordering these selected items with better accuracy than the current planning system allows.

Keywords: forecast, prediction, forecast method, dynamic changes.

JEL Classification: C29, C53

Article Classification: Case study

1 Introduction

Despite the fact that the strategic direction of an enterprise is difficult to define without a long-term forecast, nowadays there is a high probability of occurrence of relatively large inaccuracies in the preparation of forecasts on a long-term level due to

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rapid changes in the market environment. The causes need to be sought mainly in the current world economics, which result in the following consequences:

- Turbulent changes in market needs;
- Predominantly an enterprise downfall or slow-down of a new company establishment;
- Change of trends at sales or consumptions for various products;
- Products or services price fluctuations;
- etc. (Kačmáry and Malindžák, 2010).

This paper describes some forecasting methods that can be used to create forecasts in today's dynamic changes. In addition to these methods, this paper also provides an application where time series are modified so that methods, that are not suitable for use in forecasting of dynamically changed time series, can be used in these specific variable conditions.

Actual classification of forecasting methods can be divided into two main categories: Classic methods and Methods of artificial intelligence (systemic methods).

The main difference between these two categories is their approach to make a prediction. Classical methods include quantitative methods (objective methods i.e. the mathematical-statistical methods) and qualitative methods (subjective i.e. the expert methods) (Straka, et al., 2016).

A new method category (systemic methods or system approach methods) are methods that are very intriguing in terms of how prediction is made and are useful in stochastic processes. They can also be referred to so-called artificial intelligence methods, which use the intelligent computing system to a large extent. On the one hand, complicated calculations require sufficient computing power, but on the other hand, thanks to these complex computational solutions, these methods become methods which are used to solve predictions of dynamic events or appearances in a stochastic conditions and these methods brings usable and more reliable results (Malindžák, 1998).

In the following, there are the methods most commonly known in making forecasts from common practice and the application that provides the possibility of using selected classical methods to predict the daily consumption of a large store chain. In the case of the regular food retail chain, the pricing policy, which almost all retail chains use to attract the customer, grows dynamics of sale rapidly (Seger and Hindls, 1995).

2 Material and methods

2.1 Classic methods – Quantitative methods

Exponential smoothing (Holt): The vast majority of exponential events can be considered as a linear trend in a short period of time. The Holt method of exponential smoothing takes into account this fact and allows to create a forecast of further development of the investigated event (LaViola Jr., 2003).

It is so-called double exponential smoothing. A trend component is assumed to be in the model, therefore, in addition to the normal value of the variable, there is also estimated increment of this trend. The Holt method applies smoothing of level and trend parts of the model directly through specific smoothing constants for both parts. This is considered to be the greatest advantage of this method i.e. high flexibility in the determination of smoothing constants. The forecast of the future period will be created by summing up both smoothed parts of the model (Cipra, 1998).

There are three equations for calculating the forecast:

1. Exponentially smoothed series (level estimation):

$$L_t = \alpha A_t + (1 - \alpha)(L_{t-1} + T_{t-1}) \quad (1)$$

2. Trend estimation:

$$T_t = \beta(L_t - L_{t-1}) + (1 - \beta)T_{t-1} \quad (2)$$

3. Forecast for *p* periods:

$$\overline{y_{t+p}} = L_t + pT_t \quad (3)$$

where: L_t – New smoothed value (level estimation);
α – Smoothing constant for level part ($0 \leq \alpha \leq 1$);
A_t, – Observed value (real value from time *t*);
β – Smoothing constant for trend part ($0 \leq \beta \leq 1$);
T_t – Trend estimation;
p – Number of forecast periods;
$\overline{y_{t+p}}$ – Forecast.

A closer analysis of formula (1) reveals that the level Lt value is obtained from two sources. The first source is the actual value in the relevant period At and the second source is the previous balanced value, increased by the trend part from the previous period (Motulsky, 2009). The constant α gives the weight to actual value and to the trend part in the smoothed model. The constant β in formula (2) determines the trend estimation. The trend estimation T_t is designed as a weighted average of two trend components. The first component is defined by the change in levels of smoothed values from the current and previous periods. The second component is then determined by the value of the previous smoothed trend (Cipra, 1998) (LaViola Jr., 2003).

The forecast is calculated for the selected number of forward periods (p). Its value arises after multiplying the trend estimation by the number of periods and adding the smoothed value of the level part (formula 3) (Cipra, 1998).

There are given two options in formulas (1) and (2) to estimate the default values of L_t, and T_t. Either the first smoothed value of L_t is the same as the first observation, then the trend part T_t equal to zero; or instead of the average value of the first three or five observations ($A_1 \ldots A_3$ or $A_1 \ldots A_5$), and the trend is calculated as the average in the first three or five periods (Cipra, 1998) (LaViola Jr., 2003).

Regression analysis: In the following description, the authors will not represent in detail the generally known linear regression. However, this is interesting in defining the overall trend of any time series. Even more interesting is the nonlinear regression, for dynamically changing conditions, that does not immediately respond to sudden changes, but often brings a model of real behaviour to a particular event (Trebuna, et al., 2016).

If the shape of the regression function is not a straight line, it is a non-linear regression analysis. The selection of a nonlinear regression model (NLRM) based on the plotted plot diagram is not always simple. Several typical courses of a function can be plotted as a tool and suitable models can then be recalculated directly by using least squares method (linearly in parameters) or indirectly (after linearization) (Straka, Trebuna, et al., 2016).

Linear and nonlinear regression methods are also part of almost all statistical mathematical programs and spreadsheets. Therefore, there is no detailed description of the function calculation for each model. Thanks to these specific programs, nonlinear regression analysis is quite popular to use, because an user will get the result fast at a brief definition of the type and degree of the regression model and he usually do not aware

rather complicated calculations behind the computer program. The similar situation is at ARMA, ARIMA, SARIMA models (Kačmáry et al, 2015). The regression analysis method might be suitable for changing events, but it is not suitable for rapid changes in market events.

The method of harmonic weights (elaborated by Malindžák, 1998) belongs to methods from the group of the quantitative methods and they are suitable and applicable to the creation of forecast of events in dynamic changed conditions. Just the presence of harmonic weights valuates the progress of an event in the period "N" and this is the base on setting up the forecast in the future period "N+1". Here is the technique of calculation by the method of harmonic weights. The methods of Harmonic Weights are detailed explained in (Kačmáry et al., 2012).

Method of Harmonic weights is based on the following ideas:

- The closer is the value in time sequence to forecast time, the higher priority it has.
- The highest dominance should be located in the last value of the time series AN.

The procedure of method calculation:

1. The progress of trend development is calculated from the ratio of known A values between the two neighbour observations (real values – figure 1). It is so-called ratio indexes (RI).

$$RI_t = \frac{A_t}{A_{t-1}} \tag{4}$$

where: t = 2,3, ... , n

n – Number of known A series (historical time series);

RI_t – Ratio indexes.

If n=4 (the number of known values A from time series considered for forecast calculation) then (n-1) ratio indexes are as followed:

$$RI_2 = \frac{A_{N-2}}{A_{N-3}} = \frac{A_2}{A_1};\ RI_3 = \frac{A_{N-1}}{A_{N-2}} = \frac{A_3}{A_2};\ RI_4 = \frac{A_N}{A_{N-1}} = \frac{A_4}{A_3}$$

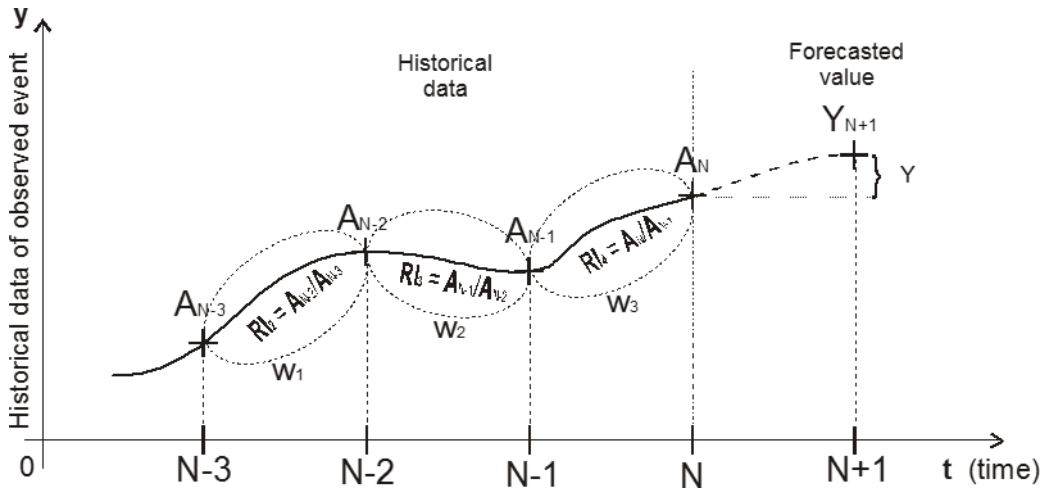

Figure 1 The principle of Harmonic weights method; source: (Kačmáry et al., 2012)

2. Harmonic weights – the calculation is followed:

$$w_t = \sum_{j=1}^{t-1} \frac{1}{(n-j)} \tag{5}$$

Example when $n = 4$, then: $w_2 = 1/(4-1) = 0{,}33$

$w_3 = 1/(4-1) + 1/(4-2) = 0{,}83$
$w_4 = 1/(4-1) + 1/(4-2) + 1/(4-3) = 1{,}83$

3. The next step is the calculation of average ratio index (ARI) calculated from these ratio indexes above for a product group "I". The ARI is based on geometric mean:

$$\mathrm{ARI} = \sqrt[n-1]{\prod_{t=2}^{n}(\mathrm{RI_t}^{w_t})} \tag{6}$$

where: w_t – t^{th} harmonic weight;

ARI – Average ratio index.

It means that for the different kinds of products there are the same weights, if *"n"*(number of known *"A"* values) is the same.

The ARI gives us directive extrapolation for the development of future Y_{N+1}.

4. And finally forecast:

$$Y_{N+1} = A_N + (\mathrm{ARI} - 1).A_N \tag{7}$$

where: Y_{N+1} – The forecasted value.

This method is similar to the exponential smoothing method, but it has two advantages:

a) The weights consider data information acquisition for forecast;
b) They are not defined at random, they are calculated by the formula (5) using the idea of harmonic series.

The method is sustainable and applicable to the systems with relatively dynamic changes with trend dependency allocation (Kačmary and Malindžák, 2013).

2.2 Classical methods - Qualitative (expert) methods

As in the case of quantitative methods, here is the list of the most important and the most commonly used methods in practice and because of their subjective assessment they become applicable in various different areas and at different conditions (growth, steady state, as well as crises or uncertainties). They are also suitable for supplementing or refining on quantitative methods (Kačmáry and Malindžák, 2012).

Brainstorming: This is the most widely used methodological approach. It is significant addition to other methods. It consists of creating expert groups (panels) whose members exchange ideas, brainstorming, while finding answers to questions defined by the problem or at various stages of forecasting. Future features of forecasts are emerging within the expert groups (panels). As mentioned above, this is a very convenient addition for forecasts creation for periods of dynamic change (Pribulova, et al., 2013).

Delphi method: This method involves asking experts in several rounds in order to progressively reach a common understanding and a consensus on the certain problem. Several rounds of questionnaires are sent out to the group of experts, and the anonymous responses are aggregated and shared with the group after each round. The experts are allowed to adjust their answers in subsequent stages, based on how they interpret the "group response" that has been provided to them. Since multiple rounds of questions are asked and the panel is told what the group thinks as a whole, the Delphi method seeks to reach the correct response through consensus [Investopedia]. In contrast to the brainstorming, consensus is created so that individual experts do not communicate with each other. Despite the fact that we cannot guarantee the experts' anonymity and the duration can be long, since the consensus is created in several rounds. This method is also suitable for forecasts creation for periods of dynamic change.

Questionnaire is the market survey method, used to collect market information in the form of expectations, requirements, deficiencies, and so on. Market survey reflects the current state of markets and that is why it is excellent tool for obtaining up-to-date information, but some discrepancies may occur in larger time horizons. Questionnaire is the most often methods used when a new product is introduced, when there are no historical data about selling in past.

2.3 Methods of artificial intelligence (systemic methods)

Systemic methods are basically quantitative (numerical) methods, but by their complexity, they can detect patterns in numerical series analysis that are not detectable by classical methods.

Neuron networks: The conception of artificial neural network is relatively young; it is actually a concept derived from networks of artificial intelligence or cybernetics itself. One of the definitions of this term by author (Kelíšek, 2007) could be: a massive parallel computing system that has the ability to store information and allow it to be further processed, whereby it imitates the human brain in collecting knowledge in the learning process (adaptability) and preserving that knowledge using inter-neuron connection.

The essence of the problem is the learning process in which the parameters of neural networks are changed according to certain rules. The nature of these rules (algorithms) determines the type of learning neural networks. Learning is understood to be the adaptation of neural networks, which will be the carrier of knowledge with the ability to implement in a particular decision-making situation after finishing of learning.

Depending on the direction in which signals are transmitted in neural networks, they can be divided into two basic groups. Feed-forward is one in which the signal is only transmitted from input neurons (neurons that are input to environmental signals) through hidden neurons (neurons that are both input and output connected with other neurons, these in some types of networks are not present at all) toward output neurons (neurons whose output leads to the environment) (Kelíšek, 2007).

The basic element of a neural network is a neuron. In general, it has several inputs from other neurons or from the environment and one output. The operation by which the neuron transforms its inputs to output is generally very simple. The complexity of neural networks is to combine many such simple elements into one whole.

As it is clear from the figure 2, the work of a given neuron is characterized by a mathematical function:

$$y = f(\sum_{i=1}^{n}(x_i . w_i - \theta)) \qquad (8)$$

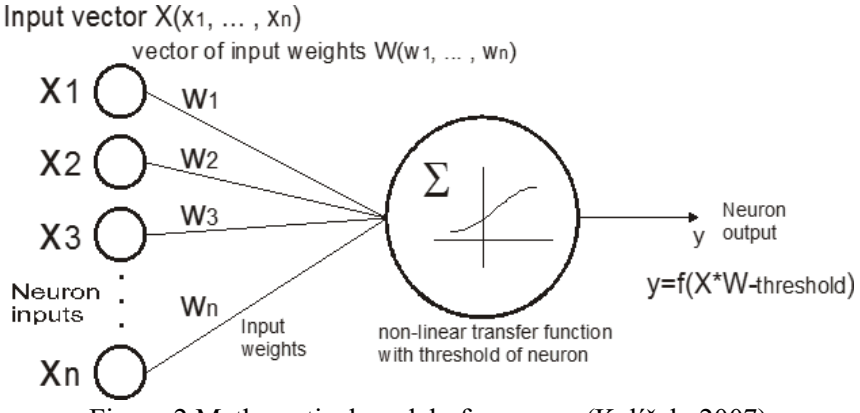

Figure 2 Mathematical model of a neuron (Kelíšek, 2007)

where: y – Neuron output;
w_i – Neuron weights;
x_i – Neuron inputs;
Θ – Neuron threshold;
f – Neuron activation function.

In the economy, neural networks are used to model market developments, economic forecasting, decision-making processes, etc.

The advantage of neural networks is that there is no need to have any special model in mind when analysis is triggered. Neural networks can also find interaction effects that must be explicitly expressed in regression. The disadvantage is the more difficult interpretation of the resulting model, therefore their use is more useful for predicting of the target variable when the data is non-linear but not very useful or when these data relationships need to be explained (Kelíšek, 2007).

Using neural network for forecasting has spread quite rapidly across the world. The study of A. Kelíšek in monitoring the development of the EUR / USD exchange rate has proven the appropriateness of this method in forecasting of dynamically changing events. The result of their study is that the neural network calculations have lower uncertainty.

3 Results - Application of the classical quantitative methods

The following chapter provides a possible solution of sales prediction of selected food products in the large retail chain ABC Stores (the company name was intentionally changed at the request of the company itself). At first sight, it might seem that the sale of selected food items will be steady because the tastes of a large sample of the population will remain unchanged, but it appears, that this is not true. In fact, large retail chains are fighting for a customer with different marketing tools and one of them is pricing policy. And it causes a significant fluctuation in the consumption of items that will become a "cut price" item from time to time. These goods are inexpensive compared to competitors and are also featured in flyers that are distributed to end customers.

The following three methods were used for forecasting: Holt method, linear regression and the method of harmonic weights. Forecasting for each product was done in two modes: for normal prices and for discounted prices ("cut prices"). In this way, classical methods (Holt, linear regression and harmonic weights) could also be used in these variable consumption conditions (Sabovčík, 2019).

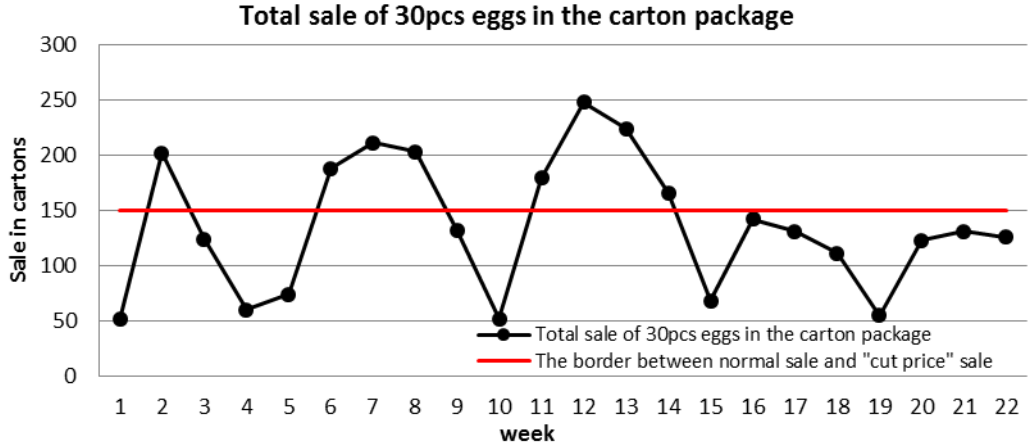

Figure 3 Total sale of the 30pcs eggs in the carton package (Sabovčík, 2019)

It can be seen, in the following case, how the consumption of one particular item - 30pcs of eggs in carton package was divided into two modes and thus it created two separate time series for the two mentioned sales modes (Figure 3). The consumption above red line is the consumption during the "cut price" period and below the red line is the consumption during normal sale mode. There are the two separate time series in the different selling modes (figure 4).

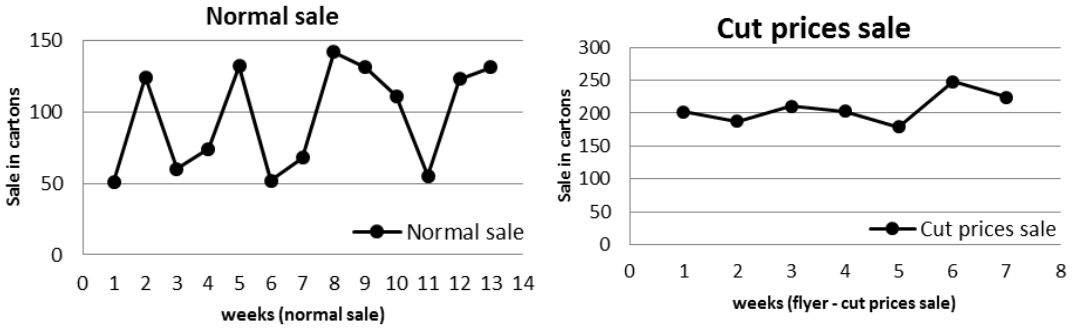

Figure 4 Separate sale diagrams in normal and cut prices modes (Sabovčík, 2019)

The forecast results: In normal sale mode the forecast by Holt method was 112 pcs of cartons, by linear regression was 122 pcs of cartons and by the method of harmonic weights was 142 pcs of cartons. The next real normal sold quantity was 196 pcs of cartons – this means that MAPE (Mean Absolute Percentage Error) was 8,99%.

In the "cut price" mode the forecast by Holt method was 212 pcs of cartons, by linear regression was 216 pcs of cartons and by the method of harmonic weights was 228 pcs of cartons. The next real "cut price" sold quantity was 126 pcs of cartons – this means that MAPE (Mean Absolute Percentage Error) was 11,56%.

4 Discussion

This article provides a list of several methods that can be used for forecast creation in dynamically changing market conditions. Also, as it is proved from the application, methods that are not particularly suitable for such conditions are possible to be used after a modification of the time series i.e. their dual use modes. The MAPE forecast error indicator showed relatively small forecasting deviations compared to actual sales and this demonstrates the possible way of forecasting by this approach.

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References

Cipra, T. (1986), *"Analýza časových rad s aplikacemi v ekonomii"*, SNTL, Praha, Czech Republic.

Kačmáry, P., Rosova, A., Straka, M., Malindžáková, M., Puškáš, E. (2015), "Introduction to the combined model of forecasting and its applicationand comparation with arima model",

In: *Carpatian Logistics Congress 2015, proceedings of the international congress in Jeseník*, Czech Republic.

Kačmáry, P., Malindžák D. (2013), *"The forecast methods of sale and production in dynamically changing market economy"*, VŠB - Technická univerzita, Ostrava, Czech Republic.

Kačmáry, P., Malindžák D., Dorčák, D. (2012), "Sale and Production Forecast in the Time of Economic Crisis", *Transport & Logistics International Journal*. Vol. 12, No. 25, pp. 1–12.

Kačmáry, P., Malindžák D. (2010), "Trade and production prognosis in condition of dynamic changes of market conditions", *Acta Montanistica Slovaca.* Vol. 15, No 1, pp. 53–60.

Kelíšek, A. (2007), "Analýza časových radov pomocou neurónových sietí", In: *Sborník příspěvků z konference mladých vědeckých pracovníků "Věda a krizové situace"*, Ostrava, Czech Republic.

LaViola Jr. J. J. (2003), "Double Exponential Smoothing: An Alternative to Kalman Filter-Based Predictive Tracking", In Andreas Kunz and Joachim Deisinger (Ed.), *Eurographics Workshop on Virtual Environments, The Eurographics Association.*

Luo, J., Qiao L. (2003), "Model-based Prognostic Techniques", In *AUTOTESTCON 2003, Proceedings AUTOTESTCON 2003, IEEE Systems Readiness Technology Conference*, IEEE Press.

Malindžák, D. (1998), *"Production Logistics I."*, ŠTROFFEK Publishing, Košice, Slovakia.

Motulsky, H. (2009), *"The difference between linear and nonlinear regression",* GraphPad Software, Sun Diego, USA.

Pribulova, A., Futas, P., Rosova, A., Demeter, P., Baricová, D. (2013), "Influence of foundry dust on moulding mixtures quality", *Metalurgija*. Vol. 52, No. 1,, pp. 51–54.

Sabovčík P. (2019), *"Možnosti prognózovania predaja vybraných potravinových položiek vo veľkom obchodnom reťazci s vplyvom zmeny cien",* TUKE FBERG, Košice, Slovakia.

Seger, J., Hindls, R. (1995), "Statistical methods in the market economy", Viktoria Publishing, Praha, Czech Republic.

Straka, M., Malindzakova, M., Rosova, A., Trebuňa, P. (2016), "The simulation model of the material flow of municipal waste recovery", *Przemysl Chemiczny*. Vol.95, No. 4, pp. 773–777.

Straka, M., Trebuna, P., Rosova, A., Malindžáková, M., Makysova, H. (2016), "Simulation of the process for production of plastics films as a way to increase the competitiveness of the company", *Przemysl chemiczny.* Vol. 95, No. 1, pp. 37–41.

Trebuna, P., Straka, M. Rosova, A., Malindžáková, M. (2015), "Petri nets as a tool for production streamlining in plastics processing", *Przemysl chemiczny*. Vol. 94, No. 9, pp. 1605–1608.

Sources of Financing of Cluster Organizations in the Czech Republic

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Abstract

The article deals with the creation of cluster organizations based on cluster initiatives in the Czech Republic and their financing. The paper is divided into three parts. The first part defines the basic concepts - cluster, cluster initiative, cluster organization - and describes the development of the cluster concept in the world. The second part presents the research methodology. A database of 114 cluster organizations that have been founded in the Czech Republic since 2002 was created within the research. Out of 98 existing organizations, there are 74 active ones. The research also included obtaining information about the membership of cluster organizations. Finance analysis was performed on a sample of 44 cluster organizations that are in a maturity stage. The results of the research mentioned in the third part of the text showed that more than half of public resources were used to develop cluster organizations. The source of funding for the operation of cluster organizations is mainly the sale of their own products and services. The share of operating subsidies in the period 2014-2016 decreased by half to about 10 per cent. Membership fees are a negligible source of revenue for cluster organizations.

Keywords: cluster; cluster initiative; cluster organization; sources of funding; subsidies.

JEL Classification: H25, L52, O31, R12

Article Classification: Research article

1 Introduction

Clustering is one of the economic policy instruments that aims to foster the innovative capacity of companies, collaborative research between the private and public sectors and, as a result, strengthen the competitiveness of regions and subjects operating in them. In 1890, Alfred Marshall (1920) discovered that the concentration of firms in industrial districts brought agglomeration economies. One hundred years later, this idea was developed by Michael Porter into a cluster theory that became the basis for an active industrial policy in a number of countries around the world.

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The beginnings of active support for the creation of clusters in the Czech Republic are connected mainly with the accession of the Czech Republic to the European Union. Since then, the emergence and development of clusters has been funded and supported primarily from public sources, specifically EU structural funds through operational programs. In 2004, clusters started to be supported under the Operational Program Industry and Enterprise using the Clusters sub-program, which ran until 2006. This program was the first to focus on the development of clusters in the Czech Republic and its main objective was to support projects for the establishment and development of clusters, at regional and supra-regional level. The governing body was the Ministry of Industry and Trade (MIT), which implemented this program through CzechInvest. The Clusters program was divided into two phases: the first phase focused on mapping potential cluster initiatives and the second phase on establishing and developing a cluster (cluster organizations). Under this program, financial support was granted to a total of 53 cluster projects totalling over CZK 168 million (Ministry of Industry and Trade, 2010).

In 2007, the Clusters program was followed by the Cooperation - Clusters sub-program under the Operational Program Enterprise and Innovation, which ran until 2013. The managing authority was again the MIT and the CzechInvest Implementing Agency. Newly-created clusters or already established clusters that, for example, benefited from the previous operational program, could join this program. Within the Cooperation - Clusters program, a total of 3 calls were announced: Clusters – I. call (2008), Clusters - II. call (2010) and Clusters - II. call, extension (2012). In the period 2007–2012, a total of 39 cluster organizations received a sum of CZK 1,074 million (CzechInvest, 2012).

Since 2014, the clusters have been supported by the Operational Program Enterprise and Innovation for Competitiveness, which runs until 2020 (Agency for Entrepreneurship and Innovation, 2019). Clusters can benefit from the Cooperation - Clusters sub-program, which aims to support the creation of clusters and technology platforms that focus on the development of innovation and international competitiveness. However, cluster organizations may also use resources from other operational programs under the responsibility of the Ministry of Labour and Social Affairs (the field of employment), the Ministry for Regional Development (cross-border cooperation) or other sector-specific programs (for example the Ministry of Agriculture).

The article aims to find out from which specific private and public sources program activities and operation of cluster organizations in the Czech Republic are financed. Another important question is whether the dependence of the functioning of cluster organizations on public resources decreases over time. A partial goal is to create a list of cluster organizations in the Czech Republic in terms of year of establishment, region of activity, legal form and industry.

2 Literary overview

Clusters are created naturally on the basis of market activity or their creation can be specifically supported by the intervention of the state and its authorities. Porter (1990) sees a cluster as a geographically close groupings of interrelated companies, specialist suppliers, service providers, and affiliates in a particular industry, as well as related industry firms that compete but also collaborate, share, and complement each other. For natural clusters that match the above definition of Porter, the term Porterian clusters (Belusi and Caldari, 2009) can also be used. Clustering can also be the result of a cluster initiative. A cluster initiative is an organized effort aimed at increasing the growth and competitiveness of clusters in the region, involving cluster firms, governments or research communities (Linqvist et al., 2013). According to Břusková et al. (2013) one can get from

a natural cluster to a "conscious cooperation" (cluster initiative) by launching concrete activities to identify clusters in the region, by facilitating companies and by creating a common strategy. A successful cluster initiative results in the establishment of a cluster organization. A cluster organization is a formalized entity that emerges from a cluster initiative and provides services to support cluster development and its member organizations (Pavelková, 2009). It is an institutionalized form of cluster (Balog, 2016). The cluster organization acts as an intermediary between different cluster members and adds value by stimulating collaboration both within the cluster and between cluster and outside world (Schretlen et al., 2011). This article deals with cluster organizations. Generally, the terms cluster organization and cluster are often not distinguished and a cluster is automatically understood as a cluster organization. However, for the purposes of this research, it is important to distinguish how the cluster originated. As the article deals with clusters that are based on cluster initiatives, the resulting entity is referred to as a cluster organization (hereinafter referred to as the "CO").

The process of cluster formation began in the 1990s in various countries of the European Union. The main reason was to strengthen industry's ability to innovate and increase national competitiveness. While the global economy is increasingly influenced by the whole industries and sectors, clusters are seen as an effective tool to facilitate and stimulate business advancement, stimulate and maintain competitiveness, and as an effective mechanism for competitive business strategy (Bialic-Davendra et al., 2014).

According to Chen and Hsieh (2008), the survival of companies is increasingly dependent on their ability to take a holistic view of their own business, which includes all stakeholders, such as customers, employees, traders, suppliers and shareholders. Companies can profit from mutual cooperation and proximity with other companies due to agglomeration savings, while the total number of companies in the region determines the economic benefits achieved. Companies are more productive when they are located in agglomerations and large regions. As a result of the increased concentration of companies, there was also an above-average economic growth in some regions. Cluster theory explains why these industrial concentrations maintain or even increase market dominance. Therefore, it is currently accepted that increasing the competitiveness of companies can be stimulated by the creation of effective groupings of companies in cluster organizations (Balog, 2016).

The cluster simply links all the essential ingredients (resources) to achieve competitive success and shares the idea of proximity, networking and specialization. Clusters stimulate and revitalize business environment cooperation. They stimulate competitive pressure, even among indirect competitors or non-competitors (Bialic-Davendra, 2011). In clusters, companies also have easier access to find business partners, finance, or employees (Damborský and Wokoun, 2010).

According to Kincaid (2005), clusters offer a wide range of benefits to all stakeholders, reflecting in particular an increase in efficiency, productivity, and innovation activities, thereby contributing to performance and competitiveness. The very existence of the cluster is driving competition by increasing productivity and giving impetus to innovation, while also boosting future productivity growth. As Zaušková (2010) further states, clustering of companies into clusters has a positive impact on innovation and competitiveness, information, growth and long-term entrepreneurial dynamics.

Clusters create an environment conducive to innovation and knowledge creation. For this reason, regions with strong clusters are seen as leaders in innovation, with globalization further deepening these trends. Clusters also have a positive impact on the

economic performance of companies because they are driven by benefits such as: higher efficiency (lower cost), flexibility (labour mobility), and also innovation (cooperation).

Companies in clusters benefit from the geographical proximity of other cluster members because of better flow of knowledge, the availability of skilled workforce as well as so-called unplanned interactions, which are a key part of the innovation process (Spirková et al., 2015). Clustered companies also have plenty of opportunities to outsource many activities, allowing them to focus on their core competencies (Pe'er and Vertinsky, 2006).

3 Material and methods

The main source of data for research was publicly available information on the official website of the COs, the Cluster and Competitiveness Portal (NCA, 2015), the ARES - Administrative Register of Businesses (Ministry of Finance, 2019), the Public Register and the Collection of Documents in the Commercial Register (Department of Justice, 2019) and the commercial business database Magnusweb (Bisnode, 2019).

The research process can be divided into the following phases:

1. **Creating a CO list in the Czech Republic** - all organizations that contain the key word cluster in their name were searched for in the public register and in the ARES register. Furthermore, the results of mapping studies carried out by CzechInvest in 2005-2008 (Ministry of Industry and Trade, 2005) were used. These contain the names of some clusters that are no longer active. The result of the research of the mentioned sources was a database containing the name of the CO, identification number, branch, legal form, the year of establishment, number of employees, region of activity, registered office, contact details and link to the website.
2. **Analysis of the degree of activity of cluster organizations** - COs can be divided into two basic groups - existing and extinct. However, even a group of existing COs is very heterogeneous and contains subjects that actually do not have any real activity. Existing COs were first divided into active and inactive according to their level of activity. The following characteristics are considered to assess the degree of activity.
    - **Active COs:** organizations with projects and updates listed on the cluster's official website. These COs can also be used to find financial statements in the public register and the collection of documents. Their activity can be further divided into higher or lower. Organizations whose websites were outdated (not updated for several years) were placed among those with lower activity; further, organizations that have low revenue in their financial statements.
    - **Inactive COs:** COs with zero activities belongs to this group. COs in this group do not have official websites, or the site is not in operation, and they do not have available financial statements in the public register and collection of documents.
3. **Mapping of the membership base of active CO** - data on the membership base were collected in the case of active CO: name of the entity, identification number, date of establishment, primary and secondary activity according to NACE classification, number of employees, type of entity (enterprise, research institution, university, interest group), legal form and contact details. An overview of CO members was gained from the website. Details of individual members were obtained from Magnusweb. On some websites, data on membership were missing,

or they were only recently established (2018). The membership base was mapped at 63 COs (out of 74 active COs).

4. **Creating an overview of the subsidies drawn for the projects of the CO** - for further analysis, active COs, which are currently in the maturity phase, were selected (organizations established up to and including 2012). Subsidies for these 44 COs were collected through the CEDR database (the General Financial Directorate, 2019) for the period of 2006-2018 and were divided into a total amount, provider and purpose. Given that the subsidies were provided for various purposes in the form of project financing, they were gathered into the following sub-groups: cluster establishment, cluster development, innovation potential development, cross-border cooperation, product innovation, education and HR development, collaborative research support, publishing activities and other non-investment transfers.
5. **Analysis of the CO operation sources of financing** - in the collection of documents of the public register, financial statements were collected with the intention to find out the sources of revenues. The collection of financial statements was complicated by the fact that the majority of COs have legal form of registered association. The associations are obliged to publish the financial statements from the year 2014 - this obligation was brought retroactively by the amendment to the Act on Accounting No. 221/2015 Coll. In addition, a search in the Collection of Documents of the Commercial Register revealed that many COs do not fulfil this obligation, despite the fact that some of them are beneficiaries of huge subsidies from public budgets. Therefore, the analysis of financial statements was limited to the period of 2014-2017 (the statements before 2013 are unavailable). The profit and loss statements were obtained for 20 organizations out of a total of 44 active COs in the maturity phase (see step 4). The above-mentioned rate of success of accounting statements corresponds to the findings of Bisnode (2018), according to which 65% of companies did not enter accounting documents in the Commercial Register in 2016 and 25% of companies repeatedly do so.

4 Results

In the first part, the results of the mapping of COs in the Czech Republic are presented in terms of the year of foundation, region of activity and industry. The second part contains the findings from the analysis of COs financing.

4.1 Analysis of cluster organizations in the Czech Republic

Based on the carried out mapping, 114 COs (as of 1 January 2019), both active and inactive, were identified. The survey showed that on average 7 COs per year have been established in the Czech Republic since 2002. The most COs were established in 2006 (19 in total), see figure 1. The year 2009 (14 organizations) ranked second in the number of COs established followed by 2012 (11 organizations). The enormous increase in the number of COs in 2006 was related to subsidy support through the Clusters sub-program under the Operational Program Industry and Enterprise. The same connection can be observed in 2009 and 2012, when the support of clusters was the subject of the Cooperation sub-program within the Operational Program Enterprise and Innovation.

After analysing the obtained information, 16 subjects were excluded from the original 114 CO file for further research. These were already extinct COs and subjects in liquidation or bankruptcy. For the remaining 98 organizations, a more in-depth analysis

was carried out and focused on these facts: the number of COs in each region, a total number and division by a degree of activity and distribution by legal form.

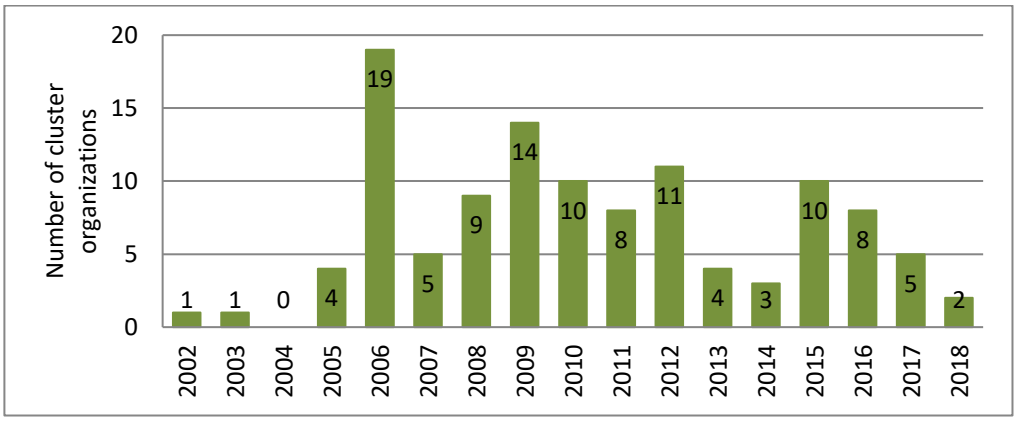

Figure 1 Number of cluster organizations by foundation year; source: own processing

The survey shows that in the Czech Republic, COs were established in all regions, including the City of Prague. The largest number of COs is in the Moravian-Silesian Region (20), followed by the South Moravian and South Bohemian Regions with 11 clusters. The least, only one CO operates in the Karlovy Vary Region. The number of COs in individual regions is given in figure 2.

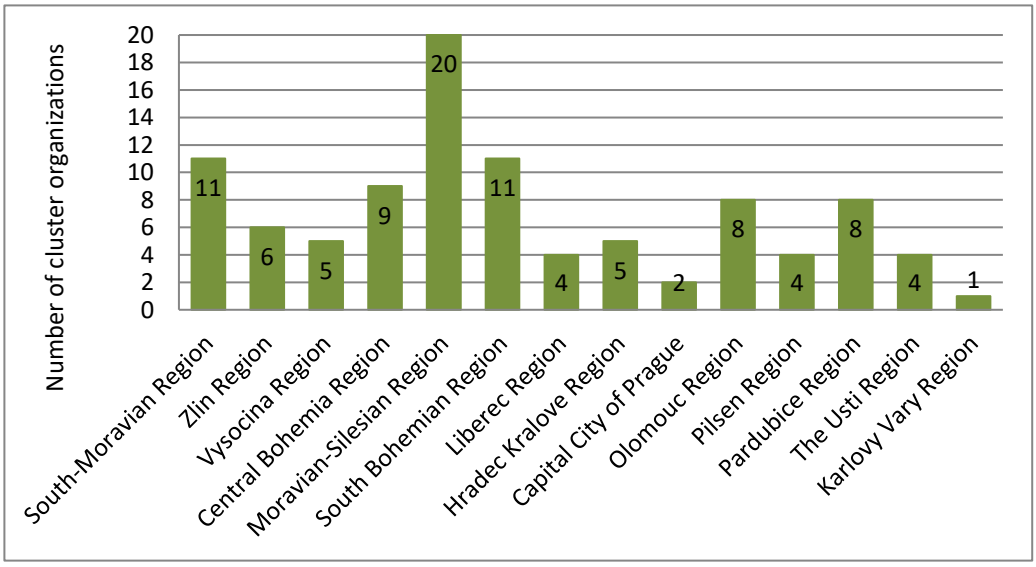

Figure 2 Number of cluster organizations in the Czech regions; source: own processing

In terms of legal form, most COs act as registered associations. Furthermore, the interest association of legal entities or cooperative has also been used quite often. Other legal forms occur rarely in COs. Since it is no longer possible to establish new interest associations of legal entities in the Czech Republic since 2014 when the new Civil Code has been in force - they have been replaced by registered associations - the registered association is the dominant legal form of the CO.

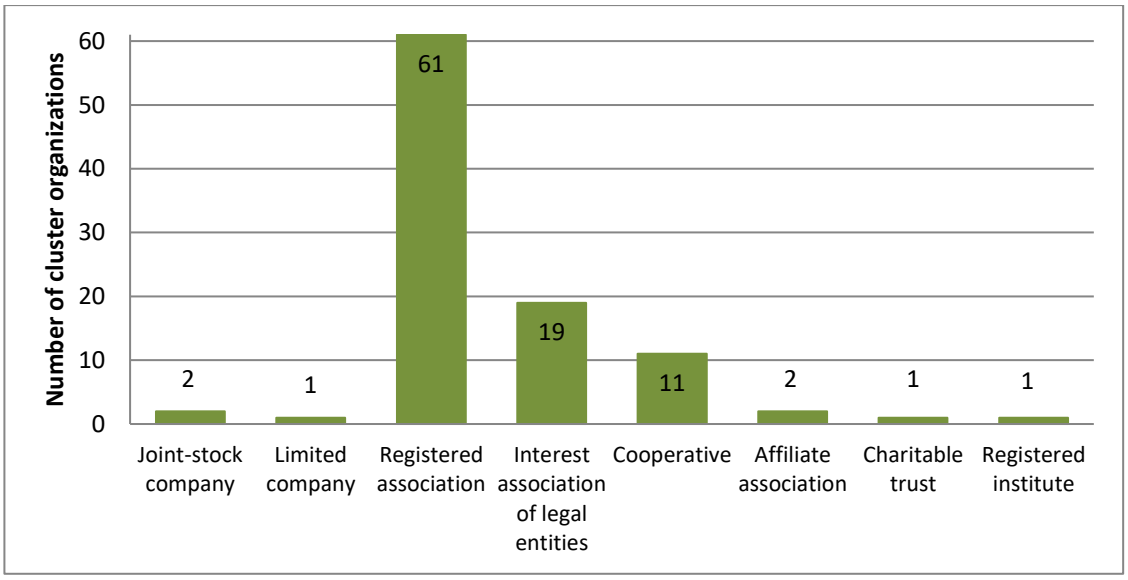

Figure 3 Number of cluster organizations by legal form; source: own processing

In terms of activity, existing COs were divided into 74 active and 24 inactive subjects. Further analysis focused only on a group of 63 active COs where it was possible to obtain information about the membership base. It was found that the average number of members in CO is 25 (the median is 21 members, the modus is 20 members). In a total of 37 COs, a number of members is less than the average. The highest number of members is in the Moravian-Silesian Automobile Cluster (76 members); the second largest CO is the Česká Peleta cluster (71 members); the smallest CO is a Cluster of Technical Plastics, which has only one member (basically it does not meet the network assumption).

In terms of the structure of CO members, companies prevail (68% in total). They are followed by interest associations and registered associations (8%). Associations, chambers of commerce, unions, civic associations and cluster organizations were also included in this group if they were members of another CO. With a share of 8%, secondary and tertiary professional schools, research and other educational establishments and institutions are represented. Universities have 6% of the membership.

Micro, small and medium-sized companies (78%) prevail among member entrepreneurial subjects (see Figure 4). There are 11% of big companies and with the remaining 11% of companies the number of employees could not be identified.

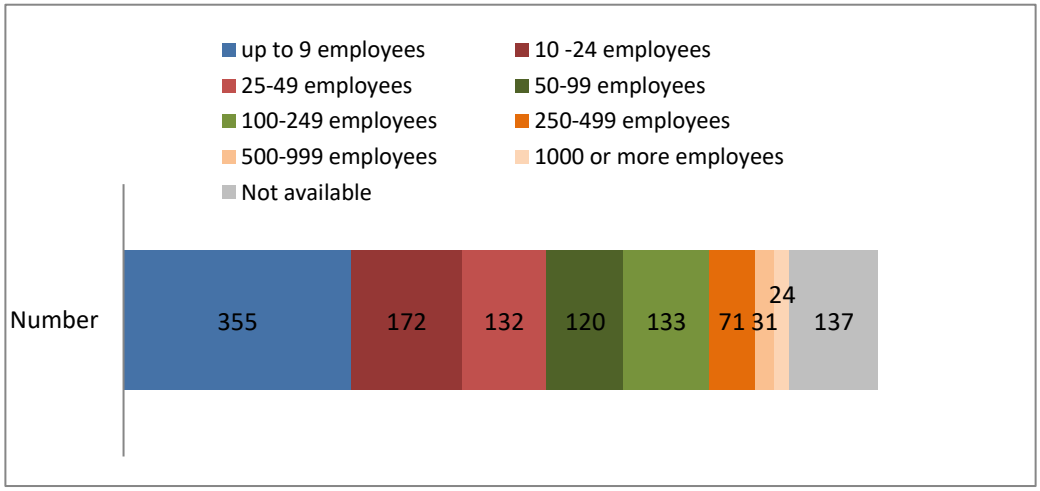

Figure 4 Cluster organization members (business entities) by staff; source: own processing

4.2 Analysis of cluster organization financing

The financing of the COs must be divided into two parts. The first part covers the financing of specific activities through projects. Project financing is mainly implemented in the form of various operational programs. For example, in the last programming period until 2013, it was the Enterprise and Innovation Program, currently the Enterprise and Innovation for Competitiveness Program. The second field is the financing of the operation of COs. CO operations can be financed from the sale of their own products and services, in the form of membership fees, but also from operating subsidies, whose providers are regions.

By analysing the data in the CEDR information system, it was found out that, the COs in the period of maturity acquired a total of CZK 2,006 million (approx. EUR 77 million) from operational programs during the 2006-2018 period. The largest part (67%) was drawn in 2013-2015 (see Figure 4), which is related to the end of the previous programming period (2013, but subsidies could be drawn until 2015). On the contrary, it was the least used in 2016, which indicates a poorly prepared new operational period (2014-2021). Thus, the situation from the previous period repeats, when only a small part of the available funds was drawn at the beginning of 2006 and in the following years (only 2% of funds were drawn by 2009). Drawing has been concentrated on the final years of the given period with a risk of inefficient spending of public resources.

It is also interesting that 17 COs (39% of the analysed number) did not receive any subsidy support in 2006-2018 and their activities and projects were fully financed from their own resources.

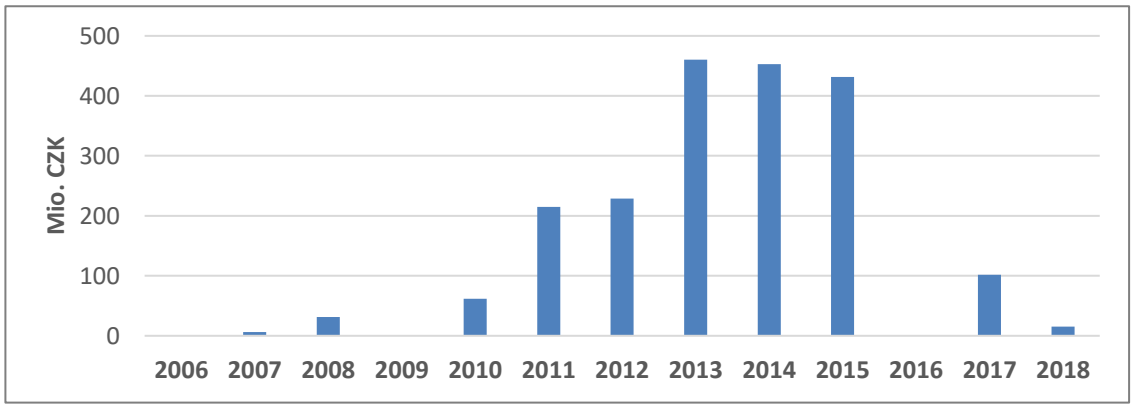

Figure 5 Subsidies drawn by cluster organizations; source: own processing

The Ministry of Industry and Trade (almost 95%) was the largest provider of the program support of COs. These were mainly resources from the Enterprise and Innovation Program. Only the resources of the Ministry of Labour and Social Affairs and Ministry of Education were used to support education and human resources development. Cross-border co-operation and internationalization of cluster organization activities were funded by the Ministry for Regional Development programs, see figure 6.

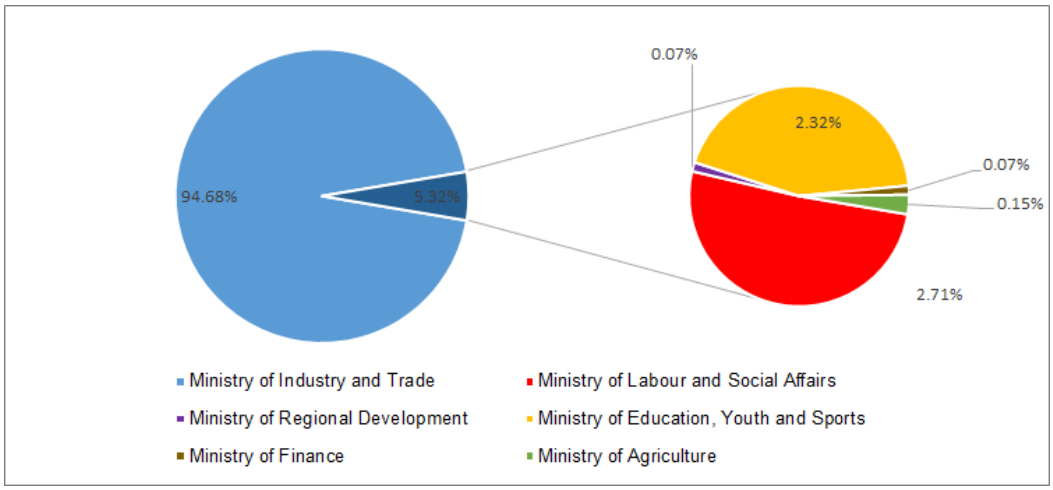

Figure 6 Subsidies by providers; source: own processing

From the point of view of the purpose, almost half of the funds were spent on the development of existing COs (see figure 7). Only a small share (less than 2%) was used to support the establishment of a new CO. However, it is important to note that the early phase of cluster mapping and clustering around the year 2006 was often carried out by other subjects (typically regional development agencies). Thus, the beneficiaries of the subsidies were not initially CO but other institutions since they were not yet established. This is followed by funding for projects focusing on education and training of CO staff and their members (8% of the total amount of subsidy spent) and funding for joint research (4% of subsidies). Funding for other activities is less than 2% of the resources spent.

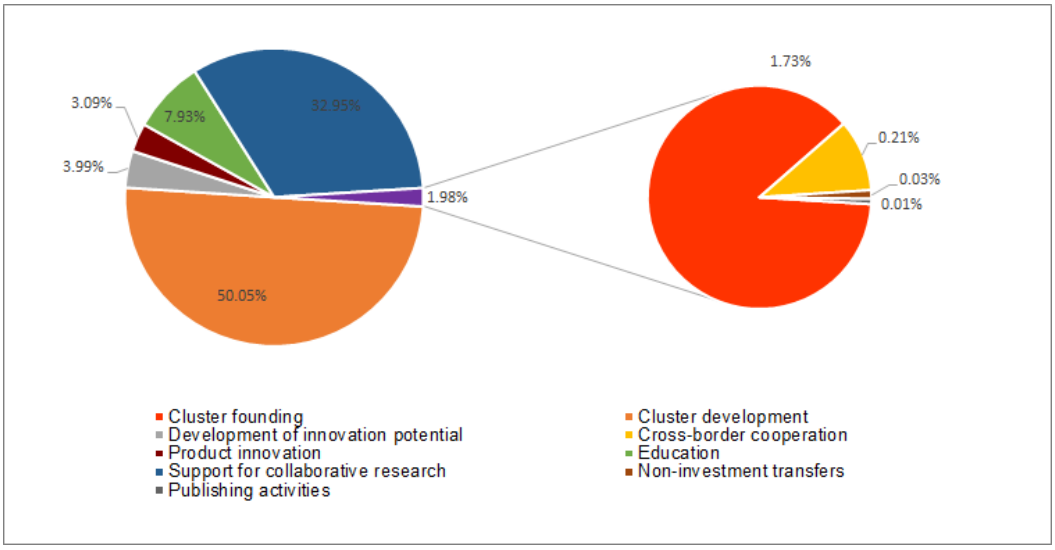

Figure 7 Subsidies by purpose; source: own processing

The last part of the research was focused on finding out sources of CO revenues and comparing their development in time series. The decreasing share of subsidies in the operational financing of COs can be positively evaluated. CO's revenues come mainly from the sale of their own products and the provision of services to members and external customers (in the case of registered associations, this is so-called complementary economic activity). Operating subsidies account for only around 10% of CO revenues, and their importance has declined significantly since 2014 (see figure 8). Membership fees are a negligible source of finance. Other income category includes interest income,

fund clearing, exchange rate gains and other income (for example, from rentals and commissions).

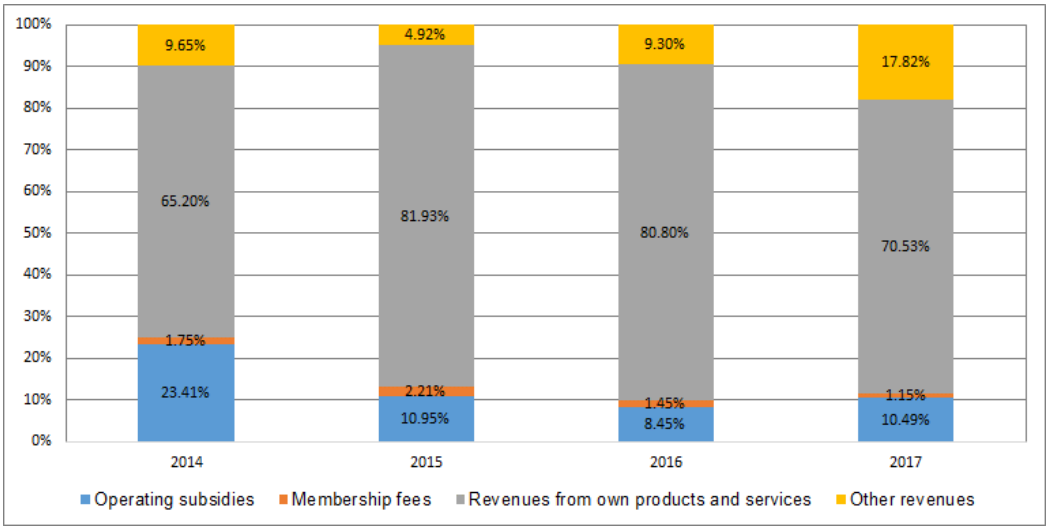

Figure 8 Sources of financing the operation of cluster organizations; source: own processing

The informative power of this part of the research is limited by the available data. Only 45% of subjects put the financial statements for all 2014-2017 periods in the collection of documents of the public register, although this obligation has been in place since 2014 for all COs in terms of their legal form. A total of 30% of COs did not include any financial statements in the public register. The remaining organizations then deposited financial statements only for certain periods, typically one or two.

5 Discussion and conclusions

It is clear that the emergence and development of COs in the Czech Republic was influenced by support programs adopted after joining the European Union. Only two COs were established before the country joined the EU. The main impetus for the establishment of COs came with the first support program Clusters (2004-2006, with the possibility of drawing resources until 2008), during which 37 COs were established. Of this number, 9 COs, that is almost a quarter, do not exist, and the same number practically does not carry out any activities. A further increase in the number of COs was related to the second support program in 2007-2013 (with the possibility of drawing resources up to 2015), during which another 60 COs were created. So far, 7 subjects have disappeared from COs established during the second wave. However, another 13 COs from the second wave are inactive. Therefore, it is evident that for quite a big part of COs, obtaining public support was an incentive for the establishment and logically some part of the public support was spent inefficiently.

In addition to COs, there are natural clusters in the Czech Republic that did not need to formalize their functioning in the form of cluster organizations. Their mapping is much more difficult because they do not use the "trademark" cluster externally, nor are they represented by an umbrella organization of the association type. The procedure for identifying a natural cluster on the example of the glass and jewellery industry has been published, for example, in Rydvalová and Žižka (2018). Natural clusters and the specifics of their functioning compared to formalized cluster organizations represent an interesting topic that deserves a separate research.

The research showed that the analysed COs, representing 60% of active subjects of this type in the Czech Republic, used over CZK 2,000 million for their development

in 2006-2018. In terms of funding, there is an interesting comparison with the extensive international survey of cluster initiatives (Lindqvist et al., 2013), although the published data in the cited study date from 2012. They are two years older than the oldest data in this article. Nevertheless, they can be used in general, as the authors conclude that the share of public / private sources in the financing of COs (60% : 40%) has been stable in the long term. The share is practically the same as in the previous 2005 study. From this perspective, the Czech COs show a higher level of financial self-sufficiency, around 70%. The share of direct operating subsidies for the financing of municipalities in the period 2014-2017 decreased by almost a half to about 10%. However, it should be noted that part of the public funds is still under other revenues (this is called fund clearing). In fact, the share of public funds in the funding of the COs is close to 30%. It can therefore be positively assessed that the dependence of the financing of the COs operation on public resources is decreasing.

However, the public funding of specific CO projects is also significant. These projects are mainly financed through operational programs. Existing operational programs will expire in 2020. It is expected that in a new EU budget for the next period there may be a smaller volume of funds that the Czech Republic will receive in the framework of cohesion policy (influence of Brexit, approximation of the Czech Republic's economic level to more advanced countries). COs will have to look for other new resources to fund their activities. Future developments will test the viability of existing cluster projects.

Therefore, the question arises as to how effective the public support of COs was and whether it really contributed to the support of innovation and competitiveness of Czech companies. Answering this question will require further extensive research in the near future.

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References

Agency for Entrepreneurship and Innovation (2019) *“OPPIK - Spolupráce”*, Available at: https://www.agentura-api.org/programy-podpory/spoluprace

Balog, M. (2016) “Development Factors of Cluster Organizations in the Slovak Republic”. *Ekonomický časopis*, Vol. 64, No. 2, pp. 149-168.

Belussi, F. and Caldari, K. (2008) “At the origin of the industrial district: Alfred Marshall and the Cambridge school”. *Cambridge Journal of Economics*, Vol. 33, No. 2, pp. 335–355. doi: 10.1093/cje/ben041.

Bialic-Davendra, M. (2011) “An Investigation of a new Concept of World-Class Clusters in Europe – A Case Study of the Visegrad Group of Countries”, *Journal of Competitiveness*, Vol. 3, No. 2, pp. 43–57.

Bialic-Davendra, M. et al. (2014) “*The clusters phenomenon in the selected Central European countries*.” Cambridge Scholars, Newcastle upon Tyne.

Bisnode. (2018) *“Informační ne-povinnost”*, Available at: https://www.bisnode.cz/o-bisnode/o-nas/novinky/informacni-ne-povinnost

Bisnode. (2019) *“MagnusWeb”*, Available at: https://magnusweb.bisnode.cz

Břusková, P. et al. (2013) “*Podstata a fungování klastrových iniciativ*.” Moravskoslezský energetický klastr, Ostrava, Czech Republic.

Chen, Y. G., Hsieh, P. (2008), "A Service-based View of Porter's Model of Competitive Advantage" *International Journal of Management*, Vol. 25, No. 1, pp. 38–53.

CzechInvest. (2012) "OPPI Spolupráce", Available at: https://www.czechinvest.org/cz/Sluzby-pro-male-a-stredni-podnikatele/Chcete-dotace/OPPI/Spoluprace

Damborsky, M., Wokoun, R. (2010), "Location Factors of Small and Medium Entrepreneurship under the Economic Conditions of the Czech Republic", *E&M Ekonomie a Management*, Vol. 13, No. 2, pp. 32–43.

Department of Justice. (2019) *"Veřejný restřík a sbírka listin"*, Available at: https://or.justice.cz/ias/ui/rejstrik

General Financial Directorate. (2019) *"The Central Register of Subsidies (IS CEDR III)"*, Available at: http://cedr.mfcr.cz/cedr3internetv419/default.aspx

Kincaid, B. L. (2005) "*Competitive advantage of clusters within lesser developed countries of the South Pacific: An empirical case study extending the Porter diamond model*." Capella University, Ann Arbor.

Lindqvist, G., Ketels, C., Sölvell, Ö. (2013) "*The Cluster Initiative Greenbook 2.0*." Ivory Tower Publishers, Stockholm, Sweden.

Marshall, A. (1920), *Principles of Economics*, Palgrave Macmillan, Basingstoke.

Ministry of Finance. (2019) *"ARES – Ekonomické subjekty"*, Available at: https://wwwinfo.mfcr.cz/ares/ares_es.html.cz.

Ministry of Industry and Trade. (2005) *"National Cluster Strategy 2005 – 2008",* Available at: https://www.mpo.cz/dokument25477.html

Ministry of Industry and Trade. (2010) *"Úspěšné projekty v OPPP – program KLASTRY"*, Available at: http://www.mpo-oppi.cz/155-uspesne-projekty-voppp-program-klastry.html

NCA. (2015) *"Portal for Clusters and Competitiveness"*, Available at: http://klastr-portal.cz/en

Pavelková, D. (2009) „*Klastry a jejich vliv na výkonnost firem"* Grada, Praha, Czech Republic.

Pe'er, A., Vertinsky, I. (2006) *"Determinants of Survival of De Novo Entrants in Cluster and Dispersal."* Available at http://dx.doi.org/10.2139/ssrn.940477

Porter, M. E. (1990) "*The Competitive Advantage of Nations*." Free Press, New York, NY.

Rydvalová, P., Žižka, M. (2018) "Discussion on Issues of Natural Industry Clusters Specifications", *Trendy v podnikání – Business Trends*, Vol. 8, No. 3, pp. 63–73. doi: 10.24132/jbt.2018.8.3.63_73.

Schretlen, J.-H. et al. (2011) "*Uncovering excellence in cluster management*." Pricewaterhouse Coopers, Amsterdam.

Spirkova, D. et al. (2014) "Cluster Policy and Its Influence on Economic Competitiveness", *Applied Mechanics and Materials*, Vol. 718, pp. 16–21. doi: 10.4028/www.scientific.net/AMM.718.16.

Zaušková, A. (2010). "Klastre - nástroj pre zvysovanie inovacnej výkonnosti a konkurencieschopnosti regiónov", *Communication Today*, Vol. 7, No. 1, pp. 43–64

Implementation of management systems as an important environmental factor within the European market

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Abstract

The paper presents the research and identification of advantages, benefits, competitiveness of enterprises in the European market resulting from the implementation of environmental management systems. These are voluntary tools used for the implementation of an effective system which purpose is to manage important environmental aspects and to comply with legal requirements and regulations. The purpose of the environmental management systems implementation is to ensure that the organization achieves and demonstrates responsible environmental behavior and creates conditions for generally safe operation. Continuous improvement of the organization's activities and processes also introduces and maintains a system that is designed to continually improve the organization's performance. The benefit of implementing the environmental management system is achieving the best results of the organization, trying to succeed in a competitive environment and meeting the requirements of stakeholders.

Keywords: environment; environmental management system; organization; organization´s efficiency.

JEL Classification: Q50

Article Classification: Research paper

1 Introduction

Implementation of the environmental management systems as an important factor in the European market is becoming increasingly important in the context of the global economy's development and the creation of wider economic units, and is the main aspect of strategic thinking of managers seeking to succeed in national and global markets.

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Organizations are beginning to realize the need and importance of environmental behavior, whether in relation to contracted partners, consumers, suppliers.

The importance and contribution of environmental management systems implementation consist of the possibility to find sources of organizations´negative impacts on the environment and to take the actions for their reduction. Such behavior is a commitment to European organizations because it represents continual improvement of their relationship with the environment, reduction of environmental burdens and increase of environmental quality. Environmental management systems can be used by all organizations and enable them to manage the environmental performance levels that help to control the quality of the environment. Another benefit is that implementation helps to identify, monitor and adhere to different environmental requirements, which will ultimately be reflected in cost reductions. However, the costs are also reduced when organizations save energy, reduce production of waste and input materials (Hammar, 2018). An important reason for implementing the environmental management system is to ensure a quality environment (Pacana, 2017). Some organizations that are in a crisis are interested in implementing a standard ISO14001: 2015 to gain a reputation on the domestic and foreign markets, and to increase their competitiveness (Iatridis and Kesidou, 2016).

It is expected that standard ISO 14001: 2015 Environmental Management Systems. Requirements with guidance for use will become a prerequisite for businesses worldwide as per a General Agreement on Tariffs and Trade (GATT). Market flexibility and organizational capacity are the basis for the acceptance of new global environmental standards. (Sheldon et al., 2017) In order to solve the environmental issues, the European Commission has identified resources efficiency as one of the key initiatives of its strategy Europe 2020. The aim is to create more values with lower inputs and use resources in a sustainable and more efficient way throughout their lifecycle. (http://www.sazp.sk)

The priority objectives set out in the Environment Action Programme to 2020 can only be achieved in cooperation with partner countries or within the European Union's global approach. Member states are committed to engage more effectively with international partners to achieve the sustainable development goals of the Rio +20 Conference. The Environment Action Programme to 2020 also proposes to explore further measures that could help to reduce environmental impact beyond the European Union (http://ec.europa.eu).

Transforming our world: the 2030 Agenda for Sustainable Development, which is a comprehensive set of priorities for achieving sustainable development goals that have long been at the heart of European policy, integrated into key cross-cutting projects, sectoral policies and initiatives, also creates a space for exploiting the potential of environmental management systems. 2030 Agenda for Sustainable Development and its 17 goals approved by UNO have given new impetus to global efforts to achieve sustainable development. UNO member states are committed to implementing the Agenda 2030 in order to achieve sustainable development in its three dimensions - economic, social and environmental - in a balanced and integrated way. The European Union, in collaboration with the member states, is committed to supporting the implementation of the document and pursuing a sustainable future for everyone.

Sustainable development requires a holistic and cross-sectoral approach for policymakers to ensure a common solution to economic, social and environmental challenges. Consequently, sustainable development requires the right instruments to ensure policy coherence across thematic areas. One of the possible ways to reduce negative impacts on the environment and to achieve sustainable development is to implement environmental management systems that are increasingly used by

organizations in various economic activities. The importance of environmental management systems´ implementation according to standard ISO 14001: 2015 Environmental management systems. Requirements with guidance for use or EMAS - Eco-Management and Audit Scheme makes it easier for organizations to enter the European market and harmonizes management systems implementation (Vílchez, 2017). Standard ISO 14001: 2015 and EMAS system are similar in content and differ essentially in form. Most of the organizations implement the environmental management system according to standard ISO 14001: 2015, although the European Community is also interested in implementing the EMAS scheme as a tool for continual improvement of the companies´ environmental performance. (Matuszak-Flejszman et al., 2019)

The advantage of standard ISO 14001: 2015 implementation is its general format, it can be certified in every country in the world and is more accessible for services industry. During eco-audits, the process of continual improvement of environmental protection is controlled by the state through EMAS registration and the publication of the eco-audit statement gives the public a better opportunity to assess the organisation's environmental and other business impact. The evaluation of the standard ISO14001: 2015 implementation is a certification by accredited body and in the case of EMAS it is registration the by competent authority.

The EMAS scheme is an important part of a several international environmental and sustainability strategy documents such as the Europe 2020 strategy, the OECD Green Growth Strategy, the Roadmap to a Resource Efficient Europe, the Eco-Innovation Action Plan, the Green SME Action Plan and the EU Action Plan for Circular Economy. These documents declare the role of the EMAS scheme in balancing resource efficiency, protecting natural capital, reducing the impact of pollution on public health and, at the same time, enhancing Europe's competitiveness. The Transformation of our World - Agenda for Sustainable Development 2030 is a document that creates a space for exploiting the potential of EMAS. (Daddi et al., 2018)

The European Union's environmental policy is based on the conviction that economic growth, social progress and environmental protection help to improve quality of life. Synergy among these three fundamental objectives contributes to sustainable development (Galetto et al., 2017). The European Union members, which supports the environment, contribute to innovation and competitiveness, thereby promoting economic growth, which is both crucial to achieving the social objectives.

The main principles of the environmental management system include compliance with national environmental legislation, preference for prevention in the field of environmental protection, identification of environmental aspects and their management, continuous improvement of the environmental profile and environmental performance of the organization. These principles are specific to the environmental management system. At present, one of the most important goals of organizations is to ensure its own growth, improve the environment and ensure the safety of the working environment for its employees. Organizations thus consolidate their market position.

The environmental management systems are implemented by the organization to manage environmental requirements and to comply with environmental legislation. It allows the organization to systematically manage the level of environmental performance it sets itself. The importance of environmental management systems is they allow to manage environmental issues within the business in a planned and systematic way, and to identify processes that lead to continuous improvement of environmental business behavior.

2 Material and methods

The aim of the paper is to point out the importance, reasons and barriers that affect organizations in implementing environmental management systems as a factor of competitiveness in the European market. Several procedures and methods have been used to provide suggestions and recommendations for investigated subject. The application of the method of analysis was required and it allowed to divide and then examine individual theoretical knowledge obtained through domestic and foreign journal resources.

The method of analysis was also used in the processing of data obtained through a questionnaire within the survey to determine the reasons for implementing the environmental management system in the organization as a significant factor of competitiveness.

The practical part was created by questionning method - by questionnaire, which was distributed electronically to 252 different organizations with implemented management systems according to their economic activities. The percentage of return was 32.5%, and so 82 organizations responded.

When processing survey results the synthesis method was used, it helped to summarize the individual responses and formulate general conclusions represented by the percentages of the organization's votes. We used this method in the practical part when processing the results of the questionnaire and summarizing the results and individual answers. The next step was to compare individual theoretical approaches, to evaluate our subject of matter- selected management systems. Data were analyzed by using mathematical-statistical methods and they enabled to summarize the individual outputs into a graphical form.

3 Results

Implemented environmental management systems contribute to sustainable development through environmental protection, mitigating the potential adverse impact of environmental influences on organization, improving environmental performance, achieving operational and financial benefits. They also bring to the organizations a better position on the European market, improvement of the products and services quality. They are a competitive advantage for any company, their deployment is on a voluntary basis and allows the business to operate economically and improve its environmental profile. The implementation of the environmental management system into the organization can be considered as a significant step towards fulfilling the principles of sustainable development through the management of environmental protection.

The environmental management systems are perceived by the public as tools for improvement of the organization efficiency and market eligibility. They have a positive impact on the company image, and in addition to all the practical benefits, they are also generally accepted by the market as a guarantee of organizational control over its processes. Management systems have the internal positive impact- inside of the company, as well as externally on society seen as a competitive advantage. Internal factors include a decreasing proportion of disagreements on overall performance, increased efficiency in in-house processes, and they ultimately lead to cost reductions and productivity increase.

We also focused on identifying the reasons, barriers to the effectiveness of implementing environmental management systems in organizations. The survey consisted of several questions, evaluating the importance of establishing the environmental management system as well as other management systems. 252 organizations were approached and 82 organizations participated in the survey (32,5%). The companies that participated in the survey had an environmental management system

setted up, although the larger number of organizations approached were not interested in participating in this survey. The reasons for their lack of interest have not been identified.

In the survey, a standardized questionnaire inquiry method was used. The obtained knowledge about the management systems´ implementation and their significance in the European market was used when preparing the questions.

The organization can persuade stakeholders that it is environmentally friendly and is involved in its protection by demonstrating the successful implementation of the international standard ISO 14001: 2015 Environmental management systems. Requirements with guidance for use. The reasons for establishing environmental management systems (Figure 1) are related to meeting legislative and other requirements, continually improving environmental behavior based on a proactive approach and reducing environmental risks.

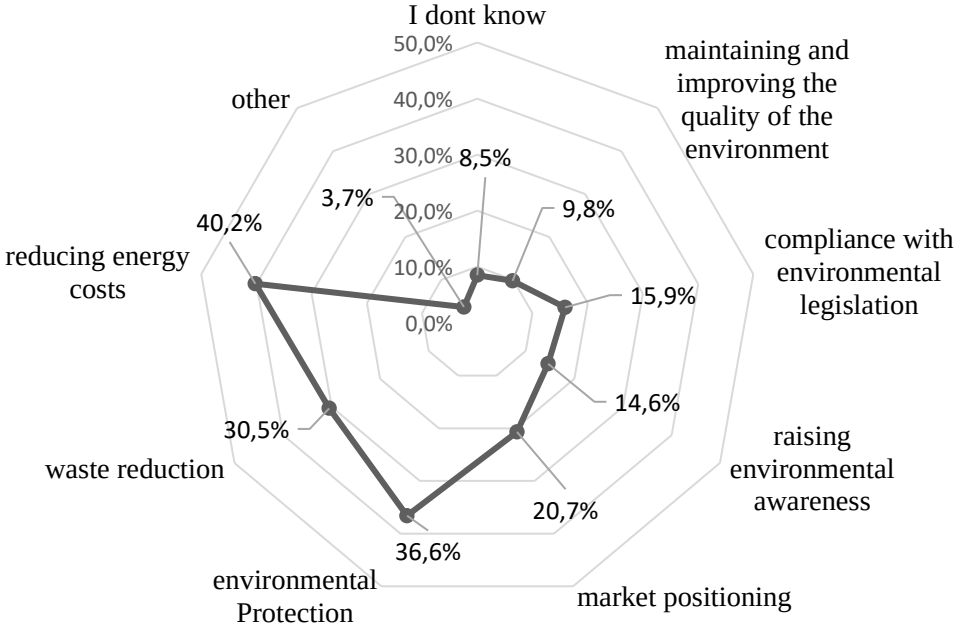

Figure 1 Reason for implementing environment management systems; source: own processing

The implementation of standard ISO 14001: 2015 increases organizations' effectiveness by reducing operating costs. The most frequently stated reasons for implementing management systems were: reducing energy costs, mentioned by 33 organizations (40,20%), waste reduction for 25 organizations (30,50%), 30 organizations reported environmental protection (36,60%) followed by improved market positioning chosen by 17 firms (20,70%). These reasons are crucial for organizations to implement environmental management systems.

Other factors for the implementation of environmental management systems according to standard ISO 14001: 2015 are an increase of the environmental awareness of the employees mentioned by 12 organizations (14,60%), compliance with environmental legislation was reported by 13 companies (15,90%), maintenance and improvement of environmental quality was chosen by 8 organizations (9,80%), 8,5% of firms did not know the answer. Other reasons for implementing management systems were reported by 3 organizations (3,70%), such as: competitiveness, increase of the company efficiency.

The results of the survey show that there might occur some barriers in the organization during the implementation and subsequent certification of environmental management systems according to standard ISO 14001 Environmental management

systems. Requirements with guidance for use. These barriers need to be eliminated so that implementation can be successful and bring the desired effects in terms of benefits from improving quality process and ultimately obtaining a certificate (Figure 2). Respondents were given the opportunity to select 3 indicators from 10 in total. For 28 organizations out of 82, the biggest barrier of implementing environmental management systems is the unavailability of environmentally friendly technologies (34,10%). The high costs of implementing environmental management systems according to standard ISO 14001: 2015 and the bureaucracy were reported by 26 companies (31,70%), which have to deal with various mandatory documents and do not have enough time to devote themselves to full implementation of standard ISO 14001: 2015.

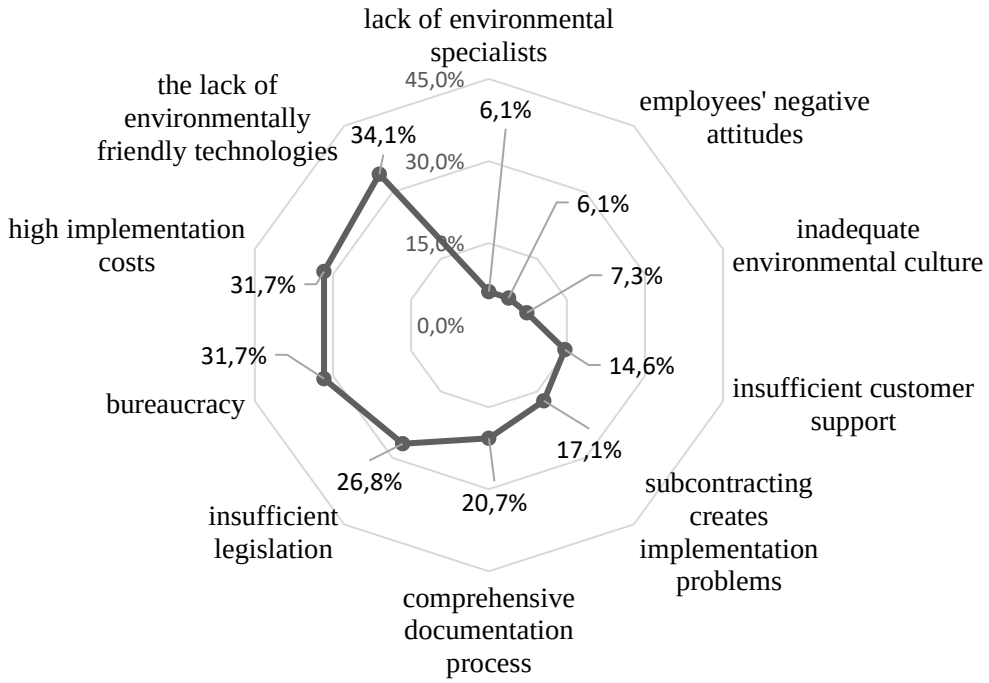

Figure 2 Reasons for implementation of environmental management systems; source: own processing

Organizations do not implement the environmental management systems according to standard ISO 14001: 2015 due to insufficient legislation, which was reported by 22 companies (26,80%). It is not sufficiently adapted or applied in Slovakia. The least labeled indicators inluded employees' negative attitudes, reported by 5 organizations (6,10%), 6 firms (7,30%) voted for inadequate environmental culture, and 12 organizations (14,60%) indicated insufficient customer support. The companies' processes are improving once the management systems are implemented. The changes occuring during the management systems implementation are important for the organization and its proper business operation.

Within the environmental management system, the organization monitors the environmental aspects of its activities and services in order to minimize their negative impact on the environment. With respect to the growing competitive environment and global economic factors the goal of each organization is to obtain a competitive advantage, which they can achieve through the implementation of not only the environmental management system but also other management systems and integrate each other. Based on these results, we can conclude that the implementation of

management systems and integrated management systems in Slovakia has a positive impact on the companies and can help them with further development and keeping their market position.

Based on the survey, it was confirmed that the implementation of environmental management systems is effective for each organization as its competitive advantage would be increased and the processes would be streamlined.

4 Discussion

Manufacturing organizations operating within European Union, which influence the environment through their activities, have the opportunity to apply environmental management through environmental management systems implementation, to successfully manage environmental protection and thus gain a significant competitive advantage over organizations with no system setted up. It is important to create, implement and maintain a properly structured environmental management system that is part of the overall management system and is linked to all elements of the organisation's environmental performance.

This system should monitor and comply with environmental legislation, manage environmental aspects, create and raise employees' environmental awareness, monitor and measure product performance activities that can significantly impact the environment, reduce waste production, search for recycling options and reduce energy consumption. The main principles of the environmental management system include compliance with European and national environmental legislation, preference for prevention in the field of environmental protection, identification of environmental aspects and their management, continual improvement of company environmental performance and behaviour.

The main reasons for implementing environmental management systems include meeting legislative and other requirements, continually improving environmental behavior based on a proactive approach and reducing environmental risks. At the same time, the position of the organization on the market improves from a societal point of view, it enables to acquire new opportunities on the domestic and foreign markets, the value and economy of the organization as well as the trust of customers increase.

The environmental management systems make it easier for a company to find negative environmental impacts, help to estimate their significance and offer a solution to reduce them and evaluate the results achieved. The importance of environmental management systems is a support of the organization of environmental activities in a planned and systematic way, identification of processes to continuously improve environmental business behavior. By purposefully improving individual processes, an organization can contribute to improving the environment, reducing the cost of energy, water, gas, or emissions, which will ultimately have a positive impact on effective corporate governance.

Responsible business behavior builds trust in the market economy, trade openness and globalization. In order to achieve positive economic results without jeopardizing the growth potential of future generations, organizations are implementing effective environmental policy tools, the most widespread and effective of which are environmental management systems according to standard ISO 14001. Not only the organization but its external environment is progressing from the established environmental management systems.

The environmental management systems serve to manage environmental issues in the company in a systematic way and by planning. The reason for the entrepreneurial

interest in environmental management is a fact that the predominant approach- when organizations respond to legislative requirements, is proving to be inefficient, in terms of environmental protection as well as economical results. As environmental protection legislation grows, the cost of its protetions is also increasing. Many companies are beginning to use a preventive strategy based on the principle of environmental management instead of a reactive strategy based on remedial measures. Organizations are responsible for protecting the environment, while at the same time allowing them to find solutions that are economically efficient for them. Organizations can decide to implement environmental management systems on a voluntary basis once the management is convinced of their benefits.

Organizations can contribute to sustainable development by meeting environmental legislation requirements, as well as by implementing environmental management systems that help organizations to improve production quality, performance, efficiency, but above all, competitiveness as well as consolidating market positions.

The environmental management systems according to standard ISO 14001: 2015 were established in 82 organizations. The significant reasons for standards´ implementation was the reduction of energy costs reported by 33 organizations (40,20%) and the reduction of waste identified by 25 organizations (30,50%). %).

Companies use the principles of sustainable development not only to strengthen competitiveness, but also to expand market share, and to implement environmental policy tools to reduce negative environmental impacts and to prevent environmental accidents. Environmental policy tools include environmental management systems , which form the core of management functions, have precisely defined criteria, serve as a tool for identifying environmental risks, and contribute to the organization's credibility.

Akcknowledgements

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References

Daddi, T., De Giacomo, M.R., Frey, M., Iraldo, F. (2018) "Analysing the causes of environmental management and audit scheme (EMAS) decrease in Europe", *Journal of Environmental Planning and Management*, Vol. 61, No. 13, pp. 2358–2377. doi: 10.1080/09640568.2017.1395316.

Galetto, M., Franseschini, F., Mastrogiacomo, L. (2017) "ISO 9001 certification and corporate performance of Italian companies", *International Journal of Quality & Reliability Management*, Vol. 34 No. 2, pp. 72–80. doi: 10.1108/IJQRM-04-2015-0064.

Hammar, M. (2018) *"Six Key Benefits of ISO 9001 Implementation"*, Available at: https://advisera.com/9001academy/knowledgebase/six-key-benefits-of-iso-9001-implementation/

Iatridis, K., Kesidou, E. (2016) "What Drives Substantive Versus Symbolic Implementation of ISO 14001 in a Time of Economic Crisis? Insights from Greek Manufacturing Companies", *Journal of Business Ethics*, Vol. 148, No. 4, pp. 859–877. doi: 10.1007/s10551-016-3019-8.

Matuszak-Flejszman, A., Szyszka, B., Johannsdottir, L. (2019) "Effectiveness of EMAS: A case study of Polish organisations registered under EMAS", *Environmental Impact Assessment Review*, Vol. 74, No. 1, pp. 86–94. doi: 10.1016/j.eiar.2018.09.005.

Pacana, A. (2017) "*Synthesis of the environmental management system compliant with the ISO 14001 – Monograph"*, Printing Office, Philadelphia.

Sheldon, Ch. (2017) "*ISO 14001 and Beyond: Environmental Management Systems in the Real World"*, Routledge, London.

Vílchez, V. F. (2017) "The dark side of ISO 14001: The symbolic environmental behavior", *European Research on Management and Business Economics*, Vol. 23, No. 1, pp. 33–39, doi: 10.1016/j.iedeen.2016.09.002.

http://ec.europa.eu

http://www.sazp.sk

Solar potential of build - up areas as a tool for building smart cities

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Abstract

The city itself is one of the most important systems, whose operation is directly dependent on external sources. The energy needed to ensure the sustainability of such a system is an important element. The current trend is to apply progressive technologies in practice that, with their innovative approach, supporting the idea of building smart cities. From the whole group of modern approaches, we find an intersection with geoinformation technologies. This approach to the solution of the chosen issue is based on spatial identification of settlement structure objects, which are supposed to show a high potential of active use of solar energy.

Keywords: spatial data; build – up area; solar potencial; roof areas.

JEL Classification: D18, K22, M31

Article Classification: Research article

1 Introduction

The effects of the long – term impact of global warming begin to greatly influence the life around us. Their impact is global associated with extreme manifestations of climate change (unexpected dry, flash flood events, etc.) (Bindzárová Gergeľová et al., 2018) The events of the last days in the Slovak Republic are clear evidence of this. Extremely dry replaced the intense rains that cause flash floods in selected parts of Slovakia. According to the Slovak Hydrometeorological Institute (SHMI), precipitation

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of varying intensity occurred throughout Slovakia. In the Slovak Republic, this situation has been given increased attention in recent days. Evidence of this is also the developing SR initiative to implement the Agenda 2030 for Sustainable Development in a national and international environment. In this respect, Europe continues to move towards sustainable development (SlovakAid, 2019).

The opaque manifestations of this climate change phenomenon make it clear to society that it is high time to reduce the impact of human activity on the environment. Their influence is directly transferred to settlement structures, which are constantly increasing energy consumption due to idustrialization (Bucher, 2011). It is also multiplied by the ever-developing development, characterized by dense buildings (Lengény et al, 2014). From this point of view, every urbanized development requires a distinctive approach to the solution of its spatial arrangement. Projecting buildings with regard to renewable resources should be key (Figure.1).

Figure 1 Demonstration of RES utilization in facade elements of buildings; source: www.asb.sk

Renewable energy resources (RES) are an important part of modern society, which is currently associated with the idea of building smart cities. The issue of efficient use of solar energy at the city level is among other things, processed in the research works of many authors for example (Legény, Mofgenstein, 2015), (Kanters et.al, 2016). Solar energy has appeared for the ordinary users decades ago as an inaccessible form. At present, not only the share of solar energy but the share the energy from renewable energy in the EU has increased. The EU objective in terms of the share of final energy produced with RES support by 2020 is presented in the following Figure 2.

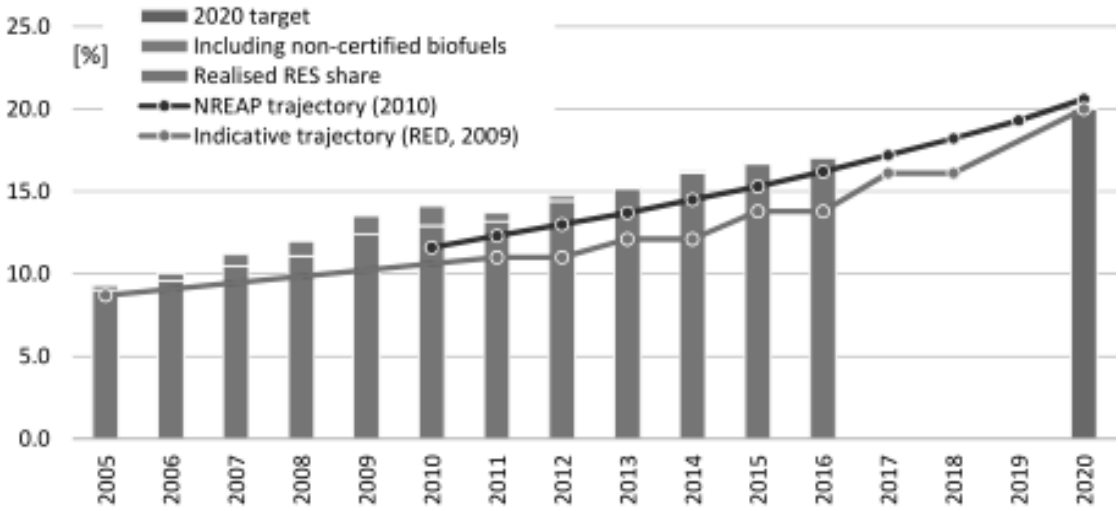


Figure 2 RES police in EÚ; source: EurObserv´ER, 2019

Another support article is the technology that has advanced to a level that offers different innovations from the category of "Smart Solutions" (Boháčová, 2017). Innovative solutions at city and municipal level require a direct link to renewable energy souces (Ministerstvom hospodárstva SR, 2014).

With the intensive use of solar energy in settlement structures, the idea of a solar strategy and also building the solar cadastral is associated.

One of the European cities that have their own 3D model of the city is Helsinki. In this model, they have an energy and climate model that includes information on energy and water consumption and includes the calculation of the solar potential (Figure. 3) of all roof and building surfaces (Solar Energy Potential, 2019).

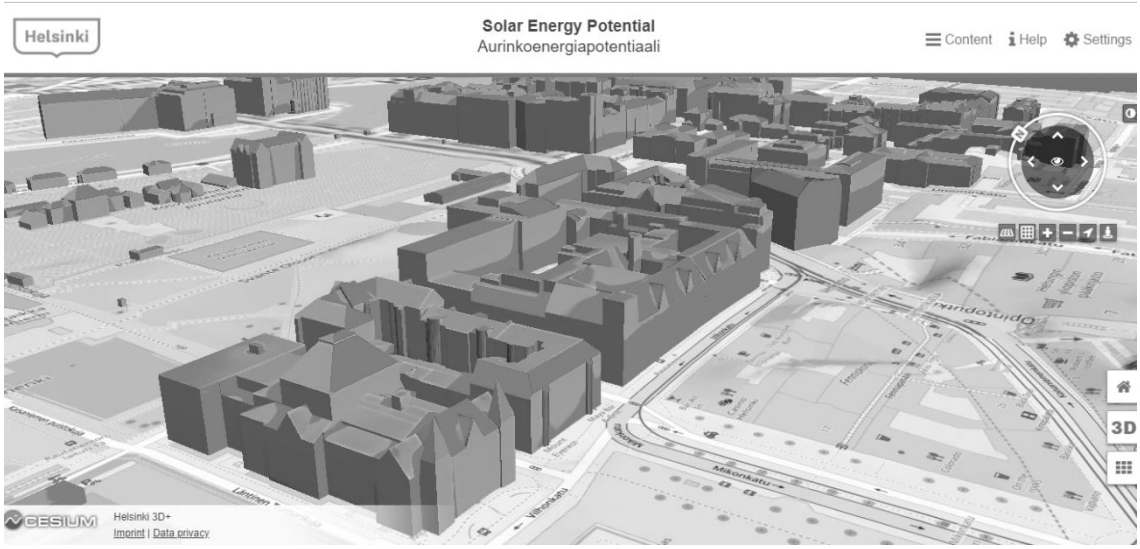


Figure 3 The solar potential of Helsinki city buildings; source: https://kartta.hel.fi/3d/solar/#/

The integration of the urban vision into the environment of settlement structures can be presented through a solar cadastre. Examples of this approach are European cities such as Vienna, Berlin, Geneva. It is a schematic overview of solar photovoltaic or thermal potential of buildings, roofs or facades. Through this online system, it is possible to provide all stakeholders with up-to-date information on possible solar gains. The following example presents the Geneva Solar Cadastre (Figure. 4) (Lengény et al, 2015).

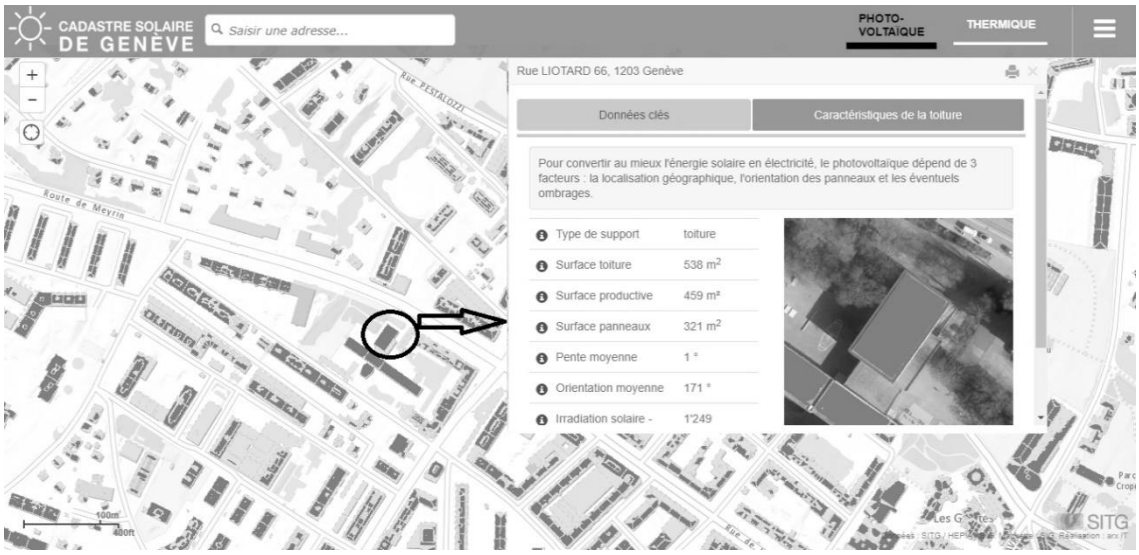


Figure 4 Preview of Geneva Solar Cadaster; source: Cadastre solaire DE GENÉVE, 2019

In order to determine the solar potential of roof and facade elements of residential buildings, it is necessary to comprehensively analyze the individual attributes of the settlement structure, especially from the spatial point of view.

The content of the contribution will be devoted to identifying the character of the selected urban structure in terms of the spatial geometry of its objects. In addressing this issue, the emphasis will be on defining the typology of spatial forms of individual development of urban structures especially for solar potencial.

2 Material and methods

The selected methodology will be used to solve the chosen problem; part of the methodology is described in the research work of the authors such as Švéda et al., Legény et al and Farthing et al. To a similar issue are devoted a number of scientific papers, the starting point of which is primarily based on a spatial viewpoint, without which it would not be possible to determine the solar potential of objects, respectively buildings (Ramachandra, 2007), (Kodysh et al, 2013). In this article, we will be focus more closely on the spatial arrangement of the residential area in the selected area. The physical layout (spatial structure) of the urban structure will be analyzed according to the following geographical aspects. Through the monitored parameter set, it is possible to effectively analyze their spatial range and the solar building itself. The structure of the monitored parameter set is defined in following Table.1

Table 1 Structure of data sets; source: own elaboration

	Classification
Land Use and	coded typological units and capture urban land use
Land Cover, Urban atlas	coded typological units and capture urban land use
Results of direct and indirect geodetic measurement	Vector and raster data
Typology of urban structure	Metacatalog of urban structure
Typology of roof areas	Cataloguing roof areas by spatial identification
DTM	morphometric characteristics
Global radiation	Raster data

These data sets need to be further classified. The following is the classification Table. 2.

Table 2 Overview of atribute description; source: own elaboration

	Category
Land Use	unclassified, open water, perennial snow/ice, developed, open space, developed, low intensity, developed, medium intensity, developed, high intensity, barren land, deciduous forest, evergreen forest, mixed forest, shrub/scrub, herbaceous, hay/pasture, cultivated crops, woody wetlands, emergent herbaceous wetlands
Land Cover (Level 1)	artificial surfaces, agricultural areas, forest and semi natural areas, wetlands, water bodies, no data
Typology of urban structure	physical data model of residential buildings (Figure.5)
Typology of roof areas	pros, cons, steep roof
DTM	slope aspect

From the point of view of the typology of settlement structures, it is necessary to start from the physical data model. Physical model is the final representation of the object model. It contains a complete list of classes with their full name and attributes, completing their data types (Arctur et al, 2004), (Kuzevičová et al, 2017). The choice of the system was tailored to GIS technology, which offers a wide range of features. The physical level of the logical design was implemented in the ArcGIS Diagrammer environment. ArcGIS Diagrammer allows the created model to be published in an xml. file, which actually creates a drawing for the geodatabase.

The presented contribution methodology will be handled in a practical way through the tools of the ArcGIS for Desktop 10.x vesion, ArcMap 10.3.

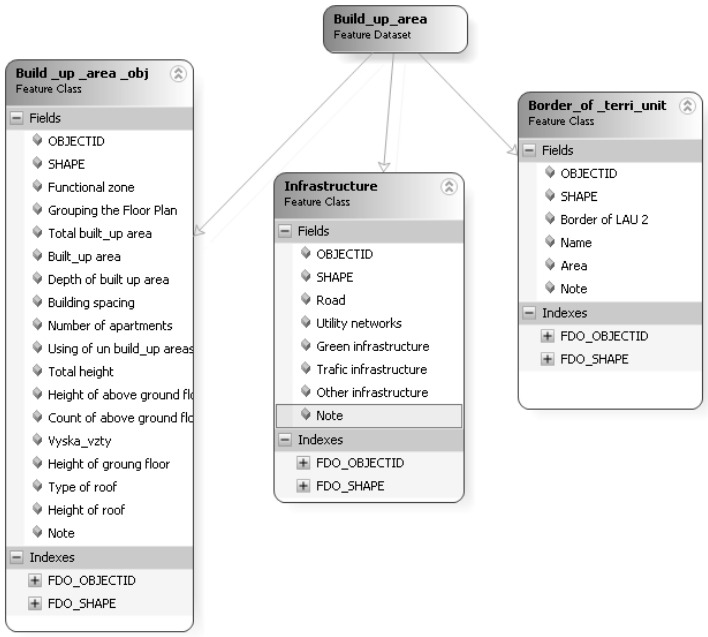


Figure 5 Preview of physical model design in ArcDiagrammer environment; source: own elaboration

3 Study area

The subject of the manuscript solution is the second largest city in Slovakia. The city of Košice along with other regional capitals of Slovakia tends to be rated among the smart cities. Such a city is expected to be innovative, digitalized and ecological.

One of the possibilities of achieving consists in an automated system of evaluation of urban areas in view of many factors and parameters.

The city of Košice along with other regional capitals of Slovakia tends to be rated among the smart cities. Such city is expected to be innovative, digitalized and ecological. One of the possibilities of achieving consists in an automated system of evaluation of residential housing in view of many factors and parameters. The location and overview of study area presents Figure 6. (Bindzárová Gergeľová et al, 2018).

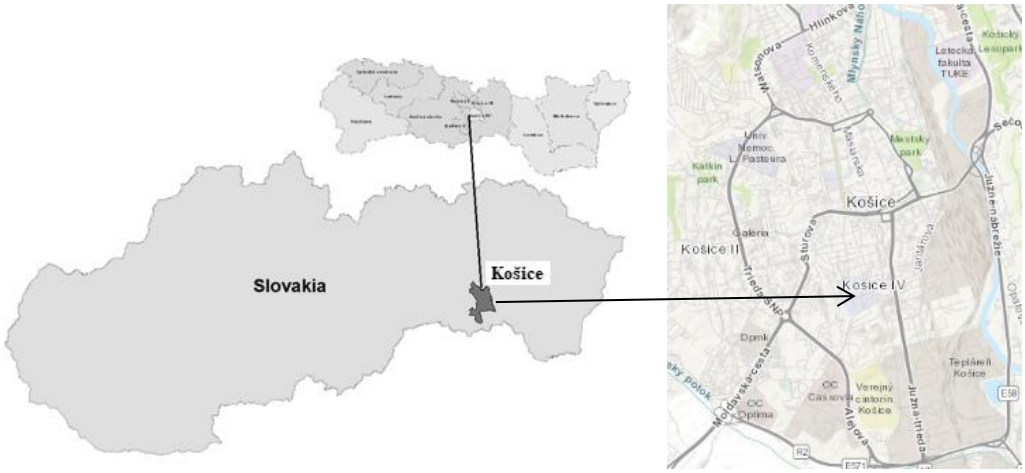


Figure 5 Schematization of study area; source: own elaboration; source: own elaboration

Geographically, the subject area is various with a favorable potential for efficient use of solar energy, which is presented in Figure. 6.

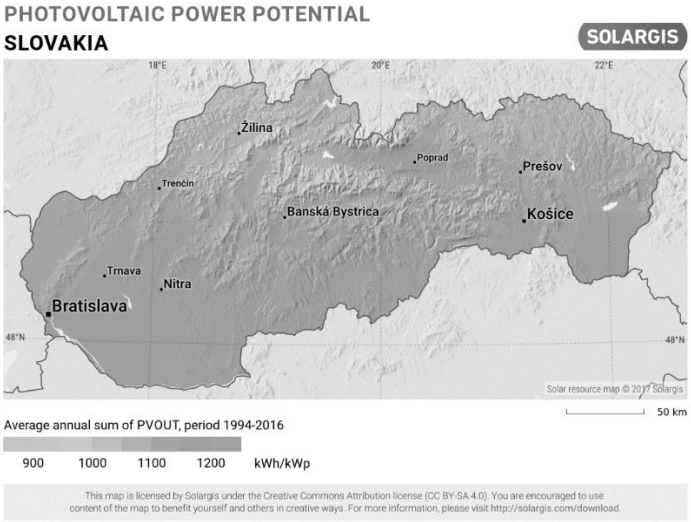


Figure 6 Solar resources maps: Photovoltaic power potencial for Slovakia; source: Solar resource map © 2019 Solargis, https://solargis.com

4 Results

GIS-based analysis combined with other solution (for example PV*SOL) is used to determine the solar potential. Addressing the issue also requires the integration of 3D modeling. For the building construction sector, this parameter is particularly important for the installation of PV systems. The 3D object models that are created contain information about their geometry, which in the case of buildings can be used to calculate slope, aspect and roof surface, which forms the input for solar radiation analysis (Kuzevičová et al, 2019). Thanks to this information, we can use the created building model to assess the suitability and design of photovoltaic systems (Bindzárová Gergeľová et al, 2019) (Figure. 7).

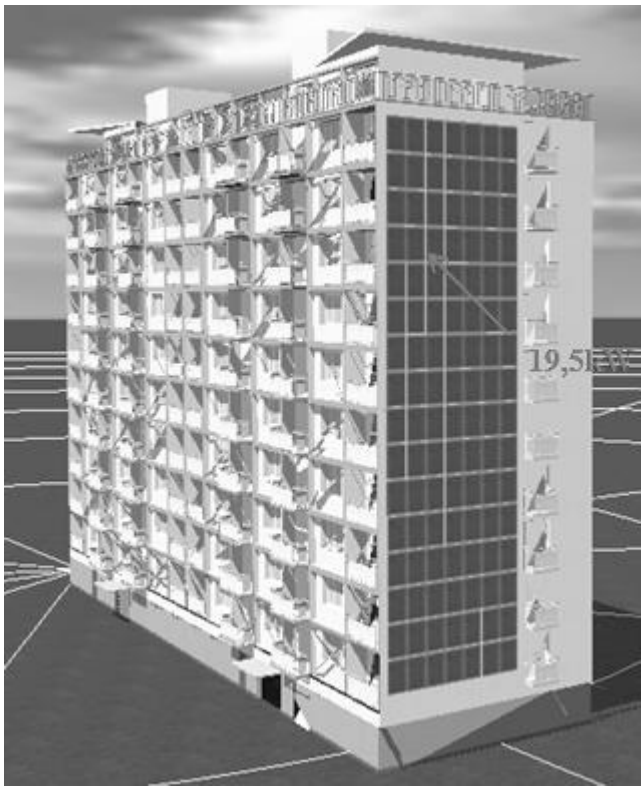


Figure 7 Integration of PV systems into roof and facade elements of buildings; source: own elaboration

By combining the above-mentioned evaluation indicators (Table.1, Table.2), basic information on the extent and manner of land use in urban space was obtained through post-processing tools of the GIS enviroment (Figure.8). The spatial assessment of the use of land cover in residential development is based on the CLC database. Land cover classes can be divided into:

- artificial surfaces,
- agricultural areas,
- forest and semi natural areas,
- wetlands,
- water bodies,
- no data (Copernicus na Slovensku, 2019).

The CLC data layers document how the landscape is used on three levels. The territory in question was ranked at the third level of CLC (Level 3).

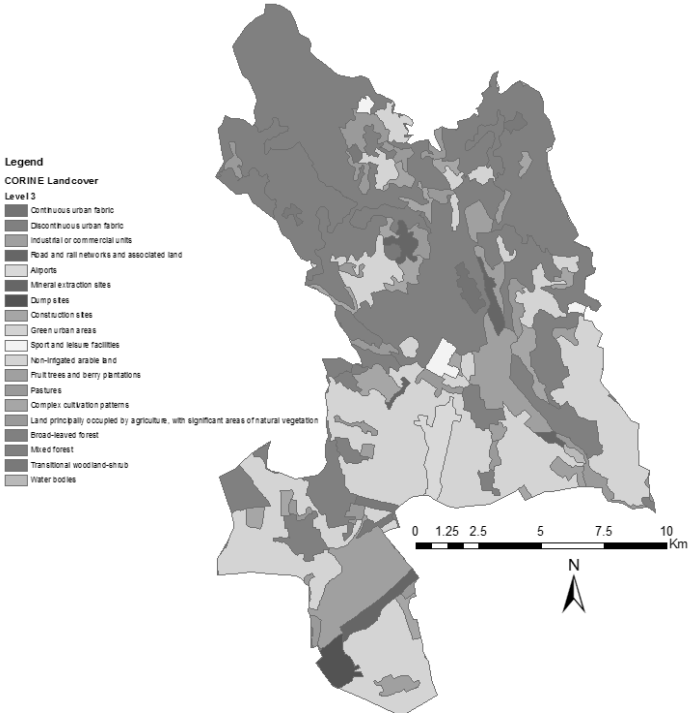


Figure 8 Scheme of spatial localization; source: own elaboration

The implementation of the methodology based on the use of Corin Land Cover (CLC) will be a supportive part of the solution. The advantage of linking several methodological procedures for processing this issue opens up room for simplifying and automating the process of determining the solar potential of a residential development. a The CLC nomenclature includes 18 different types of soil utilization given in the ptresented Figure. 8. Graphical illustration of CLC by area and method of utilization which was elaborated using GIS tools. The applied CLC color range was not stochastic, but it was strictly prescribed by a particular RGB for each type of the nomenclature in the assessed region. Graphical representation of CLC under developed area and usage has been processed by using the GIS environment. CLC color scale used is not accidental, but exactly been prescribed a specific RGB value foreach type of nomenc lature of Košice area (Kuzevičová et al, 2013). In the calculation itself, it was necessary to consider the general expression of the representation of individual types of land use for the needs of another application. From the point of view of the areal definition, tools of the environment of geographic information systems were used in the process of processing.

Table 3 Percentage presentation of CLC for selected area; own elaboration

	Percentage representation [%]		Percentage representation [%]
111	0.4	211	30.2
112	13.7	222	0.4
121	7.7	231	0.9
122	1.3	242	3.7
124	1.3	243	3.6
131	0.6	311	26.5
132	0.8	313	6.4
141	0.8	324	0.9
142	0.7	512	0.4

The percentage assessment of the area representation of individual species is presented in Table. 3. By processing, the total area of individual sites in the urban area in

question was identified. A graphical presentation of the results of the identified areas is presented in the following.

It can be stated from the presented presentation that the highest proportion of landscape cover is in the class 211.

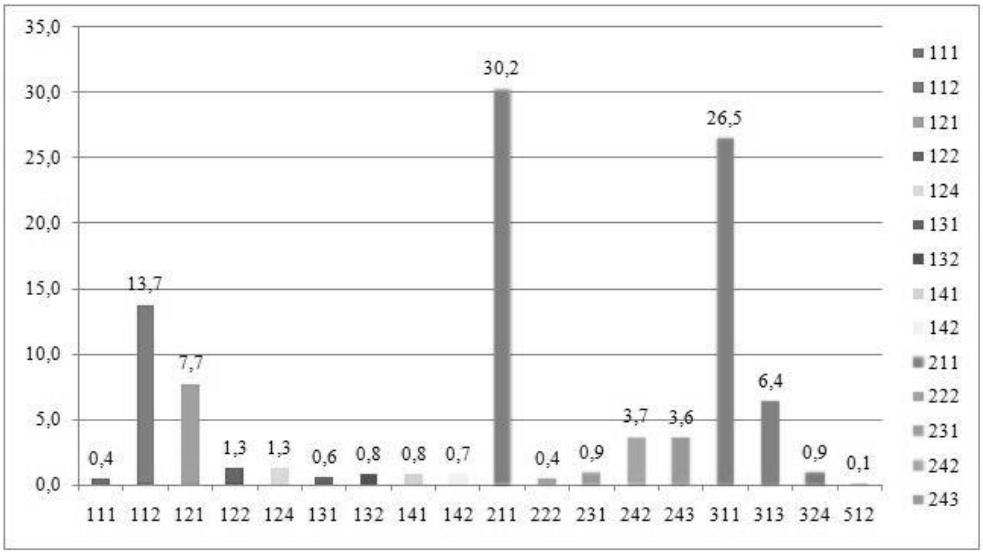


Figure 8 Usu minim melius; source: own elaboration

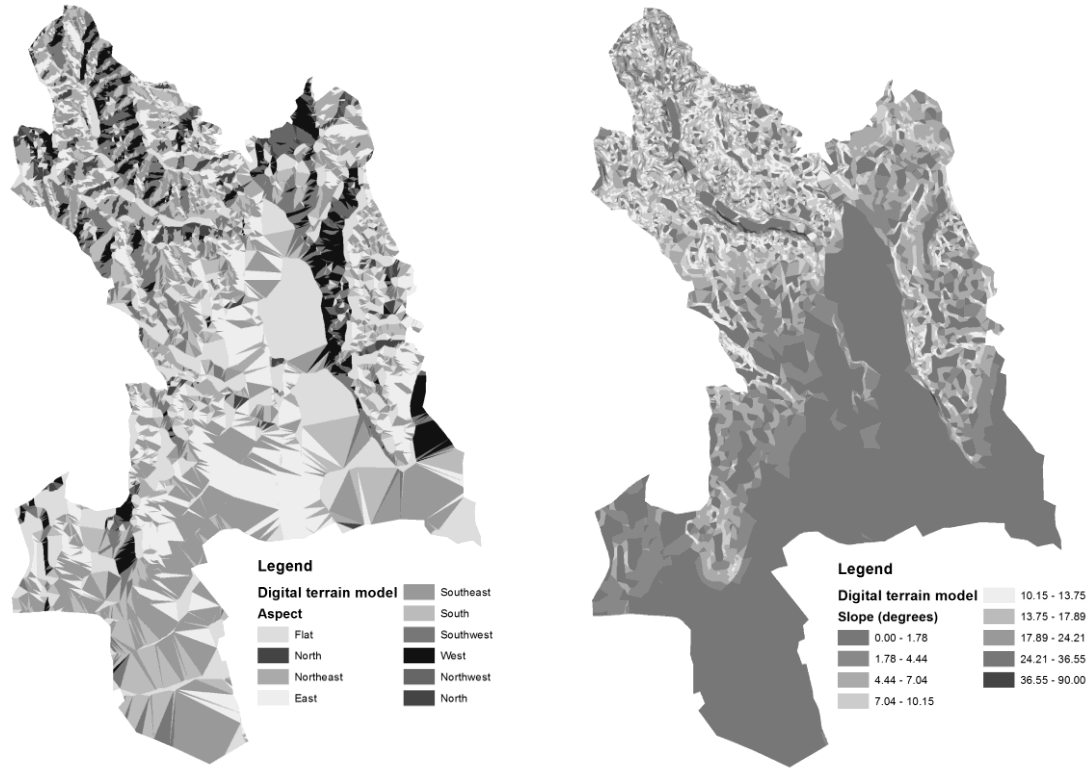
For the purposes of more complex generalization of urban areas (buildings), it is appropriate to use the underlying formats from the category of vector (shp files, geodatabase) or raster data from the category of open data.

Table 4 Overview of available formats; own elaboration

	File type
Land Use Land Cover	Vector data, polygon
Results of direct and indirect geodetic measurement	Vector, raster data
Typology of urban structure	Geodatabase
Typology of roof areas	Vector, raster data
DTM	Raster data
Global radiation	Raster data

The result of the processing is a number of graphic outputs through which the following results can be presented.

Figure 9 An example of processing objects in ArcGIS enviroment; source: own elaboration



a) Aspect b) Slope

Figure 10 Selected morphometric characteristics of the terrain of the area; source: own elaboration

5 Discussion

The content of the research article was focused on the presentation of partial outputs of the research project of the grant scheme VEGA 1/0754/18.

The research article was focused on the presentation of the possibilities of determining the solar potential of residential buildings. The problem is solved very comprehensively, because every roof, building, or any other object has its own solar potential, solar capacity. The solar potential is directly dependent on the position of the sun in the sky, which changes during the year, away from the type of season and other characteristics that result from the conditions of the residential development. In principle, to determine the solar potential, it is necessary to obtain information about 3D objects that contain the height of objects, slope, and shading of adjacent buildings. The paper presented a design page of work with available formats that support the calculation of solar potential. Without the processing of the presented data sets of layers, it could not be determined the capacity of the solar potential. The creation of 3D objects is now becoming the standard for any type of spatial analysis, including the determination of solar potential. The article was about presenting a creation page of the concept for determining the solar potential in a general perspective. In this perspective, the team of authors will continue to elaborate on the issue, which is part of the research project.

Akcknowledgements

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References

Arctur, D., Zeiler, M. (2004) "*Designing Geodatabases Case Studies in GIS Data Modeling"*. ESRI Press.

Bindzárová Gergeľová, M. et al. (2018) "Spatial site view of the structure of selected urban areas" In: *GeoTerrace-2018,* Lviv (Ukrajina): Lviv Polytechnic National University, p. 212–215.

Bindzárová Gergeľová, M. et al. (2019) "*Tvorba 3D modelov pre optimalizáciu návrhu FV systémov"* In: *Medzinárodná vedecká konferenciu RESpect 2019, 24. and 26. april 2019,* Bardejovské Kúpele, Slovakia.

Boháčová, K. (2017) "Smart priestory" *Urbanita*. Vol. 29, pp. 18–19.

Bucher, S. (2011) "Hodnotenie atribútov sídelnej štruktúry regiónu NUTS II – Východné Slovensko." *Geografická Revue*. Vol. 7.

Cadastre solaire DE GENÉVE, (2019) "*Solar cadastre"* Available at: https://sitg-lab.ch/solaire/

Copernicus na Slovensku, (2019) "*Triedy krajinnej pokrývky Corine Land Cover"* Available at: http://copernicus.sazp.sk/

EurObserv´ER, (2019) "*Policy and statistic reports"* Available at: https://www.eurobserv-er.org/eurobserver-policy-files-for-all-eu-28-member-states/

Farthing, A. et al. (2016) "Utility-Scale Solar PV in South Carolina: Analysis of Suitable Lands and Geographical Potential", *BioPhysical Economics and Resource Quality*, Vol 1, No. 2, pp. 1–15.

Gergel'ová, M. et al. (2014) "Automation of Spatial Model Creation in GIS Environment", *Inżynieria Mineralna*. Vol. 33, No. 1, pp. 15–22.

Gergeľová, M., Naščáková, J., Kuzevičová, Ž., Kuzevič, Š. (2012) "Návrh dátového modelu pre potreby aplikačného využitia v prostredí GIS", *Transfer inovácií,* Vol. 24, pp. 259–262.

Kanters, J. et al. (2016) "A planning process map for solar buildings in urban environments", *Renewable and Sustainable Energy Reviews*. Vol 57, pp. 173–185.

Kodysh, J., Omitaomu, O., L Bhaduri, B., S Neish, B. (2013) "Methodology for Estimating Solar Potential on Multiple Building Rooftops for Photovoltaic Systems", *Sustainable Cities and Society*. Vol. 8, pp. 31–41.

Kuzevičová, Ž. et al. (2013) "Proposal of methodology for determining of potential residual biomass for agriculture and forestry in Slovak republic", *Acta Montanistica Slovaca*. Vol. 18, No. 1, pp. 9–16.

Kuzevičová, Ž. et al. (2017) "Data model design for applications in tourism", *Ekonomika a manažment podniku: Economics and Business Management: Časopis pre ekonomickú teóriu a prax*, Vol 15, pp. 23–29.

Kuzevičová, Ž. et al. (2019) "Creating a Smart 3D Models as a Tool for Support for Designing the Use of RES", In: *38 TH Meeting of departments of fluid mechanics and thermodynamic*, 2019 June 19-21, Demänovská Dolina, Slovakia.

Kuzmich, F. et al. (2018) "*Formy sídelných štruktúr pre rozvoj mesta"* Available at: https://is.muni.cz/el/1456/jaro2013/CPR_TG06/um/Formy_sidelnych_struktur_pre_rozvoj_mesta.pdf.

Legény, J. et al. (2015) *"Solárna stratégia udržateľného mesta."* Slovenská Technická Univerzita, Bratislava, Slovakia.

Legény, J., Morgenstein, P., Špaček, R. (2014) "Sustainable urban design: A solar strategy for a sustainable city" *Architektura a Urbanizmus*. Vol. 48, No. 1, pp. 38-53.

Ministerstvom hospodárstva SR. (2014) "*Podpora inovatívnych riešení v slovenských mestách"* Available at: https://www.mhsr.sk/inovacie/strategie-a-politiky/smart-cities

Ramachandra, T V. (2007) "Solar energy potential assessment using GIS", *Energy Education Science and Technology*. Vol. 18, No. 2, pp. 101–114.

SlovakAid, (2019) *"Medzinárodná konferencia - AGENDA 2030",* Available at: http://www.slovakaid.sk/sk/novinky/956-medzinarodna-konferencia-agenda

Solar Energy Potential. (2019) "*3D model of Helsinki",* Available at: https://kartta.hel.fi/3d/solar/#/.

Šveda, M., Pazur, R. (2018) "Priestorové formy rezidenčnej suburbanizácie v zázemí Bratislavy". *Geographical Journal*. Vol. 70, No. 3, pp. 231–258.

Business performance from the perspective of managers and accounting data

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Abstract

The subject of this article is business performance, how it is perceived by managers and how it is reflected in a company's accounting data. The objective of the article is to determine whether business performance is understood by managers in the same way as it is reflected in the accounting data, i.e. whether the manager's subjective evaluation corresponds with the objective evaluation of the accounting data. We asked managers to evaluate their current business performance relative to their competition and to the previous year. Subsequently, we computed the performance of their companies using selected financial indicators constructed from the accounting data. The two groups of indicators were then compared on a sample of companies from various sectors, with a majority from the secondary and tertiary sectors. The results demonstrated that subjective and objective evaluations differ; however, we found a match for the profitability indicators.

Keywords: business performance; financial performance; subjective evaluation; objective evaluation; financial ratios.

JEL Classification: L25, L60

Article Classification: Research article

1 Introduction

Generally, business performance can be defined in many different ways, the context allows for its specification, the specification (e. g. overall, financial, operational performance) determines measurement. Drucker (1992) defines performance as the final test of every organization. We can add that this test has to have an economic dimension.

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Consequently, we can define performance together with Hindls et al. (2003) as a company's ability to increase the value of the capital invested.

It is necessary not only to define performance, but also to define its correct measurement, as it is the particular method of measuring performance which makes the concept more precise. If performance is a company's ability to achieve its (economic) objectives, then measuring performance can show a certain way of achieving this. Sinclair and Zairi (1995) state that "performance measurement is the process of determining how successful organizations or individuals have been in attaining their objectives" (cited from Tunji-Olayeni et al. 2014).

The quantitative measurement of business performance based on accounting data is relatively widespread (see, for example, Gunasekaran et al., 2005, Gupta, Galloway, 2003). However, many researchers consider relying solely on the use of indicators based on accounting data as problematic. Ittner and Larcker (1998) claim that "the perceived inadequacies in traditional accounting-based performance measures have motivated a variety of performance measurement innovations ranging from 'improved' financial metrics such as 'economic value' measures to 'balanced scorecards' of integrated financial and non-financial measures."

Performance is usually measured objectively using secondary (accounting) data, because this data is relatively reliable (Tosi et al. 2000). From the financial perspective it is possible to use different financial indicators, specifically numerous financial ratios, absolute financial indicators, or their combinations (for more detail see, e.g. Chia et al. 2009). However, it is also relatively common in research to use subjective measures of performance.

Previous research has demonstrated that the results of subjective and objective measurements correspond (Wall et al. 2004), and some authors even demonstrate a strong correlation (e.g. Dawes 1999). Due to the availability of both the subjective evaluation, as well as their objective counterparts constructed from accounting data, it was possible to verify the above findings in our research.

The subjective measurement of performance is basically very similar to objective measures in the sense that it uses the same constructs (based on accounting data), either independently (for the company) or in relation to the competition (see Desphandé et al. 1993, Narver, Slater, 1990, Deng, Dart, 1994). Our research uses both subjective measures of financial performance in comparison with the competition, as well as for the company (in comparison with the previous period). Chiou and Droge (2015) suggest using sales and sales growth in the case of the subjective measurement of financial performance in comparison to the competition. We also use profitability and total costs, since these are frequently used indicators of financial performance (e.g. Dess and Robinson Jr 1984, Delgado-García et al. 2012).

2 Material and methods

The article's general objective is to verify the relationship between the subjective evaluation of managers (their evaluation both in comparison to the competition and in comparison the previous period) and the objective evaluation constructed from the accounting data. To be more specific, we wanted to discover how strong the correlation is between the subjective and objective evaluation of performance.

Our research questions were therefore formulated as follows:

Does the subjective perception of financial performance by managers correlate with the accounting indicators of financial performance?

This research question led to six hypotheses, which also further concretize the research question:

H1: There is a relationship between the subjective perception of the level of sales in comparison with the competition and the sales reported in accounting statements.

H2: There is a relationship between the subjective perception of the level of overall costs in comparison with the competition and the overall costs reported in accounting statements.

H3: There is a relationship between the subjective perception of profitability in comparison with the competition and the profitability calculated from accounting statements.

However, Hypothesis 3 can be made more specific through the following:

H3a: There is a relationship between the subjective perception of profitability in comparison with the competition and the ROA indicator.

H3b: There is a relationship between the subjective perception of profitability in comparison with the competition and the ROE indicator.

H3c: There is a relationship between the subjective perception of profitability in comparison with the competition and the ROS1 indicator.

H3d: There is a relationship between the subjective perception of profitability in comparison with the competition and the ROS2 indicator.

H4: There is a relationship between the subjective perception of the level of sales in comparison with the previous period and the sales reported in accounting statements.

H5: There is a relationship between the subjective perception of the level of overall costs in comparison with the previous period and the overall costs reported in accounting statements.

However, Hypothesis H6 can again be made more specific through the following:

H6a: There is a relationship between the subjective perception of profitability in comparison with the previous period and the ROA indicator.

H6b: There is a relationship between the subjective perception of profitability in comparison with the previous period and the ROE indicator.

H6c: There is a relationship between the subjective perception of profitability in comparison with the previous period and the ROS1 indicator.

H6d: There is a relationship between the subjective perception of profitability in comparison with the previous period and the ROS2 indicator.

This work focuses on the financial indicators of performance, specifically how managers evaluated these indicators: sales (total), costs (total) and profitability. In order to compare the individual indicators, those indicators which can be ascertained from accounting data were used, i.e. sales (total) and costs (total). As profitability was not further specified in the questionnaire, it will be compared with the indicators ROA (using EBIT), ROE (using EAT) and ROS (using both EBIT – ROS2 and EAT – ROS1).

The managers then evaluated these indicators twice on a seven-point scale (1 – a significantly lower indicator value to 7 – a significantly higher indicator value). In the first evaluation the indicator was related to the competition (to the values of this indicator for the competition – the variables $Sales_k$, $Costs_k$, $Profitability_k$) and in the second case the value of the indicator was related to the value from the previous year.

The level of significance was set at a p-value of 0.1. This level was set with regard to the rather lower sample size and it is in accordance with the standard level used in other research (Schumm, et al. 2013). We chose Spearman's Rho as a suitable correlation coefficient, since the subjective performance assessment is measured on an ordinal scale. In addition, the objective measures were all skewed, with heavy right tails. While such a distribution is common for these variables, it would negatively affect the size of Pearson's

r. The last coefficient considered, Kendall's Tau-c, is more conservative, and is therefore recommended as a choice in comparison with Spearman's Rho. However, no study that has been reviewed has relied on this coefficient. Therefore, we report both coefficients but only refer to Spearman's Rho.

The population consisted of companies based in the Czech Republic. The data was gathered using questionnaires; the financial (objective) data was from the MagnusWeb database provided by Bisnode. We obtained 278 responses, of which 11 were ruled out as being from subdivisions. From the remainder, only 176 had financial statements available, and we were able to compute the necessary financial ratios for 141 companies. These companies are from all of the economic sectors, with secondary and tertiary sectors being represented almost equally, while the primary sector was only represented by two companies. The companies were of all sizes, with a median size of 60 employees. A quarter of the sample consisted of branches of multinational companies.

3 Results

Table 1 shows the descriptive statistics of the variables which were subjectively evaluated by the managers (in relation to the competition) and then the variables computed from the accounting data (either absolute or relative).

Table 1 Basic descriptive research statistics; source: own processing

		Total $sales_k$	Total $costs_k$	Profitability$_k$	Total sales	Total costs	ROA	ROE	ROS1	ROS2
N	Valid	354	353	349	142	165	165	140	140	142
	Missing	2	3	7	214	191	191	216	216	214
Mean		4,36	3,95	4,25	918932,54	860940,75	0,0721	0,1374	0,0241	0,0407
Median		4,00	4,00	4,00	125233,00	112295,50	0,0516	0,1170	0,0332	0,0419
Mode		4	4	4	0	-10[a]	0,0000	0,0000	-2,2140[a]	-2,2140[a]
Std. Deviation		1,185	1,047	1,183	2706484,42	2591299,00	0,2252	1,0621	0,2106	0,2173
Variance		1,404	1,097	1,400	7325,06 mld.	6714,8 mld.	0,051	1,128	0,044	0,047
Skewness		-0,087	-0,038	-0,315	5,576	5,754	-3,838	3,954	-8,788	-8,128
Std. Error of Skewness		0,130	0,130	0,131	0,203	0,203	0,189	0,189	0,205	0,205
Kurtosis		0,147	0,505	0,251	35,279	37,166	34,273	48,432	93,029	84,340
Std. Error of Kurtosis		0,259	0,259	0,260	0,404	0,404	0,376	0,376	0,407	0,407
Minimum		1	1	1	0	-10	-1,8631	-3,6150	-2,2140	-2,2140
Maximum		7	7	7	21256618	20266915	0,7955	10,0000	0,2821	0,3475

a - Multiple modes exist. The smallest value is shown

Correlations were used to compare the indicators $Sales_k$ and Overall Revenue, $Costs_k$ and Overall Costs and Profitability$_k$ and (sequentially) ROA, ROE, ROS1 and ROS2. The relationships between the variables are shown in Table 2. The only statistically insignificant relationship was the one between the subjectively and objectively evaluated costs ($Costs_k$ and Overall Costs). The statistically significant correlations are moderate , with the strongest correlation (r_s = 0.29) between the subjectively evaluated profitability and ROA. However, the explanatory power of the estimated relationships is weak; even in the best case the subjectively perceived profitability explains the variability of the objectively measured ROA only from 8.41%

Table 2 Correlation of relationships of the variables (in relation to the competition); source: own processing

		Value	Asymptotic Standard Error[a]	Approximate T[b]	Approximate Significance
Sales$_k$ x Total sales					
Ordinal by	Kendall's tau-c	0,105	0,063	1,662	0,097
Ordinal	Spearman Correlation	0,140	0,084	1,666	0,098[c]
No. of Valid Cases		141			
Profitability$_k$ x ROE					
Ordinal by	Kendall's tau-c	0,153	0,070	2,188	0,029
Ordinal	Spearman Correlation	0,200	0,090	2,388	0,018[c]
No. of Valid Cases		139			
Profitability$_k$ x ROA					
Ordinal by	Kendall's tau-c	0,220	0,064	3,447	0,001
Ordinal	Spearman Correlation	0,292	0,082	3,572	0,000[c]
No. of Valid Cases		139			
Profitability$_k$ x ROS1					
Ordinal by	Kendall's tau-c	0,186	0,063	2,948	0,003
Ordinal	Spearman Correlation	0,249	0,083	3,000	0,003[c]
No. of Valid Cases		138			
Profitability$_k$ x ROS2					
Ordinal by	Kendall's tau-c	0,191	0,063	3,041	0,002
Ordinal	Spearman Correlation	0,257	0,083	3,102	0,002[c]
No. of Valid Cases		138			
Costs$_k$ x Total costs					
Ordinal by	Kendall's tau-c	0,010	0,066	0,143	0,886
Ordinal	Spearman Correlation	0,013	0,088	0,149	0,882[c]
No. of Valid Cases		140			

a - Not assuming the null hypothesis.
b - Using the asymptotic standard error assuming the null hypothesis.
c - Based on normal approximation.

Based on the results, it is necessary to reject hypothesis H2. However, hypotheses H1 and H3 (H3a, b, c, d) can be considered formally statistically confirmed.

Table 3 Correlation of the relationships of the variables (in relation to the previous period); source: own processing

		r_s	Asymptotic Standard Error	Approximate T	Significance
Sales$_h$ x Total sales	Spearman Correlation	0,108	0,087	1,279	0,203
Costs$_h$ x Total costs	Spearman Correlation	0,088	0,087	1,037	0,301
Profitability$_k$ x ROE	Spearman Correlation	0,056	0,086	0,661	0,510
Profitability$_k$ x ROA	Spearman Correlation	-0,014	0,088	-0,161	0,873
Profitability$_k$ x ROS1	Spearman Correlation	-0,036	0,085	-0,427	0,670
Porfitability$_k$ x ROS2	Spearman Correlation	-0,024	0,085	-0,284	0,777

Subsequently correlations were used to test the relationships between indicators which had been subjectively evaluated by the managers (in comparison to the results from the previous year) and the indicators computed from the accounting data. The particular relationships tested were between the variables $Sales_h$ and Overall Revenue, $Costs_h$ and Overall Costs, and $Profitability_h$ and (sequentially) ROA, ROE, ROS1 and ROS2. The results showed no statistically significant relationship. The results are summarized in Table 3. Based on the results it is necessary to reject hypotheses H4 to H6 (H6a, b, c, d).

4 Discussion

From the results, it is clear that the correlation of the subjectively and objectively determined variables is moderate. Dawes (1999) arrived at similar results and reported statistically significant results for objectively measured ROI and subjectively perceived performance, although considerably stronger than we achieved: $r = 0.5$ for the current year and $r = 0.48$ for the previous period. Wall et al. (2004) found a higher correlation between the objective and subjective evaluation in the case of assessing past performance ($r = 0.42$) than in the case of assessing current performance ($r = 0.40$), although the difference is negligible. Šiška (2014) looked at a similar situation in the Czech Republic and found that managers of Czech firms perceived the strategic position of their company differently than had been determined through objective indicators (ROS and assets turnover).

The highest correlation for the relationships we examined was for profitability and ROA, which suggests that managers have the greatest awareness about the company's profitability. However, the explanatory power of the estimated relationships is weak (including the relationship between subjectively evaluated profitability and ROA, $r_s = 0.29$), which suggests that managers are not accurate enough in their perception of these concepts, or that the performance they perceive does not reflect the performance shown by the accounting data.

The research shows that managers are better at estimating the company´s performance compared to their competition than compared to the previous year. While at least a weak correlation was found between the subjectively evaluated measures compared to the competition and accounting based indicators, no statistically significant correlation was found between the same accounting-based indicators and subjectively evaluated measures compared to the previous year.

However, for the sake of completeness it is necessary to state that the variables obtained from the financial statements (MagnusWeb database) were calculated for the last known accounting period, therefore the development over time was not taken into account. This means that it is not strictly correct to compare accounting-based variables which have been calculated in such a way with subjectively evaluated performance relating to the managers for the previous year.

5 Conclusion

The research results suggest that the relationship between the subjective and objective evaluation of financial performance is weak. As a result of the confirmation of hypotheses H1 and H3 it is possible to state that this evaluation only matches in the case of sales and profitability, whether the profitability is understood as the return on equity, assets or sales. However, it is only possible to find this relationship for the subjective evaluation of performance in comparison to the competition. For the subjective

evaluation of performance in comparison to the previous period, no relationship was found between the subjective and objective evaluation of financial performance.

The results indicate that managers have a good understanding of their sales and profitability and also of the sales and profitability of their competition. This suggests that managers have a good understanding of financial performance in the current period (of time) within the market (sector). However, it appears that they fail to assess the development of the company's financial performance over time as well as when evaluating costs (and not only within the development of the company, but also in comparison to the competition, sector and market).

Based on our evidence, we cannot claim that subjectively evaluated financial performance matches the objectively computed financial performance, i.e. that the company manager's view of the financial performance offers a precise view of the company's financial performance. For managers this means that their ideas about the company's financial performance might be distorted. For precise information about a company in question it is necessary to carry out objective measurements based on accounting data.

Some of the limitations in this research include the imprecise specification of the accounting data and the variables constructed from it in order to compare them with the subjective values of the managers' comparable variables. For future research it would be useful to determine the change in the variables constructed from the accounting data over time, and then to compare these variables with the managers' subjective evaluations (related to the previous period). At the same time, it would be appropriate to relate the accounting variables from the respective year to the sector average and then relate these adjusted variables to the managers' subjective evaluations (taking into account the competition). Specifying more precisely the accounting variables should lead to more precisely determined relationships, as well as increasing the statistical significance and the strength of the relationships.

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References

Chia, A., Goh, M., Hum, S. H. (2009) "Performance measurement in supply chain entities: balanced scorecard perspective", *Benchmarking: An International Journal*, Vol. 16, No. 5, pp. 605–620.

Chiou, J. S., Droge, C. (2015) "The effects of standardization and trust on franchisee's performance and satisfaction: a study on franchise systems in the growth stage", *Journal of Small Business Management*, Vol. 53, No. 1, pp. 129–144.

Dawes, J. (1999) "The relationship between subjective and objective company performance measures in market orientation research: further empirical evidence", *Marketing Bulletin-Department of Marketing Massey University*, Vol. 10, pp. 65–75.

Delgado-García, J. B., Rodríguez-Escudero, A. I., Martín-Cruz, N. (2012) "Influence of affective traits on entrepreneur's goals and satisfaction", *Journal of Small Business Management*, Vol. 50, No. 3, pp. 408–428.

Deng, S., Dart, J. (1994) "Measuring market orientation: a multi-factor, multi-item approach", *Journal of marketing management*, Vol. 10, No. 8, pp. 725–742.

Deshpandé, R., Farley, J. U., Webster Jr, F. E. (1993) "Corporate culture, customer orientation, and innovativeness in Japanese firms: a quadrad analysis", *The Journal of Marketing*, Vol. 57, No. 1, pp. 23–37.

Dess, G. G., Robinson Jr, R. B. (1984) "Measuring organizational performance in the absence of objective measures: the case of the privately-held firm and conglomerate business unit", *Strategic management journal*, Vol. 5, No. 3, pp. 265–273.

Drucker, P. F. (1992) "*Managing the Non-Profit Organization: Principles and Practices."* New York: Collins.

Gunasekaran, A., Williams, H. J., McGaughey, R. E. (2005) "Performance measurement and costing system in new enterprise", *Technovation*, Vol. 25, No. 5, pp. 523–533.

Gupta, M., Galloway, K. (2003) "Activity-based costing/management and its implications for operations management", *Technovation*, Vol. 23, No. 2, pp. 131–138.

Hindls, R., Holman, R., Hronová, S. (2003) "*Ekonomický slovník - 1. vyd."* C. H. Beck, Praha, Czech Republic.

Ittner, C. D., Larcker, D. F. (1998) "Innovations in performance measurement: Trends and research implications", *Journal of Management Accounting Research*, Vol. 10, pp. 205–238.

Narver, J. C., Slater, S. F. (1990) "The effect of a market orientation on business profitability", *The Journal of Marketing*, Vol. 54, No. 4, pp. 20–35.

Schumm, W. R., Pratt, K. K., Hartenstein, J. L., Jenkins, B. A., Johnson, G. A. (2013) "Determining statistical significance (alpha) and reporting statistical trends: Controversies, issues, and facts", *Comprehensive Psychology*, Vol. 2, pp. 1–6.

Sinclair, D., Zairi, M. (1995) "Performance measurement as an obstacle to TQM", *The TQM Magazine*, Vol. 7, No. 2, pp. 42–45.

Šiška, L. (2014) "Perceived versus Financially Measured Strategic Position of a Company", *Change Management*, Vol. 13, No. 3, pp. 11–21.

Tosi, H. L., Werner, S., Katz, J. P., Gomez-Mejia, L. R. (2000) "How much does performance matter? A meta-analysis of CEO pay studies", *Journal of Management*, Vol. 26, No. 2, pp. 301–339.

Tunji-Olayeni, P. F., Mosaku, T. O., Fagbenle, O. I., Amusan, L. M., Omuh, I. O., Joshua, O. (2014) "*Evaluating Construction Project Performance: A Case of Construction SMEs in Lagos"*, Nigeria.

Wall, T. D., Michie, J., Patterson, M., Wood, S. J., Sheehan, M., Clegg, C. W., West, M. (2004) "On the validity of subjective measures of company performance", *Personnel psychology*, Vol. 57, No. 1, pp. 95–118.

Environmental factor of metal waste recycling and its influence on macro environment

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Abstract

In the context of economic changes is to highlight the demand for new, alternative ways of recycling materials. Also currently rising raw material prices and demand for cheaper raw materials that could suitably replace the existing one. One area of current interest is waste management. Especially in our region is the issue of recycling and reuse of waste materials economically very relevant with regard to the industrial character of the region, a high proportion of old environmental burdens and very promising economic prospects treatment of certain wastes. Basic approaches to solving it is necessary to focus on the complexity of processing different types of waste. Usually, the first sets limits for the energy, and the material page. Followed by adjustment of the input when the waste separation process categorizes the part of recyclable and non-recyclable portion, which can be processed biological and thermal treatment. Environmentally can handle only a fraction of the waste. Therefore, efforts orient mainly on modern trends using plasma technology to treat waste or unusable, including municipal waste.

Keywords: recycling; metal waste; aluminium cans; economic recovery.

JEL Classification: L61, P23, Q56

Article Classification: Research article

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1 Introduction

Metals and metal alloys are valuable structural materials which unique feature is the possibility of unrestricted processing. Recycling of different type of metals from waste provides tangible economic and ecological benefits. It increases the country's raw material independence, contributes to the growth of jobs in purchasing or waste collective points and processing of this metal waste.

Aluminium is one of the most commonly recycled metals. Aluminium is the third most abundant chemical element on the earth crust (around 8%) and the second most commonly used metal in the world, owing its physical and mechanical properties such as light weight, corrosion resistance, manufacturability, non-toxicity and heat conductivity. This is one of the raw materials that can be practically continuously recycled. By appropriate sorting of the aluminium scraps, it is possible to produce the same products that were made earlier.

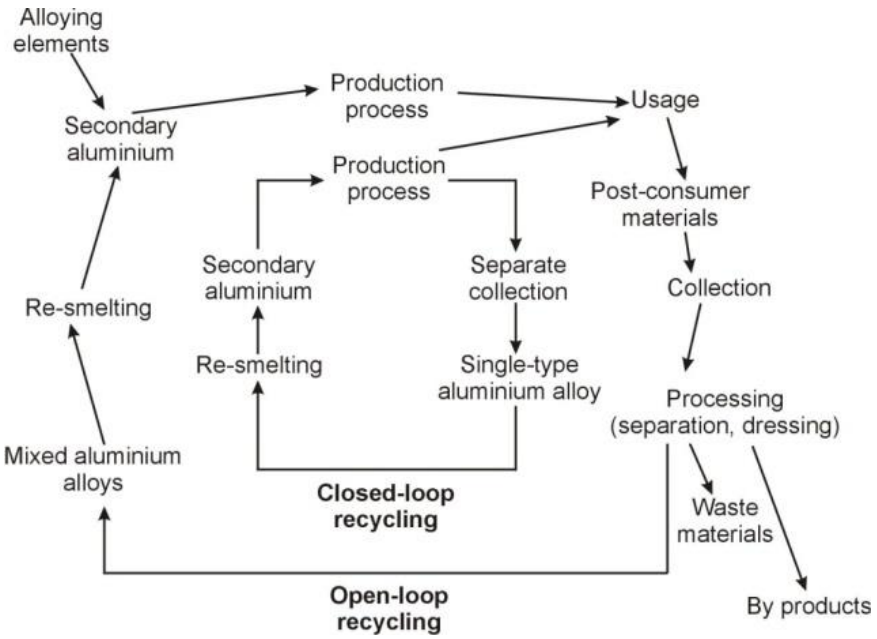

Figure 1 Recycling loop for the aluminium; source: modified by (Kamberović et al., 2009)

The recycling loop for the aluminium is shown in Figure 1. The closed-loop applies to production of scraps that has only to be re-smelted and can be reused directly for the original purpose. Also, the closed-loop recycling is to be considered for aluminium applications that can easily be collected separately and therefore be reused for the same application again, e.g. aluminium beverage cans. The open-loop applies to most of the mixed aluminium scrap recycled from usage.

The aluminium beverage can is one of the most successful industrial inventions of the twentieth century. Currently, each year 300 billion aluminium cans are sold worldwide, including 80 billion in Europe and 100 billion in the USA. Only in Czech Republic 3 billion cans are sold annually. It should be emphasized that canned beverages are especially popular among young people.

After the beverage is consumed, the aluminium can becomes the waste that can be recycled and reused for the production of a new aluminium can or other aluminium product. It is estimated that such can returns to the shops after about 60 days.

The development of non-ferrous metals recycling, including aluminium, in Czech Republic is unavoidable, which is affected by: rising prices of natural resources, the

world's resources are declining, the growing industries and the need to protect the environment.

The recycling and re-production of the aluminium beverage is progressive and the most important stage of these process is the selective collection of used packaging. But to make such collection, people have to understand the need to select individual waste. It is therefore necessary to change the attitudes of consumers through appropriate environmental education and various promotional campaigns related to the collection of aluminium beverage cans and other types of waste organized by ecological organizations or various enterprises.

For example the enterprise Coca-Cola Company declares that its aluminium beverage cans and glass bottles consist of up to 60% recycled materials. On the enterprise's website people can find information that the enterprise participates in the process of creating a selective waste collection infrastructure and encourages consumers to separate waste by promoting recycling.

The aim of the paper was to present the problem of recycling of aluminium cans in Czech Republic. In the paper ecological aspects of aluminium recycling and process of recycling itself were presented. Characteristics of the aluminium beverage can was presented, its recycling was described, but also the newest statistics on its recovery in Czech Republic were shown.

2 Ecological aspect of aluminium recycling

As there is an increased use in recycled aluminium in many different kinds of application, the aluminium is also known as the “green” metal. Aluminium cans, foil, plates, window frames, furniture, automotive components are melted down and use to make similar products again. Recycling of an essential part of the aluminium industry has many economical, technical and ecological benefits. One tone of recycled aluminium cans will make one tone of new aluminium; there is no waste material.

Aluminium remains essentially unchanged, no matter how many times it is processed and used. Therefore, it can be considered as a material with permanent characteristics, one that is not consumed, but used over and over again, without the loss of its essential properties. What is more, the unique combination of properties of aluminium makes its recycling effective, which has the results in the high levels of recycling rates, amounting to 90-95% in case of the transportation and building applications, or about 65% in case of the aluminium cans.

Secondary aluminium requires only 5% of the energy consumed in case of the primary metal production, including storage, transport, etc.. Production process of the secondary aluminium reduces the emission of CO2 into the atmosphere. It also saves 97% of the greenhouse gas (GHG) emissions and reduces landfill space requirements. Encroachments in the landscape related to bauxite mining and refining are avoided. 75% of all the aluminium ever used, equivalent to 540 million tonnes, is still in use today. Moreover, secondary aluminium production requires only 10% of the capital cost needed for the production of primary aluminium, to a certain extent owing to a simpler supply chain.

20 years ago, the level of recovery of aluminium cans in Czech Republic was only 2%. 10 years ago it was already 50% to reach 79% in 2013. 20 aluminium cans could be recycled with the same amount of energy as it takes to make one new can from raw materials. Each aluminium can may be recycled and turned into a new can within 60 days and be sold on the store shelves again.

There are two other elements which, from the ecological point of view, can decide that it is good to recycle aluminium waste. First concept is the sustainable development of the Earth which is a development that meets the basic needs of all human beings and which conserve, protect and restore the health and integrity of the Earth's ecosystem, without compromising the ability of future generations to meet their own needs and without going over the limits of long term capacity of the earth`s ecosystem. Second concept, i.e. scarcity, can be defined as the fundamental economic problem of having seemingly unlimited human wants in a world of limited resources. It states that society has insufficient productive resources to fulfil all human wants and needs. Recycling aluminium allows to reduce the use of primary aluminium, and thus to leave a part of the aluminium ore to the future generations.

3 Aluminium recycling

On average, almost 60% of post-depreciation aluminium waste is recycled. In case of the automotive waste approx. 95% of the contained aluminium is recycled. Recovery in construction industry reaches almost 85%. The lowest recycling rates are noted for the packaging industry - about 30% (65% of aluminium cans).

The essential feature of the secondary aluminium production is the variety of aluminium waste, raw materials and the variety of furnaces used in this process. The size of the scrap, its oxide content and the degree of its contamination are used to select the best type of furnace. These factors also affect the choice of fluxes associated with the process, to maximize the recovery of aluminium. Selection of processing technology differs depending on the used installation. The general process of producing secondary aluminium is shown in Figure 2.

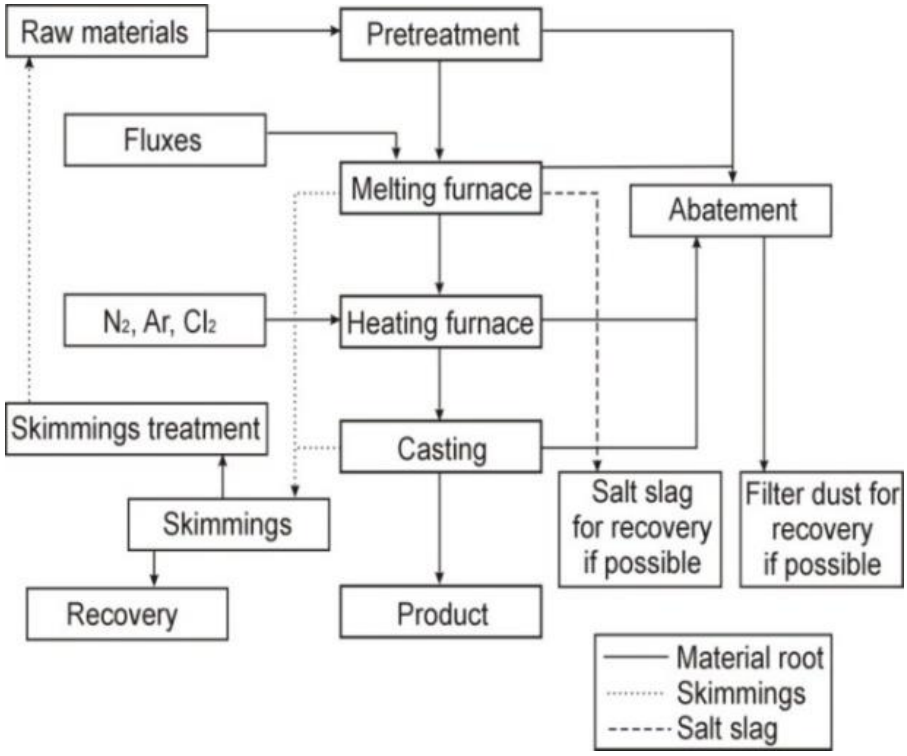

Figure 2 Generic secondary aluminium production process; source: modified by (Best Available Techniques (BAT) 2012)

It should be remembered that during such process the appropriate production factors (inputs) are consumed and, as a result of the process itself, in addition to the secondary aluminium, other product appear (outputs). Input and potential outputs of this process are presented in Figure 3.

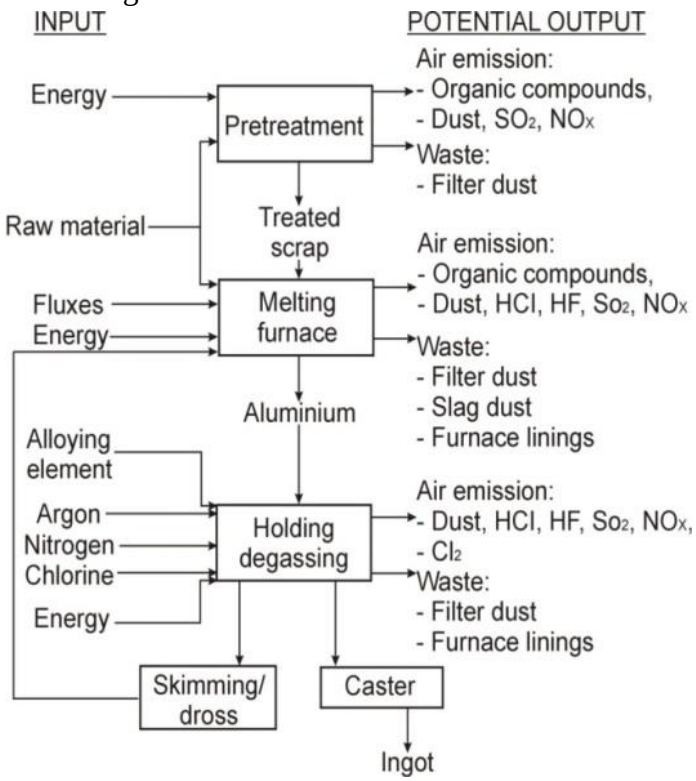

Figure 3 Input and output from secondary aluminium production; source: modified by (Best Available Techniques (BAT) 2012)

4 Aluminium beverage can - characteristics

An aluminium can is a packaging used primarily in the food industry, mainly for storing beer and cooling beverages. Such can has many advantages. it is very light, easy to transport and store (does not break). It fills the space"very well; its content occupies about 90% of the storage space. A truck loaded with aluminium beverage cans transports on average twice as much fluid as the truck with beverage bottles. Following this path, the aluminium beverage can guarantees that the road traffic is smaller, which in turn contributes indirectly to environmental protection. What is more, the amount of CO2 emitted during transport is on average 57% smaller than in the case of transportation of glass or PET packaging, which was proven in the model calculations on the transport of beverages in containers presented in paper. In addition, the aluminium beverage can allows for quick cooling of beverages, thus saving energy also in other areas. It is visually attractive and easy to print without the need for labels. From the point of view of environmental protection, as already mentioned, it is recyclable, entirely suitable for recovery.

The aluminium beverage can is one of the favourite drinks' packaging, especially among young people. Its history is very long. It was founded in the thirties in the United States. Gottfried Krueger, the brewer of German origin, was the first to test American Can Co. cans on his product. After minor modifications, American Can Co. patented the beer bottling line called Keglined and in since 1935 Krueger's Cream Ale and Krueger's Fines Beer from the Gottfried Krueger Brewing Company in Newark have been for sale.

The can's formula, which is now known to everyone, with a pin (called key) and the notch on the cap which facilitate its opening, was patented in 1959 by Ermal Cleon Fraze in the US Patent Office. In the following years the can was still being improved.

In Czech Republic officially the first canned beer appeared on the market in 1995 thanks to the enterprise Ball Beverage Packaging Czech Republic s.r.o., which packed beer.

It should be emphasized that the aluminium beverage cans are the fastest changing packaging. For the average user these changes are unnoticeable, but the production technology and appearance change at a dizzying pace.

The first produced beverage can weighed more than 80 grams, now 330 millimetres can weighs 21 grams and 330 millimetres aluminium beverage can has only 10 grams - 50% and 40% of the initial weight. In addition, it is possible to produce beverage cans with a wall thickness of 0.097 mm, so such can wall is as thin as the human hair. The can cover also gets lighter: with a new generation of cans, which has been on the market since 2009, the material savings are 10% compared to standard solutions. The aluminium cans are one of the lightest packaging for beverages and are in some cases even lighter than plastic bottles.

There are two types of materials used in the production process of aluminium beverage cans. These are direct materials, i.e. aluminium (roll-on tape), backing primer, printing and decorating ink, and also indirect materials such as: lubricating oils and lubricants for machine maintenance, coolants and cleaning chemicals, forms and printing plates and packaging materials (pallets, spacers, straps).

Nowadays, there is only one enterpris in Czech Republic which produce the aluminium beverage cans. The enterpris is following: Ball Beverage Packaging Czech Republic s.r.o.. They produce packaging in continuous system of work. The production capacity of the three plants is about 600 million pieces of aluminium cans per year. In these enterpris the production lines were designed and manufactured according to proven world patterns. Figure 4 shows the production of the aluminium beverage cans line in the form of a diagram.

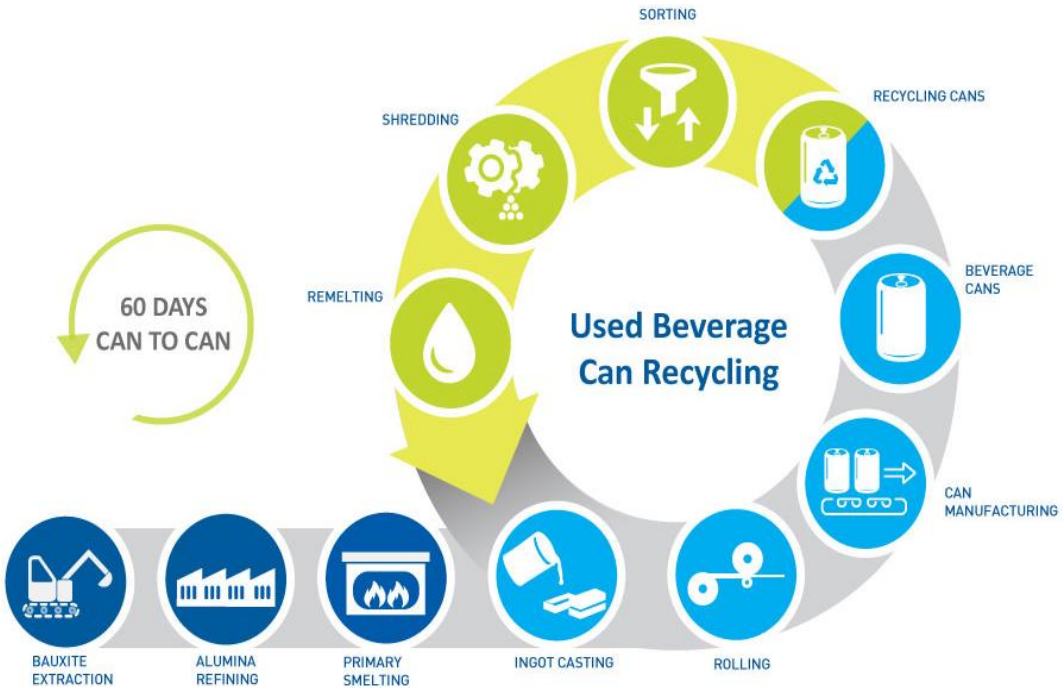

Figure 4 The aluminium beverage cans manufacturing diagram; source: modified by (Farner, 2000)

5 Recycling of aluminium beverage can

There are many additional benefits associated with the recycling of aluminium beverage cans. The aluminium can is very popular packaging among young people, which is why it is a good pretext for ecological education such as waste segregation. Its recycling also saves natural resources. As already mentioned, the use of 1 tonne of recycled aluminium saves 4 tons of bauxite and 700 kg of oil.

The domestic market of used aluminium beverage cans in Czech Republic has been established on the basis of existing operators dealing with scrap trade (collective points). At the same time, existing and ongoing waste sorting plants contribute to the acquisition of this valuable raw material. Simultaneously, many selective collection programs in municipalities activate their communities, contributing to greater interest in sorting waste in households.

The recycling of the aluminium beverages cans starts at the waste collective points. Cans are checked with use of a magnet to separate them from those made of steel. Aluminium can scraps are also cleaned from different type of waste. Often the aluminium can scraps are again cleaned on special sieve to remove smaller contaminants from inside (e.g. sand). Then all checked aluminium scraps are briquetted and in such form go to mills and foundries.

Figure 5 Recycling process of the aluminium can; source: modified by (Farner, 2000)

The majority of used Czech aluminium beverage cans are exported abroad. This is because, on the one hand, the favourable price offered by Western European buyers, and on the other hand, the functioning of specialized enterprises for the recycling of used cans. In Czech Republic such closed circulation (recycling loop) of cans will be possible when their consumption increases even further. Currently the aluminium can scraps are melted together with other aluminium scraps. However, the preparation to launch the first

line which can process the aluminium beverage cans, is already underway. The full recycling of the aluminium beverage cans in schematic form is shown in Figure 5.

It should be emphasized that every kind of aluminium can may be recycled and converted into new one within 60 days and resold on store shelves.

Aluminium cans are technologically difficult to be recoverrd, among others things because the aluminium sheet used during their production is very thin. The aluminium beverage can processing is possible only in a few metallurgical furnaces in Europe.

It should be remembered that aluminium remains substantially unchanged regardless of the number of times it is processed and used. Therefore, it can be considered as a solid material that is not consumed but recycled without losing its essential properties.

6 Statistics about recycling of aluminium beverage can in Czech Republic

Aluminium beverage can is the packaging that is recycled the most often among other types of packaging. In recent years, the level of aluminium beverage can recycling in Czech Republic has exceeded the European average of 68%, which means that Czech Republic is one of the European leaders in this field. Figure 6 shows how the aluminium beverage can recovery has changed over the last two decades. In 1995 this recovery was only 2%. However, its rapid growth took place, leading to a recovery of 80% in 2014 and beyond.

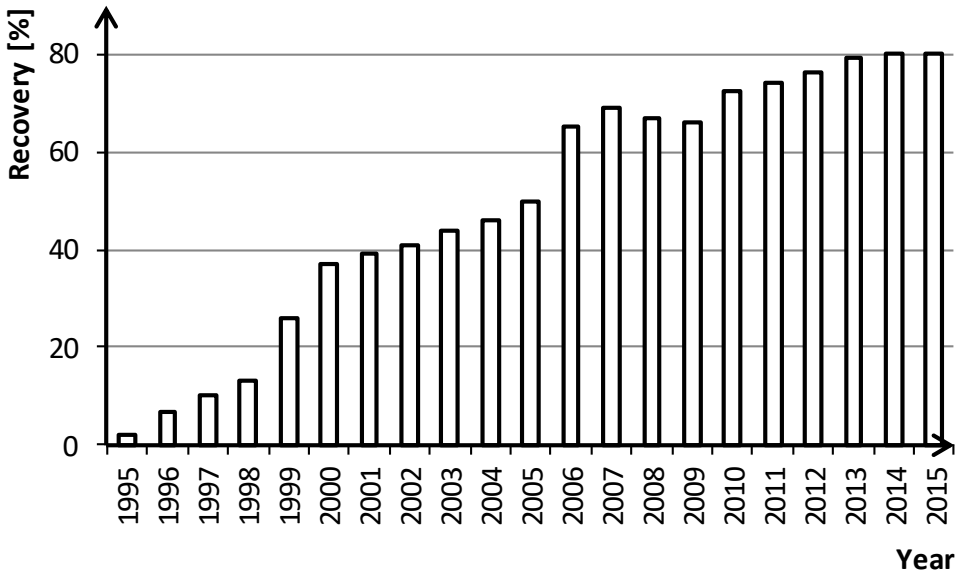

Figure 6 Recycling process of the aluminium can; source: modified by (Farner, 2000)

The segregation of aluminium beverage cans and other waste was enforced in Czech Republic by Czech and European law. Residents pay less for the disposal of municipal waste in case of sorted waste, so they are more willing to segregate all of their waste.

People often segregate aluminium beverage cans, leaving them near waste containers, throwing them close to mixed garbage containers or throwing them to the appropriate containers for segregated waste. If it comes to containers for segregated waste, the used aluminium beverage cans should be thrown into yellow containers that are marked as containers for plastic. But they are not always properly marked and often

people do not know which container to choose. That is why they leave segregated waste near containers or thrown them close to mixed garbage containers.

In Czech Republic there is a very interesting phenomenon related to the segregation and recovery of aluminium beverage cans and other metal waste. These cans are sorted and taken by people who collect scrap and give them to the waste collective points. These are mostly people who have financial problems, most of them do not work, unemployed, for who the collection of scrap, including aluminium scrap, is one of the main sources of income.

7 Discussion

Aluminium is a material with very wide application possibilities, especially considering its physical characteristics and material characteristics. It is used, among others, in the food industry to produce beverage cans. This is a material that can be recycled repeatedly, moreover it is often said that it is treated as a material of infinite vitality.

The rapid rise in popularity of aluminium means that the annual volume of its production turns out to be higher than the production of all other non-ferrous metals together. It should be kept in mind that this is a metal that for industrial use was discovered only at the end of the 19th century. Since then, it is gaining momentum, especially in the construction and automotive sectors. Although demand for this material is steadily increasing, there is no danger that its resources will soon end because it is easily to be recycled.

Recycling of non-ferrous metals in Czech Republic, also recycling of aluminium, is unavoidable, which is influenced by: increasing prices of natural raw materials, which the world's resources are decreasing, the growing industries of many branches and the need to protect the environment. Processing of aluminium waste and its alloys is increasingly common practice observed on domestic and foreign raw materials markets.

Many people decide to buy drinks in aluminium cans and a large percentage do it very often. They think that such cans are lighter than glass containers, they do not break, they are easier to be packed into their bags and to be taken to school or work.

Aluminium canned drinks are very popular among young people who also, thanks to appropriate environmental education, are more likely to care for the environment, and thus to sort cans and drop them into suitable containers.

In Czech Republic, as in other European Union countries, there has been an increase in recycling of aluminium beverage cans. What is more, statistics show that the recovery is higher than the European average. This may be due to changes in Czech regulations on waste management. People prefer to segregate waste, including used aluminium beverage cans, to pay less for the disposal of municipal waste and thereby to reduce the cost of their household. But it is also the fashion for life in a clean environment and in taking care of the environment.

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References

Act on waste electrical and electronic equipment (OJ. 2005, No 180, item 1495).

Act of 14th December 2012 on waste is in force (2013) *"Zákon o odpadech. MŽP"*, Available at: https://www.mzp.cz/www/platnalegislativa.nsf/d79c09c54250df0dc1256e8900296e32/8fc3e5c15334ab9dc125727b00339581?OpenDocument.

Ari, V. (2016) "A review of technology of metal recovery from electronic waste", Chapter 6, In: *E-Waste in Transition - From Pollution to Resource*.

Begg D., Fischer S., Dornbusch R. (2007) *"Mikroekonomia"*, PWE, Warszawa, Poland.

Best Available Techniques (BAT) (2012) *"Reference Document for the Non-Ferrous Metals Industries"*, Institute for Prospective Technological Studies Sustainable Production and Consumption Unit European IPPC Bureau.

Błachowicz K. (2015) *"Polska wśród liderów recyklingu aluminium w Europie",* Available at: http://portalkomunalny.pl/polska-wsrod-liderow-recyklingu-aluminium-w-europie-324124/ (date of access: 2015-02-17).

Bonderek Z., Smorawiński Z. (2004) "Recykling lakierowanych aluminiowych odpadów opakowań po napojach", *Archiwum Odlewnictwa*. Vol. 4, No. 13, pp. 25–32.

Brožová, S., Drápala, J., Kursa, M., Pustějovská, P., Jursová, S. (2016) "Leaching refuse after sphalerite mineral for extraction zinc and cobalt", *Metalurgija.* Vol. 55, No. 3, pp. 497–499.

Brožová, S., Ingaldi, M., Šperlín, I. (2013) "Economical aspects of high-temperature heating utilization for industrial waste treatment", In: *METAL 2013 - 22nd International Conference on Metallurgy and Materials, Conference Proceeding, Brno,* Czech Republic,

Brožová, S. (2013) "Possibility of using pyrolysis and plasma during disposal of plastic parts of electric waste", In: *International Multidisciplinary Scientific GeoConference Surveying Geology and Mining Ecology Management, 2013, SGEM, Albena,* Bulgaria.

Buffington J. (2012) "The Beverage Can in the United States: Achieving a 100% Recycled Aluminum Can through Supply Chain Innovation", *JOM Journal of The Minerals, Metals and Materials Society.* Vol. 64, No. 8, pp. 923–932.

Castro, L., A., Martins, A., H. (2009) "Recovery of tin and copper by recycling of printed circuit boards from obsolete computers", *Brazilian Journal of Chemical Engineering,* Vol. 26, pp 649–657.

Cui, H., Anderson, C., G. (2016). "Literature Review of Hydrometallurgical Recycling of Printed Circuit Boards (PCBs)", *Journal of Advanced Chemical Engineering*, Vol. 6, pp 1-11, 2016.

Dobrowolski D. (2006) "10 lat aluminiowych puszek w Polsce", *Opakowanie.* Vol. 51, No. 4, pp. 24–25.

Dvorsky, R., Slíva, A., Luňáček, J., Pikšová, K. (2010) "Preparation of silicon nanoparticles by means of disintegration in a cavitation water jet", In: *2nd NANOCON International Conference. Olomouc:* TANGER, Czech Republic.

Farner S. (2000) *"Remelting of aluminium by continuous submerision of rolled scrap",* Department of Materials Technology and Electrochemistry Norwegian University of Science and Technology IME, rapport: 24.

Fundacja na Rzecz Odzysku Opakowań Aluminiowych RECAL (2017) Available at: http://www.recal.org.pl/

Hoberg H., Wolf S. (2015) *"Recycling of aluminium and the effect on sustainable development",* Chair for Mineral Processing. Beneficiation and Waste Treatment, RWTH Aachen, Internim Report.

Ingaldi M. (2017) "Recycling and segregation of used aluminium beverage cans according to the residents of Silesia voivodship", *Production Engineering Archives,* Vol. 16, pp. 7–11,

International Aluminium Institute (IAI) (2017) Available at: http://www.world-aluminium.org/Statistics/Historical+statistics

Jakubiak, M., Grzesik, K. (2014) "Recycling of end-of-life vehicles. Regulations, technology and practice", *Logistyka.* Vol. 4, pp. 4339–4347.

Jasica, G., Heinrich, M. (2012) "Kształtowanie jakości wyrobu w procesie produkcyjnym", Problemy Eksploatacji. Vol. 2012, No 2, pp.79–91.

Jonšta, P., Váňová, P., Brožová, S., Pustějovská, P. (2016) "Hydrogen embrittlement of welded joint made of supermartensitic stainless steel in environment containing sulfane", *Archives of Metallurgy and Materials.* Vol. 61, No. 2A, pp. 709–711.

Kamberović Ž., Romhanji E., Filipović M., Korać M. (2009) "The recycling of high magnesium aluminium alloy sestimation of the most reliable procedure", *Metalurgija.* Vol. 153, pp. 189–200.

Kardas, E., Brožová, S., Pustějovská, P. (2017) "The evaluation of efficiency of the use of machine working time in the industrial company - case study", *Management systems in production engineering.* Vol. 25, No. 4, pp. 241–245.

Kardas, E., Brožová, S. (2013) "Situation in waste treatment in Poland", In: *METAL 2013 - 22nd International Conference on Metallurgy and Materials, Conference Proceedings 2013, Brno,* Czech Republic.

Mingqian B. (2006) *"Analysis of the Recycling Method for Aluminum Soda Cans",* Bachelor dissertation. University of Southern Queensland, Faculty of Engineering and Surveying.

Moryson G. (2009) "Ocena klasyfikacji odpadów aluminium i jego stopów", *Archiwum Technologii Maszyn i Automatyzacji.* Vol. 29, No. 3, pp. 59–72.

OECD Environment Directorate, Materials case Study 2: Aluminium, (2010) Available at: http://www.oecd.org/dataoecd/52/42/46194971.pdf

Oujezdský, A., Slíva, A., Brázda, R. (2015) "Using ICT in education: measuring systems interfaced to computers", In: *9th International technology, education and development conference. Madrid: INTED Proceedings, 2015*.

Pikoń K., Pompa Ł. (2010) "Uciążliwość ekologiczna recyklingu opakowań aluminiowych". *Archives of Waste Management and Environmental Protection,* Vol. 12, No. 1, pp. 1–14.

Radziewicz J. (2010) *"Problems of waste management in Poland, Agricultural Electronic Warehouse, No 42 Ecology and Environment"*, Available at: http://rme.cbr.net.pl/index.php/archiwum-rme/13-nr-42/ekologia-i-srodowisko/12-problemy-gospodarki-odpadami-w-polsce

Stulgis G. (2013) "Recykling aluminium – ogniwo gospodarki", *Recykling Odpadów.* Vol. 150, No. 6, pp. 22–24.

Slíva, A., Samolejová, A., Brázda, R., Zegzulka, J., Polák, J. (2003) "Optical parameter adjustment for silica nano and micro-particle size distribution measurement using mastersizer 2000" *MICROWAVE AND OPTICAL TECHNOLOGY, 2003*, Vol. 5445, pp. 160–163.

Slíva, A., Brázda, R., Procházka, A., Martýnková, G., S., Barabászová, K., C. (2019) "Study of the optimum arrangement of spherical particles in containers having different cross section shapes", *Journal of nanoscience and nanotechnology*. Vol 19, No. 5, pp. 2717–2722.

Slíva, A., Brázda, R., Procházka, A., Martýnková, G., S., Barabászová, K., C. (2019). "Investigation of geometric properties of modified titanium white by fluidisation for use in the process of transport, handling, processing and storage", *Journal of nanoscience and nanotechnology,* Vol. 19, No. 5, pp. 2997–3001.

Statistical yearbook of the Republic of Poland (2016) Central Statistical Office, Warsaw, Poland.

Statistical Yearbook of Industry-Poland (2016) Central Statistical Office, Warsaw, Poland.

Yoshida S.O., Baba H. (2010) "A New Used Aluminum Beverage Can Recycling System", In: *12th International Conference on Aluminium Alloys*. Yokohama, Japan,

Wieczorkiewicz R. (2017) "Na świecie sprzedaje się rocznie 300 mld puszek aluminiowych", Available at: http://www.portalspozywczy.pl/napoje/wiadomosci/na-swiecie-sprzedaje-sie-rocznie-300-mld-puszek-aluminiowych,135754.html

World commission on environment and development (2011) "Our common future, Chapter 2: towards sustainable development", Un-documents.net.

Zintegrowane Zapobieganie i Ograniczanie Zanieczyszczeń (IPPC) (2001). "*Dokument Referencyjny BAT dla najlepszych dostępnych technik w produkcji metali nieżelaznych",* KOMISJA EUROPEJSKA, Grudzień, Poland.

Green Marketing Communication

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Abstract

New forms of marketing communication are constantly being developed, supported by the development and implementation of information and communication technologies. These new communication tools are being fulfilled by new messages, especially those with an ecological theme (green marketing). The paper deals with the positive and negative aspects of marketing communication of ecological products and services. It characterizes five categories of environmentally sensitive consumers as well as the specifics of own environmental claims of the organizations.

Keywords: marketing communication, green marketing, greenwashing, ecological consumer.

JEL Classification: M31, Q01, Q56

Article Classification: Research article

1 Introduction

There is always a link in the form of communication between the seller and the buyer.

With the growing development of productive forces in individual development stages of human society, due to the changes in the generally binding patterns of behaviour, standards and values, as well as in technological innovation, new forms and means of communication are changing and expanding to include new tools (Štarchoň at all, 2004). These new tools, supported by the development and implementation of information and communication technologies, are increasingly sophisticated and more frequently use the ecological theme to communicate with the customer, which affects all human action activities, from research and development to technical, technological, manufacturing and non-productive, respectively service processes, to fun and relaxation.

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Traditional marketing, as has been known for decades, is becoming less and less effective. Advertising campaigns on television, on billboards or in print media cease to be as effective as they were once, because they are trying to hit the widest possible "audience". The traditional concept of marketing used only sales or advertising. It was based on the fact that it was mainly about getting a customer rather than caring for him. It stressed the importance of having a profit from each sales transaction and that it is not necessary to keep the customer permanently. It was more concerned with how to sell products to the customer than how to understand customers, how to communicate with them, how to create and deliver real value to them (Sedláková, 2011; Jenčo, 2018).

Nowadays, companies are trying to take advantage of new opportunities and establish contacts with customers, partners and surroundings. They use not only modern tools of information and communication technologies, but also messages with new content. This content having an increasing accent, is the environmental issue that comes into marketing communication, e.g. in energy, industrial product manufacturing, but also in services such as tourism and wholesale and retail. This is not only modern topic, supporting the competitiveness of organizations, but above all a topic needed. However, not from the point of empty phrases and greenwashing, but from the point of view of serious efforts of the organizations to improve their environmental friendly technologies and products step by step. Marketing communication with environmental issues is called green marketing, respectively green marketing communication.

2 Material and methods

The paper is the theoretical basis for clarifying the terminology and environment approach to green marketing research and their impact on marketing communication and environmental consumers. The presented paper is aimed at the theoretical approach of the concept of green marketing, which is based on literature review. It is also complemented by experience and knowledge from the own case studies.

3 Results

3.1 Green marketing and green marketing communication

Sergio Zyman, a marketing genius, wrote in 2005 that traditional marketing is dead. Mass advertising has lost its ability to move the masses. Technologies have brought people more possibilities than they had in the past and stood at the birth of consumer democracy. Everybody has a "thousand" possibility choice for every product he desires, and "million" different products attract his attention and the favour of his wallet. Zyman says that the marketing of the future should focus on creating values, especially in the minds of consumers. He promotes that a company should build its brand on a motive that is common to both the consumer and the product or service. It is therefore a deepening of these relationships (Zyman, 2005; Križo, 2018).

Nowadays, we encounter advertising at every step and we don't even realize it and become immune to it. If a business wants to be successful and promote its products, services, or ideas awareness, it must choose a form of promotion that stands out and does not disappear in a flood of competitive advertising campaigns (Sedláková, 2011). Therefore, it is necessary to constantly develop new forms of marketing communication and fulfil their messages, which are attractive for the target group. Such a message in content marketing is green marketing.

Consumption of products produced by ecological processes is an indicator of consumers' environmental awareness. Ecological consumption in Western Europe and North America, partly already in the new EU Member States, is growing year after year. With regard to changing consumer behaviour, the number of so-called green signs goes up as well. Many of them have been strategically purchased by large companies, which have also seen changing consumer behaviour and growing demand for ecological products. Recent environmental marketing surveys conducted by foreign marketing agencies show that consumers are becoming more demanding on product quality, where quality no longer stands separate from environmental requirements. With an increasing number of environmentally sensitive consumers, environmental marketing and ecological product markets are becoming successful (Mališová, 2012).

The priority of green marketing is to promote and support the marketing of organizations and products that deal for example with:

- renewable energy sources,
- saving any kind of energy,
- recycling waste from production, used products and other waste,
- biological products,
- natural cosmetics, etc.

3.2 Environmental Consumers

The number of consumers who feel that if they themselves do nothing for the environment, by buying environmentally friendly products they do something good, and by boycotting non-ecological products they feel les guilty. A survey conducted by Porter Novelli (USA, 2005) has shown that consumers are five times more interested in the approach of the company and in its specific environmental activities, than the management of the concerned companies had believed. Consumers have confirmed that they are interested in the environmental performance of the company and it has a great impact on consumer behaviour. While more and more companies are strengthening their product range with "green products", mainly for reasons of altruism or public relations, consumers are actually more interested in whether the product or service is of higher quality, whether it saves water, energy, or does not contain toxic substances, etc. All this is attributed to product quality - "it's a better product" (Mališová, 2012).

Environmentally sensitive consumers are demographically difficult to categorize. It is an extremely diverse, non-homogeneous group, including a wide range of factors for which they buy ecological products. According to (Mališová, 2012, Johnson, 1966) there are five categories of "green" consumers:

- the first is the so-called "True Blues" - environmental aspects are important when buying products. They believe that by promoting ecological products, they can personally contribute to change - literally "slow down the environmental crisis". They are politically and socially active, willing to devote their time and energy to ecologically safe practices and tend to influence others to buy eco-friendly products. They are more willing to contribute non-profit environmental organizations and avoid the products and firms that are non-ecological and irresponsible towards society,
- the second identified group is the so-called "Greenbacks" - willing to pay up to 20 % more for environmentally friendly products compared to same products. They are concerned about their environmental status and support activities for its benefit. They are usually apolitical, and it is not difficult for them to pay the price difference for "the good of the planet." They refuse to buy products from

companies that are unethical and non-ecological. They are literally eager for information that reveals untrustworthy business practices and clearly boycott them. The Greens are mostly a well-educated population and hold mostly good job positions

- the third group is represented by the so-called “Sprouts” - willing to get involved from time to time in environmental activities, but only when it does not require much effort, e.g. separation waste. They read product packages and are interested in brands but less than previous category of Greens. Although both groups have roughly the same monthly income, this consumer group is not willing to pay more for environmental products. According to this survey they are easy to influence and therefore it is not difficult to convince them about the benefit of organic products,
- the fourth group is classified as “Grousers” - they do not believe that an individual can play an essential role in the current situation. They think that the responsibility in these issues belong to government and large corporations. This group reported in the survey that they are too busy and too much involvement in environmental activities is too complicated for them. A very important reason for reluctance to promote ecological consumption is that ecological products are too expensive. They are convinced that whatever they do, they won't change the actual situation. In other words: "Things will still be bad. So why worry,
- The last group, called “Basic Browners”, has no unambiguous opinion on the questions related to the environment. They believe that environmental issues are not so serious to deal with. They are not interested in ecology. This group is made up of consumers with the lowest income and lowest education. In the survey, they said: "They have too many other serious problems”.

An ecological approach is a new concept of perceiving the value of all kinds of capital, including natural capital. From the point of view of corporate activity management, it gives an incentive to improve economic and environmental indicators. From a marketing point of view, it is primarily about providing greater and more sustainable value to the customer. Through transparent and clear integrated marketing communication, it enables to take advantage of new market opportunities and build a strong brand. Ecological marketing raises sensitivity to environmental issues inside the company based on intensive customer communications.

3.3 Greenwashing

Corporate claims about environmental performance have increased rapidly in recent years, as has the incidence of greenwash, that is, communication that misleads people into forming overly positive beliefs about an organization’s environmental practices or products. References to greenwash in the literature have grown rapidly since the term was introduced more than two decades ago, with a sharp increase in papers since 2011 (Lyon, 2015). Greenwashing is misleading to information of consumers about the environmental impact of a business or the environmental friendliness of a product or service. It is striking how many half-truths, lies and not fair information is communicated towards the customer with an ecological theme (Hrubý, 2011). Examples of greenwashing from practice:

- a network of hotels called "green" because they "allow" guests to sleep for a few days on the same blanket or use the same towel, but in fact they do very little for saving water and energy in their facility, or the hotel manager drives a

luxury automobile with excessive fuel consumption,

- or banks that suddenly turn into green because they allow clients to manage theirs
- finance on-line (despite the fact that it is now the norm),
- advertising an energy company claiming green production technology. In fact, however green technology is either just a fraction of the total no so green business of the company or its task is to hide some environmental damage in the form of leakage oil or accident at a power plant.

TerraChoice, an American marketing company dealing with environmental issues, has published six greenwashing offenses committed by companies, and later in 2009, the seventh greenwashing mistake (TerraChoice, 2012):

- hidden commercial move - a product offered as "green" is green just based on one selected characteristic, e.g. based on recycled paper content, but without other negative impacts such as energy consumption, climate change impacts, or forestry,
- non-existent evidence - replacing a certified brand with easily accessible information promoting a product or "credible" third-party certification - e.g. in case energy-saving fluorescent lamp lacking an economy certificate
- superficiality of claims – promoting the product as "green" or "environmentally friendly", when these claims are meaningless without a detailed product analysis,
- choice of lesser evil – manifestations like e.g. "cigarettes made from organically grown tobacco" trying to hide the fact that cigarette smoking itself is harmful,
- insignificance - though true but insignificant claims such as "CFC free destroying the ozone layer". Since the production of CFCs was a few years ago prohibited, this claim is insignificant,
- flat lie - e.g. misleading claim that the product is officially certified, though it is not,
- worship of false labels - on which the company by a word or picture / logo gives the impression of credibility that it owns a certificate of truthfulness of its claim, what it is not true at all. It is a kind of own environmental claim.

Own environmental claim (OEC) is characterized by advantages and disadvantages from companies own point of view and from the point of view of the addressed customer (Hrubý, 2011). Advantages:

- freedom - the design and concept of OEC is up to the author / firm, marketing,
- flexibility - OEC is not subject to any approval, so it can be created and used quickly,
- simplicity - applies quickly and basically costs nothing.

Disadvantages:

- uncertainty - there is no clear guarantee of its credibility due to the absence of evaluation by the third party,
- risk of untrustworthy company - misleading, deceptive, nonsensical, or unclear environmental claims will cause loss of customer confidence for the brand, contribute to the emergence unfair business competition.

OEC features:

- "spreading honey around the mouth" - expressions with unclear meaning, e.g. ecological, green, clean nature, nature friendly, sustainable, etc.,
- suggestive pictures - graphics suggesting an unjustified impression of environmental friendliness, e.g. flowers coming out of factory chimneys,

suddenly growing vegetation after a passing car, etc.

- unrelated claims - emphasis on one less important environmental-friendly feature and the concealment of others that are no longer environmentally friendly, e.g. based on content recycled paper, but without mentioning other negative effects such as consumption climate change or forestry,
- the best in its category - such a statement is not credible when we claim it
- apparently untrustworthy - "Would anyone like an eco-friendly cigarette?" - cigarettes made from organically grown tobacco,
- "double-talk"- jargon and information that few people understand,
- fake partners - a brand that gives the impression that it has been created on an independent basis verification,
- no evidence - maybe it's true, but there are no arguments, e.g. energy saving a fluorescent lamp lacking an economy certificate,
- lies - a completely fictitious statement.

How to approach to the creation of the right OEC:

- Be honest with yourself when it comes to the overall environmental impact of your product throughout his life cycle,
- Produce the product in collaboration with your customers, issue an advertising claim, and ask your customers to support a gradual reduction in the impact of your product on environment. Do not exaggerate your achievements. Nothing like absolute "green" or "environmentally friendly" product does not exist (yet),
- Ask your customers to join you on their way to more environmentally-friendly products. It is the most honest gesture (which helps to create strong and permanent relations with customers).

4 Discussion and conclusion

Today's fast life requires appropriate forms of communication that reflect this speed, which in no way should mean that this form of communication is superficial, misleading, not based on arguments, or beyond ethics. Electronic communication tools, which are an unambiguous trend in integrated marketing communication, must not mislead the advertiser to communicate under the guise of anonymity (even if positive) the product's benefits but shockingly, not based on truth or serious research. Therefore, in a serious marketing communication greenwashing, respectively any other "washing" should not have a place. Socially responsible business means that the company also integrates a component of marketing communication whose consequences ultimately affect and influence global events in the world.

References

Hrubý, P. (2011), "Jak se bránit greenwashingu", In: 5. *Český a slovenský obalový kongres*. Praha – Čestlice, Czech Republic.

Jenčo, M. et al. (2018) "Assessing the quality of employees in terms of their resistance", *Quality – Access to Success*. Vol. 19, No. 167, pp. 48–53.

Križo, P. et al. (2018) "Evaluation of the most frequented forms of customer feedback acquisition and analysis", *Communications in Computer and Information Science.* Vol. 877, pp. 562–573.

Lyon, P.T., Wren Montgomery, A. (2015), "The Means and End of Greenwash", *Organization & Environment.* Vol. 28, No. 2, pp. 223–249.

Mališová, H. (2012), "Zelená pre ekologický marketing", *Marketing & Komunikace*. Vol. 17.

Johnson & Son. (1966). Roper Starch Worldwide, Inc, Johnson Wax, Education Racine, Inc.: Sustainable development: the new American dream : a look at Racine's attitudes and actions regarding economic, environmental and social health. Vyd. S.C. Johnson & Son., Inc., marec 1966, 43 s.

Sedláková, K. (2011), *"Využitie virálneho marketingu v praxi"*, [Diploma thesis] Katolícka univerzita v Ružomberku. Pedagogická fakulta; Katedra manažmentu a marketingu. Ružomberok, Slovakia.

Štarchoň, P., Faltys, J., Dzugasová, J. (2004), *"Priamy marketing alebo priama cesta ako si získať a udržať zákazníka",* Direct Marketing Beta, Bratislava, Slovakia.

TerraChoice Group Inc. (2012), *"The seven sins of greenwashing. Environmental Claims in Consumer Markets"*, Summary Report: North America,

Zyman, S. (2005), *"Konec marketingu, jak jsme jej dosud znali",* Management Press, Praha, Czech Republic.

Design of Information - Classification Base of Built-up area objects on a Parametric Data Model Platform

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Abstract

The representation of build - up area objects is typified in its wide variety and defined by the degree of urbanization of the area. Only the perception of the shape diversity of objects based on their mathematical description and 3D space modeling provides the basis for monitoring changes in residential, residential, and overall social environments. At present, the emphasis is placed on building parametric models for the efficient management of such project types. The 3D parametric data model represents an integral part of the life cycle of objects. To cover the information-classification base of all data, including 3D elements, the knowledge from the category of building information models will be applied in the solved issue.

Keywords: 3D model; build-up area; parametric rules; geodatabase; information-classification base.

JEL Classification: D18, K22, M31

Article Classification: Research article

1 Introduction

Currently, is growing importance and the application using of spatial modeling real-world objects. It can be said directly that we would no longer find a sphere that would

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effectively manage its decision-making processes without taking into account the spatial aspect. This was due to the current technological advancement as well as the development of computer technology, software equipment and, in particular, the creation of new data formats allowing full 3D access. The creation of spatial models expands in different spheres of social events. The application of spatial models is found in medicine, automotive, tourism, production process simulation and so on. An effective tool for capturing real reality is just the 3D view. Great emphasis is put on effective and especially accurate creation of spatial models that describe the real situation of the modeled phenomenon. High-end research and commercial workplaces come every day with the offer of modern applications based not only on software products, thanks to which it is possible to create perfect 3D images of diverse models. This fact slowly but surely ends the era of viewing in 2D. A new trend in the proposal and final creation of models of observed phenomena in 3D is the revolution in the way spatial information is collected, which is mainly supported by modern approaches in this area. The problem of quality and quantity of input data for spatial modeling significantly solves this approach (Orfánus et. al., 2011), (OGC, 2019).

Currently, the build-up area deserves more attention. The point of view of this issue can be viewed from multiple angles (Figure.1).

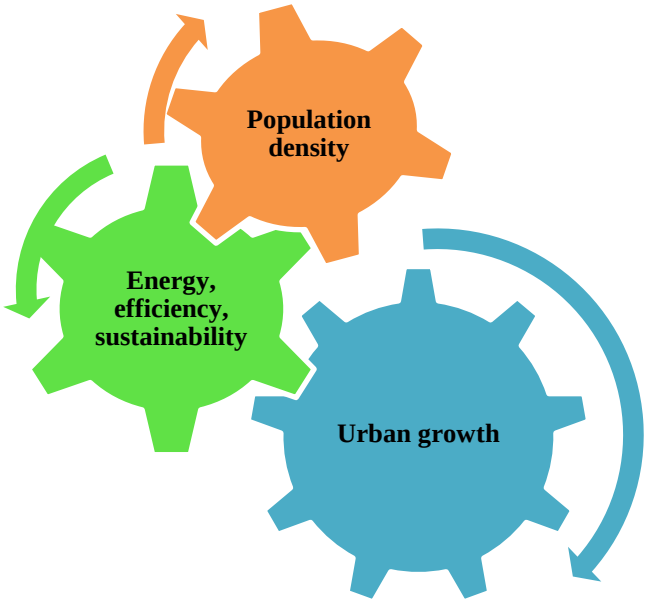

Figure 1 Aspects of assessing the importance of build - up area structures; source: (Kuzmich et al., 2018)

This area of interest requires requires constant access to data and information, which is, in most cases, stored and managed in the computer systems as well as in information systems. Database systems are an integral part of every information system (IS). The requirements in terms of data management are directed to easy manipulation of information and strong enough and powerful features that these systems provide. The basic technology, which should ensure the quality of the entire system (not excluding the GIS system), is a database technology.

Given the amount of spatial data used in the field of build – up structure for the purpose of managing data using geographic information system. The Geographic Information System (GIS) comes with new possibilities in creating, managing and sharing spatial data via inovation resolution:

- geodatabases implementable for different areas of interest.
- parametric building models (information models)

GIS has become part of the development of information systems in recent years as a result of the irreplaceable task of locating objects and phenomena processed by these systems (Gergeľová et al., 2012). Within Geographic Information Systems, the term geodatabase is used.

The outputs generated in this way, based primarily on spatial data, must be based on certain conceptual designs based on the information-classification basis of the build-up area structures. The starting point of the whole solution is typology, forms of settlement structures, the spatial structure of buildings. In particular, the typology takes into account the environment in which the given structure of the settlement structure is situated. Furthermore, urban, architectural and other supplementary constructions of residential buildings are taken into account (Šveda et al., 2018).

2 Material and methods

The basis of most of the ISs being operated, they are the essential and essential part of the database. The ISs in their deployment areas serve not only to collect, manage, and control the data they create but also to transform the data into information (graphic or descriptive format) (Connolly et al. 2008).

There are a number of definitions and explanations of the terms the database. A database is a collection of data relating to a particular area of interest or purpose.

The database can also be understood as a set of data describing a part of objective reality managed by the database system. The database does not just mean software data processing.

Very important are also the methods of database design that enable database building in the first place in a systematic manner and meet predefined criteria.

As databases are usually part of information systems, database design methods need to be in line with methods of creating information systems (Šimonová and Panuš, 2007).

Depending on the method of organizing data in databases, we can divide them into the following basic groups (Pokorný, 1992), (Pokorný and Halaška, 2003):

- Hierarchical model,
- Network model,
- Relational model,
- Object model,
- Object - relational model.

In most of the GIS systems used, data storage is applied in a relational database. Object - oriented database management is the offer of the best GIS options (Gergeľová et al., 2012).

The advantage of deploying an object-oriented model is that this model works directly with individual geographic features - objects.

Geographical features are the basic organizational units of the data model, and each object contains all components of the description of the represented geo features at one location.

2.1 Geodatabase

Geodatabase is a basic model for representing real world objects in GIS and for organizing spatial data into layers. It is a comprehensive set of tools and application logic for editing and managing spatial data.

Application logic is available from ArcGIS Desktop client applications, through servers or specialized applications created using ArcGIS Engine. This is a method of storing spatial data based on GIS standards and database systems.

The data structure is implemented on relative database systems and uses XML. The geodatabase was designed as an open and simple model for spatial data storage (ArcGIS 9).

The term geodatabase is often associated with ESRI ArcGIS. It allows the creation of a central data warehouse for inserting and managing spatial data of various types (raster, vector, table, etc.).

Geodatabase is a basic data structure and is the data format used to manage ArcGIS data. Data is stored and organized into so-called data sets.

ArcGIS Desktop offers several options for storing spatial data in the geodatabase:

- *Personal Geodatabase* – designed for working with a smaller data set, can work with only one user, max. size 2 GB, MS Access is used for working with attribute data,
- *File Geodatabase* – since version 9.2, individual data sets can reach up to 1TB, allow for more efficient vector data storage,
- *SDE geodatabase* – multi-user geodatabase allows you to work with different models of data storage IBM DB2, Informix, Oracle and SQL Server, is used as a central database for workgroups, it allows to realize extremely large continuous GIS databases, current work of several users, versioning database.

The XML language is used to exchange information between geodatabases and other systems. XML format allows you to publish and maintain the complete content and schema of the created geodatabase, share data and update them.

The geodatabase consists of the following sections:

- feature dataset – vector data,
    - object classes,
    - feature classes,
    - relationship classes,
    - geometric network,
    - planar topologies,
- raster dataset – raster data,
    - rasters,
- TIN dataset,
- locators,
- validation rules,
- domains.

2.2 Procedural modeling, creation of parametric and information models

Procedural modelling belongs to the category of innovative solutions in the part of IT and creation of spatial models. It is a process where a spatial model is not created by classical procedures (i.e. manually), but a set of rules and algorithms that prioritize the appearance of the resulting model is preferred. The popularity of using this type of model is also conditioned by the way data is generalized and the usability of the details of the created models from the LOD category. The spatial model of the monitored group of build - up objects can be presented in the following way based on the above facts (Figure.2).

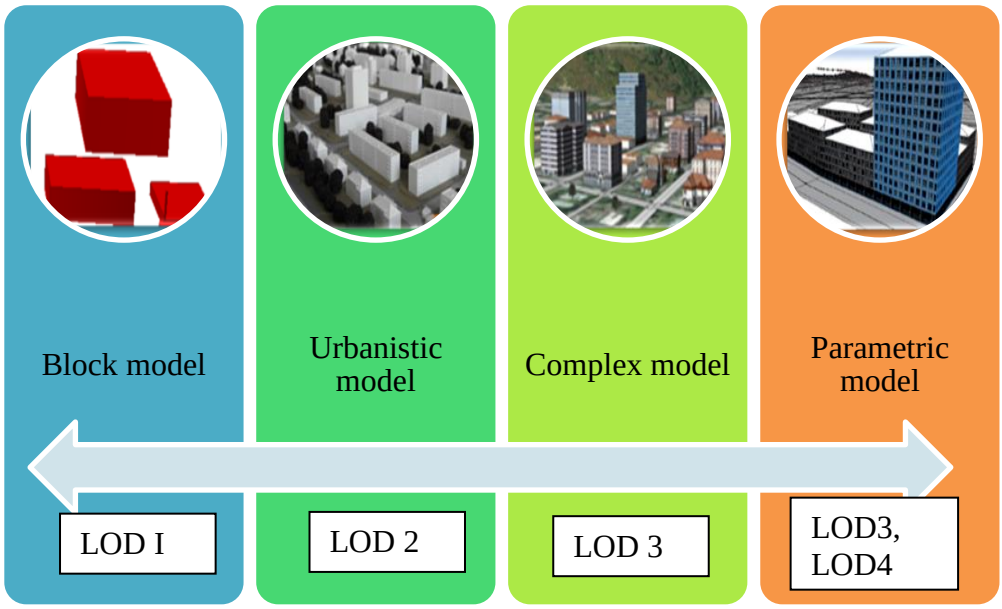

Figure 2 Categorization of 3D Building Models; source: own processing

The spatial model categorization takes into account the following overview of information (Gergeľová et al., 2014):

1. Block model – presenting a basic view of the territory, e.g. building with the correct height , absence of modeled roof
2. Urbanistic model - completes the block model with basic roof shapes
3. Komplex model - includes all the essential details with phototexture
4. Parametric model - model created on the basis of defined rules, algorithms and input parameters

The essence of the information model does not consists in developing a model for an architectural project, but in that it represents an innovative way of exchanging and complete sharing of all the information that exist in various interchangaeble formats throughout the life-cycle of the project concerned. Information can be fed into the project gradually, depending on the phase of the project being realized (Funtík, 2015).

The main difference in relation to the administration of the project documentation in the *CAD* system is in the fact that all objects of the BIM model demonstrate parametric behaviour. This characteristics offers substantial advantages. Any change in one parameter results in an aggregated set of changes related to the management of the project as a whole (Funtík, 2013). Another advantage is in the elimination of error accumulation. By standards, the applied method of survey is selected in accordance with the level of details and precision of the information model. The process of construction is frequently exposed to the requirements to document the actual status of the construction at the given

stage of life - cycle for a concrete project intent (Makýš et al., 2016). The development of the BIM model itself is affected by several factors (selection of the way of surveying the architectural object, measurement technique chosen, processing software environment, degree of details the project documentation is made). However, the domain of information models of BIM category is loosing its contentual and thematical component if lacking precise area-related information. For a BIM to be developed, it is the documentation of a actual construction is that is considered as inevitable.

Figure 3 Processes in BIM; source: own processing

3 Results

The design and creation of data models has its close connection with the knowledge of the world and the systematic discovery of every round of us (Connolly et al., 2008) (Connolly et al., 2009)The term data model means a conceptual description of the space of the problem solved. These include, for example, the definition of entities, attributes and the integrity of the entity (Danek and Daneková, 2011). Data models are a means of knowing, describing and organizing data. They have arisen in connection with the need to specify the data structure in analyzing and designing database and information systems. The data model is a mathematical formalism allowing for a data-oriented description of the studied reality. It represents a graphical representation of the internal organization of data in DBMS through entities and relationships.

When designing a database, it is necessary to build on three levels (Arctur and Zeiler, 2004), (Halász, 2011) (Figure.4).

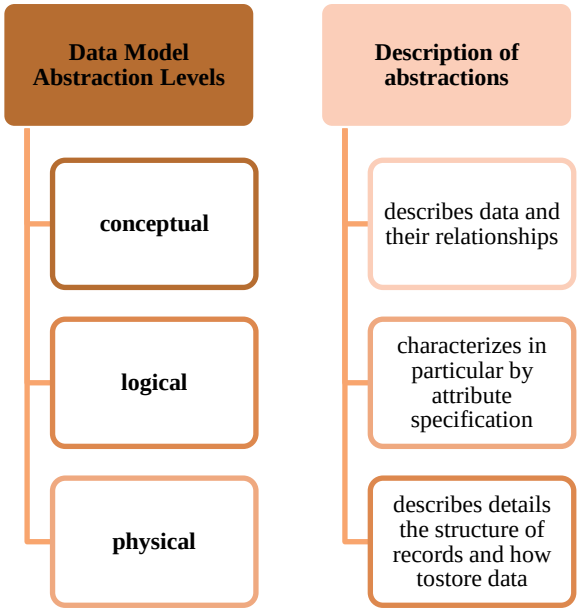

Figure 4 Data model processing levels; source: own elaboration

3.1 Conceptual model

The conceptual model allows for a basic solution approach for each field in the application area. It presents a basic description of the contents of the database at the conceptual level.

For the "Buil – up area" application, the following areas and layers are proposed (Figure.5):

- Build – up area object
- Public infrastructure
- Border of territorial unit for statistical purposes (LAU 2 – Local Area Units)

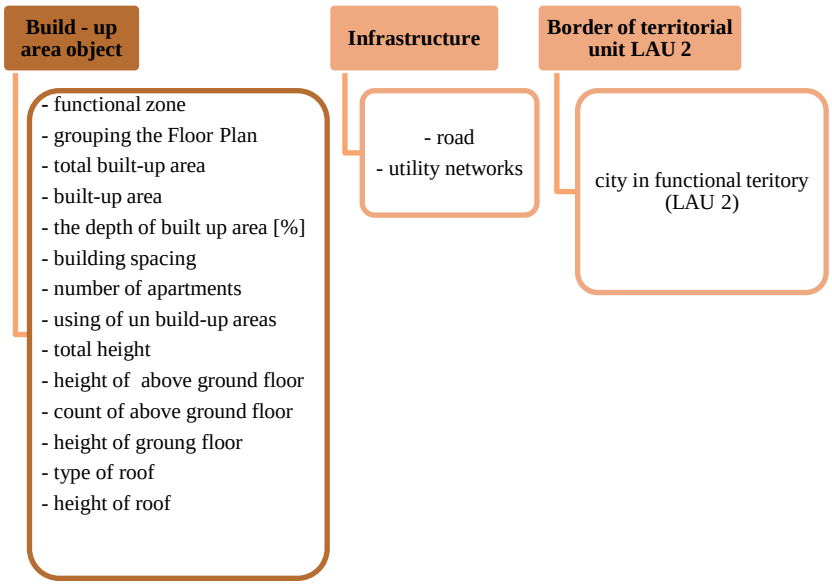

Figure 5 Preview of the conceptual model design scheme; source: own elaboration

3.2 Logical model

By logical proposal we approximate conceptual design to a great extent. The basis of the successful design of a logical data model is to assign the distinctive features of the conceptual part to other characteristic features (attributes of object classes - entities). At this stage, the conceptual model was refined.

Within the GIS, it is also necessary to define the layer type (vector, raster) and, in the case of a vector, whether it is a point, a line, an area, or a 3D object of the multipatch type (Table 1).

Table 1 Definition of the representations for the individual layers proposed; own elaboration

Name of layer	Form and type of presentation
Build – up area object	Vector layer, polygon
Infrastructure	Vector layer, line, polygon
Border of territorial unit	Vector layer, line

In the case of the proposed „ Infrastructure “" layer it is appropriate to break it into other layers that will be of different types:

- Green infrastructure - Vector layer, polygon,
- Trafic infrastructure - Vector layer, line, polygon,
- Other infrastructure - Vector layer, line, point,
- Inžinierské siete - Vector layer, line.

The basic object classes input when designing the logical form of the data model are the variables. Each variable attribute was the associated variable name based on the conceptual design.Each variable can only acquire certain types of values with the specified character range for its description. The description of the basic characteristic of the selected variable is given in Table 2.

Table 2 Preview of layer processing „Buil - up area object“; own elaboration

Name of attributes	Field type	Range	Description
Functional zone	String	30	Categorization of urban structures zones
Grouping the Floor Plan	String	30	Assessment in the sense of three basic compositional principles (point, line, polygon)
Built-up area	Integer	2	Total built-up area
The depth of built up area [%]	Integer	2	Share of the area built to area
Building spacing	Integer	2	Expression of construction distances to meet certain requirements (urbanistic and etc.)
Number of apartments	Integer	2	Number of apartments in the building
Utilization of undeveloped areas	String	30	Using of the unstopped area (greenery, park, playground)

3.3 Physical model

Physical model is the final representation of the object model. It contains a complete list of classes with their full name and attributes, completing their data types. The choice of the system was tailored to GIS technology, which offers a wide range of features. The physical level of the logical design was implemented in the ArcGIS Diagrammer environment. ArcGIS Diagrammer allows the created model to be published in an xml. file, which actually creates a drawing for the geodatabase.

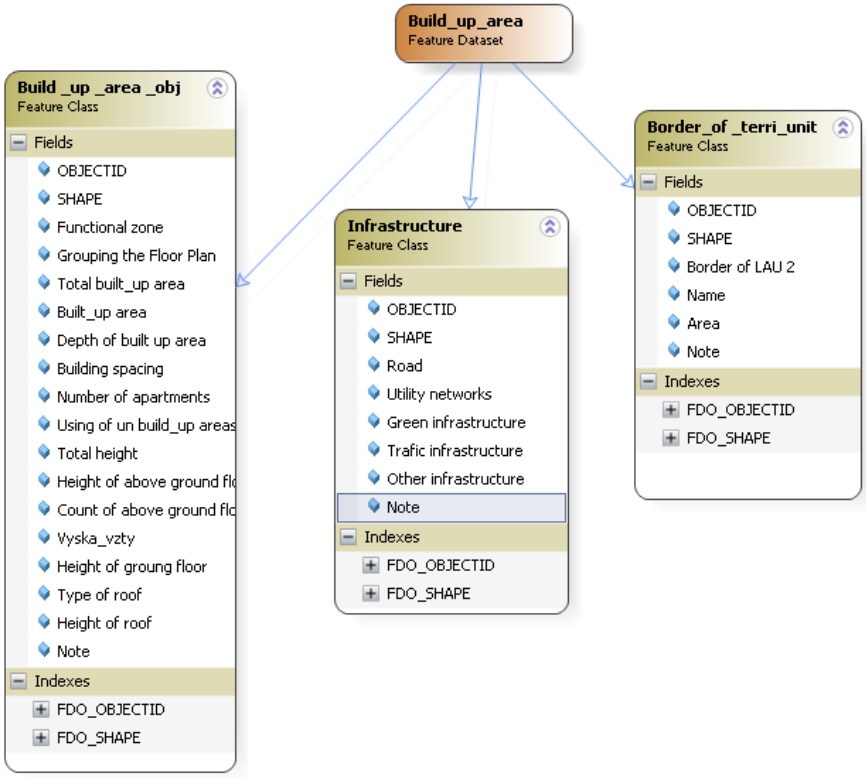

Figure 6 Preview of physical model design in ArcDiagrammer environment; source: own elaboration

3.4 Parametric model versus information model of buildings

More efficient creation of 3D models of cities and buildings is concentrated in the IS environment in which can be worked with *parameters*. From a range of tools and software available, such models can be created using procedural modeling in GIS and BIM solutionsModels created in this way rely on a geometric, attribute component that is complemented by a set of procedural rules. The basis of the rule - making concept is *. *CGA grammar* (Figure.7).

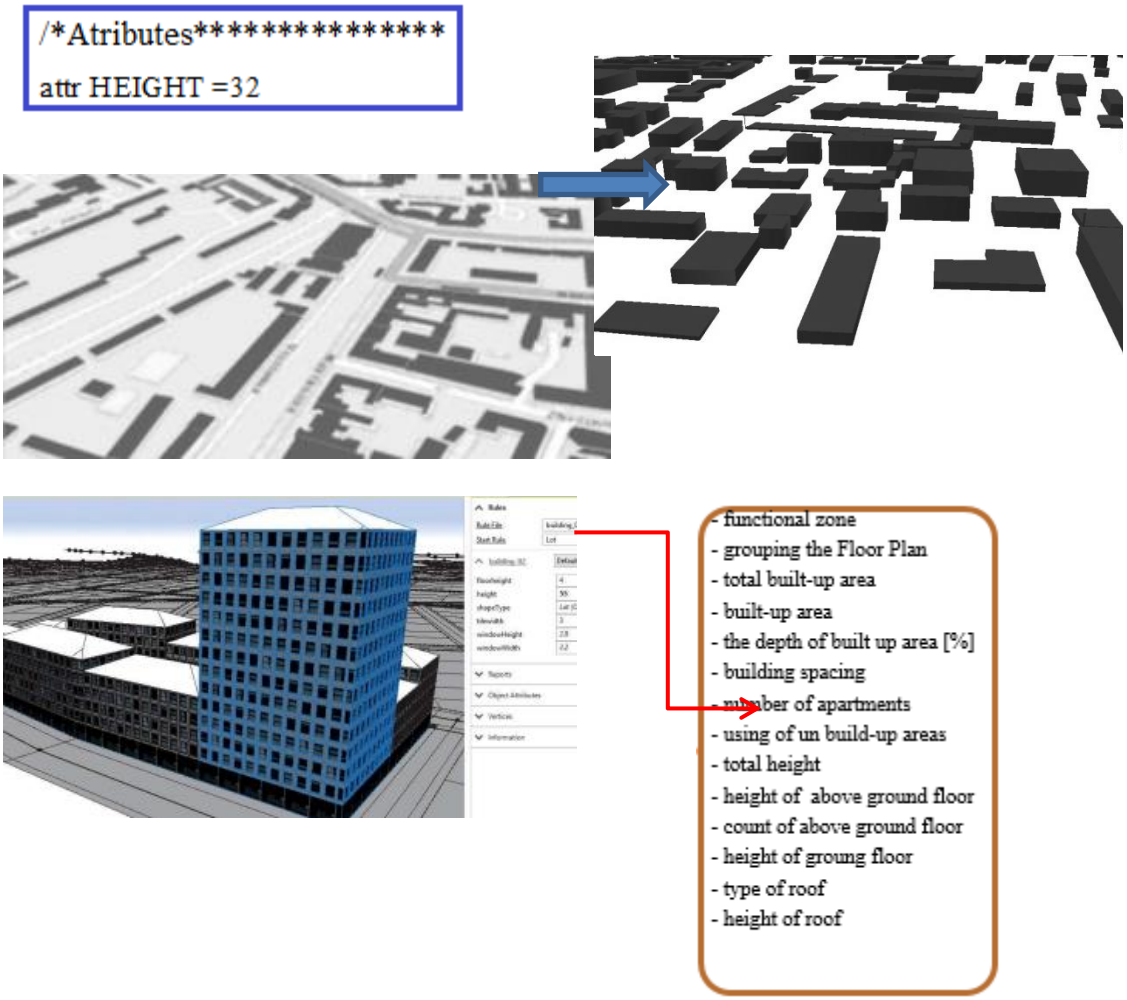

Figure 7 Preview of parametric model processing with descriptive database; source: own elaboration

4 Discussion

The content of the research article was focused on the presentation of partial outputs of the research project of the grant scheme VEGA 1/0754/18.

The research article was focused on the presentation of the possibilities of the design of the information-classification base of the 3D models of the buildings of the housing development. The paper presented a design page of work with available formats that support spatial modeling. At present, 3D modeling becomes the standard for any type of spatial analysis, from flood modeling, noise, vibration, solar radiation to urban studies of environmentally-oriented cities (eg. climate change warming of city centers). In this aspect, the team of authors will continue to elaborate further on the issue, for the complexed creating a 3D model of the city and its superstructure part of the information - classification base.

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References

ArcGIS 9 (2005) "*Co je ArcGIS*?: *ESRI Inc."* Available at: http://download.arcdata.cz/doc/2005/Co-je-ArcGIS-90.pdf

Arctur, D., Zeiler, M. (2004) "*Designing Geodatabases Case Studies in GIS Data Modeling",* ESRI Press.

Connolly, T., Begg, C., Holowczak, R. (2008) "*Business database systems. 1 st. edition."*, Essex.

Conolly, T., Begg, C., Holowczak, R. (2009) *"Mistrovství - databáze. Profesionální pruvodce tvorbou efektívních databází. 1 vyd."*, Brno, Czech Republic.

Danek, L., Daneková, J. (2011) "Prínos GIS a ontológie v doméne manažmentu povodí: Juniorstav 2011" In: *13. Odborná konference doktorského studia*. Brno, VUT, Czech Republic.

Funtík, T. (2013) "BIM ako vhodný nástroj pre trvalú udržateľnosť v stavebníctve", In: *Mezinárodní konference Udržitelná výstavba budov ve střední evropě 2013*, Fakulta stavební ČVUT v Praze. Praha, Czech Republic.

Funtík, T. (2015) "Podrobnosť BIM modelu v priebehu projektu", *Eurostav*. Vol. 2015, No. 1-2, pp. 40–41.

Gergel'ová, M. et al. (2014) "Automation of Spatial Model Creation in GIS Environment", *Inżynieria Mineralna*. Vol. 33, No. 1, pp. 15–22.

Gergeľová, M., Naščáková, J., Kuzevičová, Ž., Kuzevič, Š. (2012) "Návrh dátového modelu pre potreby aplikačného využitia v prostredí GIS", *Transfer inovácií*. Vol. 24, pp. 259–262.

Halász, J. (2011) "Dátové modely" In: *Rusko, M., Halász, J. (2011), Environmentálne orientované informačné systémy*. Strix, Žilina, Slovakia.

Kuzmich, F. et al. (2018) "*Formy sídelných štruktúr pre rozvoj mesta",* Available at: https://is.muni.cz/el/1456/jaro2013/CPR_TG06/um/Formy_sidelnych_struktur_pre_rozvoj_mesta.pdf

Makýš, P., Funtík, T.(2016) "*Laserové skenování jako zdroj dat pro BIM*", Available at: <http://www.bimfo.cz/Aktuality/Laserove-skenovani-jako-zdroj-dat-pro-BIM.aspx>

OGC (2019) "*3D Data",* Available at: <https://www.opengeospatial.org/resources/data>

Orfánus, M. et al. (2011) "Protipovodňová ochrana Modry - meracie práce", *In: Manažment povodí a povodňových rizík: Zborník príspevkov*.

Pokorný J. (1992) "*Databázové systémy a jejich použití v informačních systémoch",* Academia, Praha, Czech Republic.

Pokorný, J., Halaška, I. (2003) "*Databázové systémy",* České vysoké učení technické v Praze. Praha, Czech Republic.

Šimonová, S., Panuš, J. (2007) "*Databázové systémy I pro kombinivanou formu studia",* Univerzita Pardubice. Fakulta ekonomicko – správní, Pardubice. Czech Republic.

Šveda, M., Pazur, R. (2018) "*Priestorové formy rezidenčnej suburbanizácie v zázemí Bratislavy", Geographical Journal*. Vol. 70, No. 3, pp. 231–258.

Zeiler, M. (1999) "*Modeling Our World, The ESRI Guide to Geodatabase Design"*, ESRI Inc.

Contract for Work in the Context of Industrial Revolution 4.0

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Abstract

A contract for work is probably the second most widely used type of contract (next to the purchase contract). Therefore its complex legal regulation is very important for the unambiguous definition of the rights and obligations of the parties to the contract. By the contract for work, the contractor undertakes to perform certain work and the employer undertakes to pay the price for its performance. Work as defined by the law manufactures specified products (provided the manufacture does not fall under the notion of a purchase contract), the maintenance, repair or modification of certain items or the result of other activities. Fabrication, repair or modification of buildings or parts thereof shall be always covered by contracts for work. The paper analyses and assesses the most important provisions of the new shape of the contract for work in the Context of Industrial revolution 4.0. The article is based on our current work. The basis for the draft new legislation was taken from the former regulation of this contract by the Commercial Code.

Keywords: civil law; business law; civil Code; new civil code; commercial code, contract for work.

JEL Classification: C11

Article Classification: Research article

1 Introduction

A contract for work is probably the second most widely used type of contract (next to the sales contract), therefore we see it as useful to present more details on its new regulation as brought by the New Civil Code (hereinafter "CivC").

The fundamental provisions specify that by the contract for work the Contractor undertakes to perform at his/her cost and risk the work for the customer and the customer undertakes to take over the work and pay the price.

The price of the work is agreed sufficiently clearly, if, at least, the method of its determining is settled or if, at least, the price set by an estimate is specified. If the parties are willing to enter into a contract without specifying the price, then the price for the same

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or at least for a comparable work at the time of the conclusion of the contract and under similar terms and conditions shall be accepted.

The Explanatory Memorandum to the CivC states that the new legislation should remove the dualism of civil and commercial regulations of contract for work. The valid rules contained in the former Commercial Code ("ComC" hereinafter) have been taken as the basis of the proposal of the new legal regulation with due regard to some regulations abroad because the concept of a contract for work in the current CivC is tributary to its original concept from 1964 and the model of the Civil Code of 1950. In certain aspects it takes regard to some provisions from the former Code on International Trade, whose normative constructions were taken over by the valid ComC but which have often been formulated more precisely and clearer than the current rules.

In order to be sufficiently clear, the draft regulation was structured so that it first specifies the contract in general, and then deviations concerning the price of the work are agreed under a budget, on the work carried out on real estate and work with intangible results.

The work is conceived as a standard activity (work), whereas the work as implementation of the contract for work differs from the work provided by the employee on the basis of a contract of employment in particular that, according to a contract for work, the contractor carries out activities independently, according to its own schedule, with its own resources and at its own risk, and does not underlie any constant supervision or control by the customer.

As a principle, the contractor performs the work in person or arranges for the performance under his personal supervision only if this is necessary due to his personal capacity or to the nature of the work. If this is not the case, the contractor may assign the work to be performed or to be supervised by another person, in which case he is responsible according to the general law of contracts, for the proper performance of the work as it would be performed by him alone.

In order to perform the work it is very often necessary that the customer must provide assistance in various forms (deliver a machine to perform repairs, allow entry to the building/ real property, to arrange the construction site, etc.). The CivC rules, on a General level, for various aspects of these situations. The Contractor serves not as the person dispensing orders of the customer, therefore he does not principally obey his instructions. However, such a relationship may be agreed upon to some extent. In the same way it may (and sometimes has to) be agreed that the customer delivers to the Contractor things or material for the performance of the work, etc. In these cases the regulation is set that the Contractor, as the person who performs the work on its own responsibility, must examine with sufficient care for all orders given by the customer as well as, where appropriate, all things delivered by the customer to perform the work and draw his attention to their eventual defects. In the CivC are also rules for situations where the customer, although being contractually obliged, shall not deliver the thing.

Just because it is the rule that the contractor does not obey the orders of the customer in carrying out the work the CivC must rule for the right of the Customer to control the performance of the works. Even in that direction the CivC has incorporated the existing concept of the Civil Code 1964 and the ComC.

The obligation to perform the work shall be met by the Contractor upon its completion and passing, the Customer will meet his duties by the payment of the price. The CivC also rules for special cases in which the work is to be passed in parts, when the price is specified only by an estimate, when the work is aborted for various reasons, etc. As regards the defects in the work, the CivC makes reference, in accordance with the

previous arrangements, to the appropriate application of the provisions concerning the Sales contract.

2 Methods and Material

The goal of the contribution is to evaluate the new legal regulation in doing this we shall make use preferentially of the comparative and analytic methods in the Context of Industrial revolution 4.0.

According to the Explanatory Memorandum the work is conceived as an activity (of work),whereas the work as implementation of the contract for work differs from the work provided by the employee on the basis of a contract of employment in particular that the Contractor does not underlie any constant supervision or control by the Customer. We may note that there are a couple of cases, and especially in the construction service, where we have a commercial relationship established and there is a technical supervision carried out continuously.

As we can see from the legislation, the work is an activity, but compared to the previous CivC, however, it may be materially captured. Because the new CivC is based on the previous ComC, it may be more acceptable for the business than for the non-business sphere.

The CivC thereafter rules for situations where the Contractor may entrust the performance of work to another person (persons). However, he remains responsible for it as if carried out by him alone.

The contract for work is often used especially in construction, where it is necessary to handle the terminology settled and where the use of the suitable term with its content given as usage in trade (business) may be the starting point for the determination of the obligations of the Contracting Parties. Therefore, we first pay attention to these issues.

Under building construction work we understand a work irrespective of its construction-technical design, purpose and duration. In addition to the simple or line constructions, especially for the constructions in industries, the construction is, as a rule, divided into: construction part of the building (which, however, also includes other than construction works, and those that attributed to the construction part, e.g. light wiring, medical equipment, central heating systems, etc.) and technological part of the building (also called the machinery and technological parts of buildings).

The construction part of the building is structured into construction objects. A construction object is defined as a spatially coherent part of the building, which forms its basic part.

The operating unit (OU) is a complex of mutually functionally connected operational settings, completing the entire technological process and/or the special technological process of one-way use, as specified by the construction documentation and, as a rule, put into operation in a continuous time. The operating unit is its main features characterized by the type of the process for which is established.

The operating unit splits into operational settings, as a rule into several operating settings of machinery, electrical or other equipment (in the case of technological structures) for the basic technological process (or for a special technological process), and into other operational settings for additional technological processes. For an operational unit shall be held complete technological equipment e.g. for an engineering plant or sewage treatment plant.

In the case of complex production structures, it is possible to divide the operating unit into partial operating units. The operation unit of these constructions is characterized

by the complexity of technology from the entry of raw materials, semi-finished products and other materials intended for processing up to the outlet of final products, including, if necessary, packaging and shipping.

The partial operating unit (POU) is a complex of mutually functionally related operational settings, performing partial parts of a complex technological process and/or minor parts of a complex special technological process as specified by the construction documentation and, as a rule, put into operation in a continuous time.

The POU as well is divided into operational settings, in case of constructions for manufacturing characterized by a closed technological process that is on the input and output usually terminated by partial cut-offs (intermediate in-process store, landfill, etc.). When designing the division it is necessary to ensure that the complexity of the relevant component of the operational complex is secured so as to ensure the implementation of independent complete tests of POUs and their gradual passing and preparation for subsequent field tests (warranty tests).

Operational setting (OS) is a functionally integrated part of the operating unit, a POU or technological part of the construction (machinery and equipment forming a separate functional unit), consisting of a complex of the technological equipment, performing a partial technological (i.e. separate) process and/or a technological special process, or a complex additional technological process. These are specified by the construction documentation and, as a rule, put into operation in continuous time.

Operational setting is, as a rule, divided into operating units or into operational units and basic units or directly into base units. If appropriate (e.g. for the construction performed by sub-contractors), an operating setting is divided into partial operational settings or operational settings and operational units or directly into basic units.

Partial operating setting (POS) is a functionally comprehensive part of the operational setting, consisting of a complex of technological equipment and performing a separate partial technological process (or a special or a supplementary technological process), designated by the construction documentation and put into operation in continuous time. It is used only exceptionally, for very complicated and complex equipment, when it is useful or necessary to put between the operating setting and the operating unit interstage. It shall be divided into operating units, or operational units and basic units or directly into basic units.

The operating unit (OU) is functionally a comprehensive part of an operating setting or of a POS, consisting of a complex of technological equipment and carrying out a comprehensive part of the technological process specified in the construction documentation.

The OU may be divided into basic units. The functional structure of the operational unit shall be specified in the construction documentation and its function can be verified only by a cumulative test of all basic units forming the OU.

The basic unit (BU) is a product supplied by one manufacturer that has a separate destination as a unit, fulfils a specified principal or complementary function with permanent operation and consists of a structurally enclosed unit that cannot be completely divided into two or more functional units. In the construction documentation the BU shall not be subdivided any more. The term basic unit refers in principle to a single-part delivery, the designation separate machine or equipment.

3 Discussion and Results

The fundamental provisions specify that the Contractor undertakes to perform at his cost and risk a work for the customer and the customer undertakes to take over the work and pay the price.

So, as opposed to the wording of the fundamental provisions of the ComC, the text is amended by the performance for the risk and expense of the Contractor, which was the consequent wording contained in the ComC in its Section 537, a follow-up to the fundamental provisions. The text of the fundamental provision was also amended by the inclusion of the obligation to take over the work that was also in the Section 537ComC.

The price is ruled differently by the fundamental provisions. The CivC specifies that the price shall be deemed or agreed upon with enough determinacy, if, at least, the method of its determining is agreed, or if it is determined at least by an estimate. If the parties are determined to enter into a contract without specifying a price, it shall be deemed for an agreed price a price paid for the same or comparable work at the time of conclusion of the contract and under similar terms and conditions. We remind that the conclusion of the contract by the will of the parties not to specify the price of the work can't be recommended especially in the case of large, atypical of industrial constructions.

The specification of the work in the ComC has been defined by the fundamental provisions in Section 536, in relation to the fundamental provisions of the sales contract and the provisions in Sections 409 to 410.

In the CivC the Section 2587 is devoted to this issue and it specifies that the work means manufacturing of a certain thing should it not fall under the sales contract and, further on, the maintenance, repair or modification of a thing, or an activity with a different outcome. The work is always the manufacture, maintenance or modification of a construction or parts thereof.

When concluding the Treaty, mainly the Contractors (similarly as the Buyer in the case of a sales contract) should, in our view, consider the inclusion of an article "Meaning and purpose of the Treaty" (we recommend its inclusion). The content of this article is not just a proclamation but may be linked to serious legal consequences in connection with other provisions of the legal regulation.

We should also not miss in the contract for work in construction basic information about the construction. We hold it appropriate to include the statement of the Customer (the Constructor), that the construction is properly licensed (potential fines or termination of illegal construction do not affect only the Customer, but brings a lot of problems to the Contractor as well). It is appropriate to agree when the Customer shall forward (or communicate its release) the license - building permit to the Contractor (if it was not released before the conclusion of the contract). It should be passed no later than upon delivery and taking over of the construction site. We may especially recommend in the Treaty to place the name and location of the construction and its characteristics (e.g., that it is construction of a permanent, temporary character etc.). If the data on the purpose and value of the construction should not be explanatory enough, the contract may also include an article about the importance of the building.

We may recommend, in addition to the accurate identification of the contracting parties in contracts for construction, to include also:

- the other participants in the construction
- details of the investor (or information about future user)
- at least a basic solution of the supply system (i.e., persons supplying to the investor, the manner of supply) and specification of contracted performance, including the determination of the functions of General Designer, general supplier

(Contractor), technological parts of construction and general supplier of construction of part of the building

- In addition to the precise specification of parties to the contract, i.e. the Contractor and the Customer, it can be added – and it's also very practical - who are their statutory bodies and individuals (officers, employees) authorized to negotiate upon possible contractual amendments
- In order to facilitate the fulfillment of obligations arising from the tax legislation (in particular from the law on value added tax) the Tax ID
- If, before starting the manufacture - goods to be used for the manufacturing shall be sent, specification of warehouse should not be missed in the contract, as well as the transporting disposition, i.e. address of the recipient, the agreed mode of transport and the place of destination (it is possible also to agree for packaging). The equipment supplied in the packaging should be signed appropriately (refer to the agreed code), to make it clear for which unit or operational setting it is specified
- It is also appropriate to agree upon a person who will act as the Building Inspector of the Contractor and who will perform the functions of Technical Supervisor of the investor, therefore, to include provisions about who shall be entitled on the construction site to records and confirmations to the Construction (Assembly) Journal and to control the work done.
- For more complex constructions, the contract may list also other persons, etc. representatives for the technical issues (to resolve technical problems, or submit technical documentation for drafts of amendments to contracts resulting from the proposed technical changes), the Coordinator (responsible for coordinating the work of subcontractors and/or other suppliers delivering directly to the investor), the person responsible for work safety at the construction site, etc. These officials, however, are not generally entitled to negotiate changes in contracts (technical representatives can, however, be authorized to agree to such minor changes to the project and in the project is consistently indicated; e.g., there may be a change in the data dimension setting the distance of individual machines from each other). For larger buildings it may also be agreed who on behalf of the Contracting Parties shall be entitled to perform the submission and acceptance of the works. Who is called the contractor and the principal responsible geodetic surveyor
- For larger buildings it may also be agreed who shall be entitled on behalf of the Contracting Parties to perform the passing and taking over of the work and/or who is the so called responsible geodetic surveyor of the Contractor and Customer.
- As a rule, in the contracts will be specified the person performing the so-called personal supervisor of the designer (not necessary for a subcontract on the lower level of the supply chain).

The provisions of Section 2588/1 CivC rule for cases where nobody else than the specified Contractor can perform the work, as the performance of the work is dependent on its specific know-how. This may be e.g. in the case of an artistic blacksmith who has committed himself to create a specific original work. In this case the obligation shall expire by a loss of his capability (e.g. by an accident or illness) or by his death. However, this does not apply if the work may be performed by a person who took over the business of the Contractor as his successor.

In accordance with Section 2588/2 CivC the death of the Customer shall not terminate the obligation by itself, unless the execution of the obligation becomes by this

fact impossible or unnecessary. It is also true in the case of the obligation´s extinction by the Customer's death.

The work need not be conditioned by the personal characteristics of the Contractor- or it is not required due to the nature of the work (e.g., for maintenance of beverage vending machines). In such cases the contractor shall not be obliged to perform the work personally and may have to arrange for it through a Subcontractor. However, beside the latter cases it is deemed to be agreed that the Contractor shall perform the work in person or under his personal supervision.

If not otherwise agreed, the Contractor shall procure all that is necessary for the work performance. If no time for performance of the contract is agreed, it shall be performed within an appropriate time limit. Time of performance of the contract work shall be established in favor of the Contractor.

Sometimes there will be not only one time of the contract performance time as the total duration, but often there will be contracted the time for a partial performance and time for consideration of the other party shall be agreed upon. Contracts should specify these questions in a concrete manner.

According to the agreed extent of performance it can be agreed in case of supplies for a construction whose documentation shall be handed over by the Customer to the Contractor, if the contractor will prepare the construction design (if this is agreed, the contractor may also arrange for the building permit). However, it can also be agreed that the relevant construction design and building permit shall be arranged for by the Customer and passed to the Contractor.

However, if the particular degrees (types) of the documentation should be supplied by the Contractor who is also responsible for material supplies, it can be arranged in the event of partial performance what parts of the documentation and at what time shall be passed to the Customer. Particular types of documentation can have partial time-limits for their performance, e.g. time for individual construction objects and/or OS.

It is also appropriate to agree the place of performance for particular construction design projects and what negotiations shall be carried out between the Contracting Parties in advance.

The time of the "submission of the construction site" by the Customer to the Contractor should also be agreed (i.e. the handover of the building site in the stage that allows for the performance of the construction works), that may be - especially in case of larger buildings - implemented gradually in the agreed partial periods.

It is also necessary to agree for the submission of "building of preparedness", which means an already advanced stage of construction work that will allow for the beginning and continuous performance of supplies erection work by the supplier of the technological part of the construction. Also the so-called "mounting preparedness" can be agreed upon which means a very advanced stage of assembly works falling at one with the technological part of the construction that allows for the construction works of subcontractors necessary for the full completion of the construction (e.g., floor screeds, tiles, paint and other finishing works).

The provisions of Section 2591 CivC specify that if it is necessary to perform the work under the participation of the Customer, the Contractor shall provide him with a reasonable amount of time for its rendering. If the time limit expires, the Contractor shall have the right - according to its choice - either to ensure an alternative performance on the Customer's account or, if notified in advance, withdraw from the contract.

This provision shall apply in particular (but not only) on materials that the Customer committed himself to supply to the Contractor (but may be also related to some documentation, etc.).

If the things the procuration of which the Customer committed himself to arrange shall not be provided in time, legal rules specify that the Contractor may provide for it a reasonable period of time and after its expiration he may, after prior notice given to the Customer, provide the things on behalf of the Customer. The Customer is then obliged to pay their price and expedient costs without undue delay, after being requested to do so by the Contractor. The things necessary for the performance of the work to the provision of which the Customer shall not be obliged, shall be arranged by the Contractor.

The subsequent provisions of Section 2592 and 2593 CivC correspond to the previous regulation by the ComC. They provide that the Contractor shall proceed in the performance of the work independently. The opposite - should he be bound exclusively by the instructions of the Customer - applies only in the case if this has been agreed to corresponds to custom practice.

The Customer is entitled to supervise already the performance of the work. In case of constructions supply of machinery technology this function is performed by the Technical Supervisor. Should he find that the Contractor declines from his obligations he may ask for remedy and a proper performance of the work (e.g. by recording a relevant protocol in the Construction or Assembly Journal). If the Contractor is in breach of his obligations and shall not provide for remedy within a reasonable time and the Contractor's performance lead without any doubt to a substantial breach of the contract, the Customer may withdraw from the contract.

The following provision of Section 2594 CivC has essentially the same solution as used previously by the ComC. The obligation to give notice without any delay is given hereby for the case that the nature of things or orders given by the Contractor is inappropriate. This applies when due care is exerted. It does not mean that the Contractor would have to e.g. execute again all the attest certifying the properties, however, he cannot accept the "inputs" from the Customer without giving them the necessary attention.

Should an inappropriate thing or instruction constitute an obstacle to the proper implementation of the work, the Contractor shall suspend the performance of the work until the replacement of work changes the instruction. The deadline for the completion of the work shall be extended by the period of the suspension and the Contractor is entitled to reimbursement of the costs associated with it for the specified period of time. Should the Customer insist on the thing delivered or instruction given the Customer may request that the Customer will confirm the latter in writing. Should the Contractor proceed in accordance with this rule given by Section 2594 the Customer shall not be entitled to compensation of damage resulting from improper things or orders.

In accordance with Section 2595 there is moreover the right of the Contractor to withdraw from the contract should the Customer insist on the performance of the work under the apparently inappropriate instruction or with the use of apparently inappropriate things after a warning is given by the Contractor.

Should the contractor supply a thing processed during the performance of the work, he is - as regards the thing - in the position of the seller when the thing becomes part of the work. It is considered that the purchase price is included in the price.

The things that should be supplied by the Customer to the performance of the work shall be handed over to the Contractor in the time specified by the contract, otherwise, without undue delay after the conclusion of the contract. In doubts, it shall be considered that the price for the work shall not be reduced by the purchase price of the thing.

Should the Customer not provide the things which he has committed himself to supply, in time, it is stipulated that the Contractor may provide him with a reasonable

extra period of time and after its expiry is entitled, after the prior notice, to provide for the things on behalf of the Customer. Should the Contractor so request, the Customer is then obliged to pay for the price and connected costs without undue delay. The things required for the performance of the work that the Customer is not obliged to supply in accordance with the contract, shall be provided for by the Contractor.

This means that the Contracting Parties may agree who shall provide for the things required for the performance of the work. Should the Contracting Parties do so, the contractual arrangements shall apply. If the contract does not provide for these matters, then it is deemed to be agreed that the things shall be provided for by the Contractor.

Should the subject -matter of the work be a thing specified individually, the right of ownership shall be acquired by the Customer. This does not apply when the Contractor has processed a thing supplied by the Customer in another location than the Customer´s or on his land or provided for by him, or when the value of the work is the same or higher than the value of the thing processed. In such a case the right of ownership shall be acquired by the Contractor. This is ruled explicitly by Section 2599/1 CivC, the manufacture of things specified by kind determines the ownership of the Contractor's (Section 2599/2 CivC). This corresponds to the previous rules of the ComC.

The following provisions apply for the situation of thwarting of the work. Should the Contractor acquire the ownership right by the processing of the thing and the work will be thwarted for reasons not accountable to the Contractor, the Customer shall not be entitled to the compensation for things he handed over to the Contractor for processing. (The rights from unjustified enrichment according to the CivC shall remain unaffected.) However, should the same situation occur for reasons accountable to the Contractor, the Customer shall provide compensation for its processed thing, or shall return to him a thing of the same kind.

The determination of person who bears the risk of damage to the thing and who has the right of ownership, is of course, of considerable importance. It can be documented, for example, on cases of works in construction. Should the contract specify that the Contractor is the owner (then we can recommend to the Contractor to insure the thing and include the premium in negotiation of the price for fork) and the Customer, for example, fulfilled the conditions for initiation of bankruptcy proceedings, the work will not be included into the assets of the bankrupt. As a consequence of this situation, however, is the fact that the Contractor shall bear the risk of damage to the manufactured thing (unless agreed otherwise).

On the contrary, should the Customer be the owner of the work then the work will be included in the assets of the bankrupt and the debt to pay for the price of the work should be included in the list of claims of all creditors. This debt, according to the situation, may eventually be satisfied only to a minor extent, if at all. However, the Contractor shall not bear the risk of damage to things. Nothing prevents the closing of a potential agreement by the fact that the Customer shall bear a risk of accidental damages, however, as the owner until full payment of the work shall remain the Contractor.

It is therefore possible that the owner will be one Contracting Party and the risk of accidental damages shall be borne by the other Party. It can also be arranged for ownership and risk of damages in case of real properties, existing buildings and the construction site to be passed to the use of the Contractor (for the time of the construction) and different arrangements for the performed work itself.

The individual contractual arrangements must be based on the specific conditions relating to the Contracting Parties and the nature of the work. In particular, it is necessary to take into account the way and terms of payment, if any Contracting Party has taken a

credit, whether the work is subject to a lien, whether it shall become part of another work, etc.

We should not omit the arrangements for early securing against damage and insurance of the work at the time of construction in process. The contract should also address the issues associated with potential termination of the obligation to perform the work.

When dealing with questions of ownership right, we may encounter in practice the situation that incompatible solutions are chosen as for relations between the Customer and the Contractor on the one hand, and the relations between the Contractor and its Subcontractor on the other hand. For the identical subject-matter, if one contract is agreed (as follows from the law), in the case of the ownership of the Customer and a subcontract to the latter the subcontractor's right of ownership is agreed. Such a solution should be avoided and the entire supply system should have an identical ownership regime.

According to Section 2604 CivC the work is performed when it is completed and passed to the Customer. Both conditions must be met. The work is held to be completed if its capacity to serve its purpose is demonstrated. The Customer takes over the work performed with the reservations or without reservations. The Customer should properly perform the inspection of work. Should the work be taken over without reservations the court will afterwards not adjudge him the right to reclaim apparent defects of the work should the Contractor object that the right has not been exercised in time.

As the eligibility of the work to serve its purpose indicates the completion of the work, it is suitable to state the purpose of the work directly in the contract. The Customer should become acquainted with the work properly. He shall in particular exercise the right to claim with reservation (s) apparent defects of the work.

By agreement it shall be determined when the performance of the work will be completed, including the agreed conditions of the tests and the conditions for recording the Protocol on Takeover (including its content). A completion of the work in parts can be agreed as well, by separate construction objects and operational settings. At the same time, corresponding bonuses and penalties (fines) in relation to these periods can be arranged for.

The completion of the work consisting in construction activities will be more complicated. The timely fulfillment and proper performance will often depend on the interaction (agreed upon in an appropriate way) of other persons, in particular of the Customer (passing of the construction site as mentioned above or handover of construction documentation).

In many cases, the Contractor is unable to secure the complete performance of the work through its own employees, but will arrange for subcontracts (in particular, wiring, insulation, air-conditioning, etc.). The CivC allows such solution. The Contractor may namely assign the performance of the works to another person should the contract or the nature of the works not imply the contrary. When the work is performed by another person, the Contractor is responsible as if he would perform the work by himself.

The contractor can also conclude with its subcontractors contracts for work but also sale contracts and other types of contracts, including innominate contracts. For these cases we can recommend that the Contractor negotiate the terms and conditions of subcontracting in conformity with the terms of the (main) contract with the Customer.

4 Conclusions

We can say that the treatment under consideration is in line with the legislation in other developed countries. In the case of a contract, reference may also be made to the

use of the FIDIC business terms. We can appreciate very positively the regulation by Section 2628 CivC. It specifies that the Customer does not have the right to refuse takeover of a construction because of isolated minor defects that as such and even in connection with others does not prevent the use of the construction neither functionally or aesthetically and that do not limit its use in a substantial way. The ratio of this provision is that in case of constructions we can never avoid minor defects (e.g. paint). Also the regulation of other states (e.g. conditions for the performance of construction in German law) contain the same rules. In fact this reality was already mentioned in the Economic Code which was broader and covered also minor individual defaults. The ComC did not contain such a rule if not agreed by the Contract Parties; therefore it has appeared to be too strict. However, we must stress in this context the agreement must cover only defects defined by Section 2628CivC.

As regards the rights emerging from defective performance, the CivC of 1964 defines the period during which they may be claimed as a period of three years (Section 646/3), but the ComC as a period of five years (Section 562/2). The new regulation of CivC takes over the rule of ComC. Implementing the regulation to CivC may, however, in justified cases provide for a shorter period for some parts of the construction of up to two years. However, there is also a rule that specifies: "Should the parties agree a shortening of this period, it shall not be taken into consideration, if the Customer represents the weaker Party to the contract."

Section 2360 CivC provides for cases when there are other persons committed jointly and severally with the Contractor and when the contractor shall relieve itself of the obligation for defects of the construction. This provision rules for joint and several liability of specified persons together with the Contractor. Section 2360 CivC provides for cases when there are other persons committed jointly and severally with the Contractor and when the contractor shall relieve itself of the obligation for defects of the construction. This provision rules for joint and several liability of specified persons together with the Contractor. These are

- Partial supplies of the contractor
- Person who supplied the building documentation,
- Person who carried out the construction supervision.

The subcontractor, however, is not liable if he proves that the defect was caused only by the decision of the Contractor or of the person carrying out the construction supervision. The person who supplied the building documentation is not accountable if he proves that the defect did not cause an error in the construction documentation.

The Contractor shall not be accountable for defects of the construction if he can prove that

- that defect was caused by an error in construction documentation, supplied by a person chosen by the Customer,
- the only failure was in the construction supervision, the person of Supervisor chosen by the Customer.

Other provisions adopt with minor changes the previous legislation in Section 556 to 559 ComC. New rules amended are related to the works in competition that - although very necessary - were missed in our legal system so far.

Should the work consist in another result than the manufacture of things or maintenance, repair or modification of things, the Contractor shall proceed in performing work as agreed and with professional care so as to achieve the result specified by the contract. It is therefore specified that the work may result in other activities, for example. Software, project documentation or other documentation.

The result of the activity, i.e. work with intangible results, shall be passed to the Customer. It is deemed to be passed if

- completed and
- the Contractor allows the Customer its use.

The result of the activity that is subject to rights of industrial or other intellectual property can be provided by the Contractor also to persons other than the Customer, if this was agreed. Should the contract contain no explicit prohibition on such a provision, the Contractor shall be entitled to do so unless it is contrary to the interests of the Customer due to the nature of the work. Crucial for the provision of the result to other persons is the arrangement of the Contracting Parties. Here a suitable agreement of the Parties is strongly recommended.

Should the subject-matter of the work consist in the result of activities protected by the industrial property law or other intellectual property rules, it shall be deemed that the customer has provided the work to the Contractor for the purpose arising from the contract.

As we can see a refutable presumption is put to the rule that the result of the activity specified by the contract has been provided by the Contractor to the Customer for the purpose arising from the contract. Also in these cases, it is appropriate to agree on suitable arrangements between the parties.

The last provision on the contract for work in the ComC specifies that the provisions of the part dealing about work with intangible outcomes shall apply mutatis mutandis to the outcome reached in accordance with the provisions of the public promise (competitive work).

The importance of contractual negotiations for contracts for work is evident exactly for the wide range of contractual freedom allowed by the CivC and from the fact that the Code does not contain rules on partial issues and leaves them to the Contracting Parties (e.g., supply of spare parts, service, length of the warranty period, sanctions, invoicing, payment, tests, takeover, cooperation on the construction site, details of taking records in the Construction Journal, etc.). The recommendations contained in the present paper that are based on practical experience of the author may be used for the contractual negotiation.

References

Bejček, J., Marek, K., Kotásek, J., Ondrejová, D. (2012) *"Nástin obchodního práva. II. 2nd Edition",* Masarykova univerzita, Brno, Czech Republic.

Eliáš, K., Zuklínová, M. (2001) *"Principy a východiska nového kodexu soukromého práva",* Linde Praha, Praha, Czech Republic.

Marek, K. (2018) *"OZ v praxi, smlouva o dílo",* Bulletin advokacie, Česká advokátní komora, Praha, Czech Republic.

Marek, K. (2012) *"K uzavírání smluv. Právní fórum",* Wolters Kluwer, Praha, Czech Republic.

Marek, K. (2014) "Contract for Work Under Civil Code", In: *Procedia Ekonomics an Finance*. Vol. 12, pp. 387–396.

Marek, K., Hajnišová, E. (2015) "Contract for Work", In: *International scientific and practikal conference of zoung scientists and students 14.- 15. 5. Sborník z konference Time of challenges and opportunities : problems, solution and prospects*, Baltská universita, Riga, Latvia.

Statistical view of metal waste recycling and its impact on macro environment

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Abstract

The paper deals with the context of economic changes is to highlight the demand for new, alternative ways of recycling materials in dependent with currently rising raw material prices and demand for cheaper raw materials that could suitably replace the existing one. One area of current interest is waste management. Especially in our region is the issue of recycling and reuse of waste materials economically very relevant with regard to the industrial character of the region, a high proportion of old environmental burdens and very promising economic prospects treatment of certain wastes. In the paper, basic approaches to solving it is necessary to focus on the complexity of processing different types of waste has been carried out followed by adjustment of the input when the waste separation process categorizes the part of recyclable and non-recyclable portion, which can be processed biological and thermal treatment. Environmentally can handle only a fraction of the waste. Therefore, efforts orient mainly on modern trends using plasma technology to treat waste or unusable, including municipal waste.

Keywords: recycling; waste; industrial region; environmental.

JEL Classification: L61, P23, Q56

Article Classification: Research article

1 Introduction

Currently in Czech Republic, Act of 15th May 2001 on waste is in force (No 185). This Act defines waste as: "any substance or object, which the holder thereof discards or

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intends or is required to discard" (Act of 14th December 2012). The act presents also ways of their treatment.

The Act on waste also defines a hierarchy of ways of waste management practice, which are characterized in detail (Act of 14th December 2012):

- prevention of generation of waste,
- preparing for re-use,
- recycling,
- other ways of recovery,
- waste disposal.

This act also defines main ways of dealing with waste (Act of 14th December 2012):

- recovery means „any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy",
- recycling means „any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations",
- waste disposal means „any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy",
- incineration of waste shall mean waste „oxidation processes, including burning, gasification or decomposition of waste, including pyrolytic decomposition, performed at dedicated facilities or facilities (including waste incineration plants) on principles set out in detailed regulations",
- waste storage means „a temporary waste accumulation, which include: preliminary storage of waste by their producer, temporary storage of the waste by the unit colleting waste, storage waste by the unit processing waste. Waste intended for recovery or disposal, except landfilling, can be stored if the necessity for storage results from technological or organizational processes and does not violate time limits justified by these processes, however, not longer than for 3 years".

The main cause of excessive waste generations is irrational resource management. Waste collected on landfills can be used to a large extent as secondary raw materials, valued at several hundred million dollars. It is not possible to reduce the mass of generated waste to a level that ensures the balance of raw materials, ecology and sanitation without the far-reaching synchronization of technology and the way people live with the shaping and functioning of the ecological structure in a given area. Action to reduce the amount of generated and collected waste in the environment should include (Radziewicz J., 2010):

- recycling of waste materials at the place of origin,
- recycling of waste materials outside the place of origin,
- minimizing the production of waste through the use of modern, low- or no-waste technologies, modification of the designed products,
- replacement of traditionally used raw materials.

The use of waste as a secondary raw material, besides eliminating environmental pollution, also provides many economic effects in the form of (Radziewicz J., 2010):

- the increase of the raw material base of the national economy,
- the reduction of capital and energy consumption of raw materials acquisition and processing,
- the reduction of material consumption and production costs.

The article presents the analysis of the levels of recovery and recycling of selected waste generated in Czech Republic in 2017.

2 Recycling of waste

In materials management the use of raw materials and recovery materials is becoming increasingly important. Many kind of materials of mineral origin (such metals) and organic (e.g. rubber, wood, paper) return to production processes in the form of secondary raw materials. The use of waste means that the demand for materials is growing much slower than the volume of production in industrialized countries (Materials Management in 2015, 2016).

Nowadays, by upward tendency in materials recovery can be observed. In many cases, the return rate of materials is up to 90% by more efficient waste sorting system and consistent policy that prefers the use of waste. The use of waste is also becoming more and more important in Poland for ecological and economic reasons. It is related to the protection of natural environment as well as the reduction of the energy consumption during production process. It results in the inrease of use of waste that is the source of cheap and environmental friendly materials (Materials Management in 2015, 2016).

Wastes suitable for recycling „are useful waste materials generated in production processes (post-production waste) as well as used products (post-consumption waste) and pre-sorted (segregated) municipal waste fractions (without processing) which can not be directly used in manufacturing". They are divided into two groups (Statistical yearbook of the Republic of Poland (2016):

1. METALLIC WASTES SUITABLE FOR RECYCLING – include steel and iron scrap, scrap of nonferrous metals and their alloys, discards of metallurgic metals and their alloys and post-consumption waste mainly obtained from procurement:

- *Process scrap* is scrap that is generated in various phases of the metallurgical production. The supply of process scrap is influenced by the share of continuous casting of steel and the range of metallurgic products.
- *Post-production* scrap is scrap generated in plants processing metallurgic products.
- *Post-consumption scrap* is generated as a result of withdrawing from use metal products used in previous periods. It is assumed that steel returns to the production process in the form of postconsumption scrap in the period of 15-20 years from its production.

2. NON-METALLIC WASTES SUITABLE FOR RECYCLING – are waste materials generated in production processes and post-consumption waste that mainly come from procurement. The most important non-metallic wastes includes: plastics, waste paper, waste rubber, cullet, textile wastes and used oil.

The use of wastes – recovery of secondary raw materials (obtained from production processes and also obtained from procurement) is more and more important in Czech Republic for ecological and economic reasons. This is combined with the protection of natural environment and reduction of energy consumption by production

processes, which involves an increase in use of wastes that are a source of cheap and pro-ecological materials. This concerns among others scrap and wastes steel, non-ferrous metals (copper, aluminium, lead, zinc and tin). Acquisition of metals from waste materials consumes less energy than their acquisition from original sources (Materials Management in 2015, 2016).

3 Presentation of results

The chapter presents the results of amounts of waste and levels of recovery and recycling of waste generated in Czech Republic. The collected results include data from Central Statistical Office in Czech Republic.

In Czech Republic the amount of generated waste is on the level of approx. 40 million t. These wastes include municipal waste. The amount of waste excluding municipal waste was on the level of approx. 30 million t.

In 2017 in Czech Republic almost 31 million t of waste, excluding municipal waste, was generated. These wastes were generated by industrial companies. Figure 1 shows the structure of industrial waste generated in Czech Republic in 2017 by type.

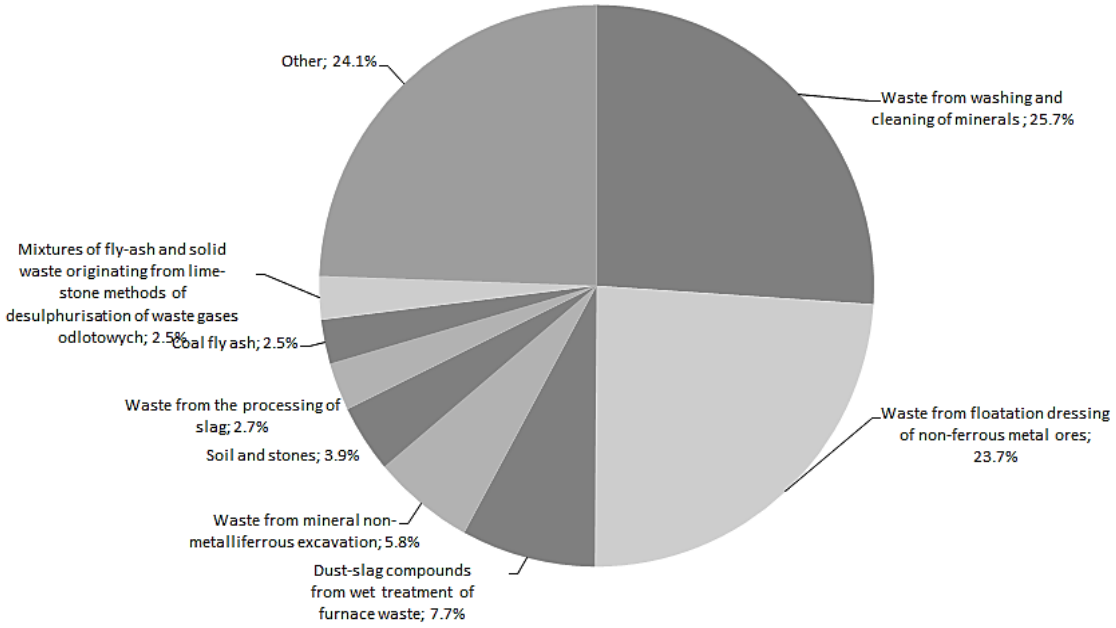

Figure 1 The structure of industrial waste generated in Czech Republic in 2017; source: modified by (Statistical Yearbook of Industry-Poland 2016, Environment 2016)

Based on the results presented in Figure 1 it can be said that among industrial waste generated in Czech Republic in 2017 the largest amount of them was waste from washing and cleaning of minerals (over 25%) and waste form flotation dressing of non-ferrous metal ores (over 23%). The large group of waste was waste that were non classified in any other type. Figure 2 shows the level of industrial waste utilization according to the way of treatment of them in Czech Republic in 2017.

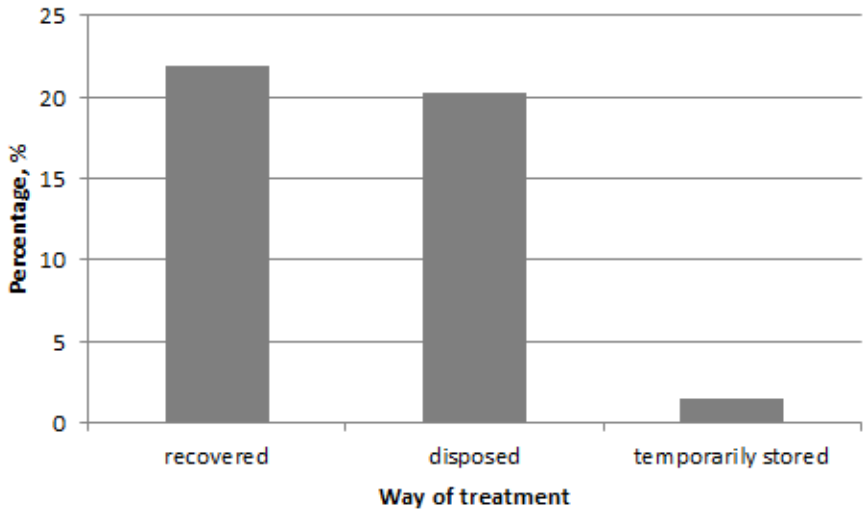

Figure 2 Percentage of industrial waste utilization according to the way of treatment in Czech Republic; source: modified by (Statistical Yearbook of Industry-Poland 2016, Environment 2016)

Among 131 million t of industrial waste generated in Czech Republic in 2017, almost 22% of them were recovered, over 20% - was disposed and approx. 1.4% was temporarily stored.

The high level of recovery is recorded for many groups of waste. In 2017 over 5,026 thousand t of packaging, 131 thousand t of gear oils and 222 thousand of tyres were introduced into the market. The achieved levels of recovery and recycling of packaging and post-consumer waste in 2017 were presented in Figure 3.

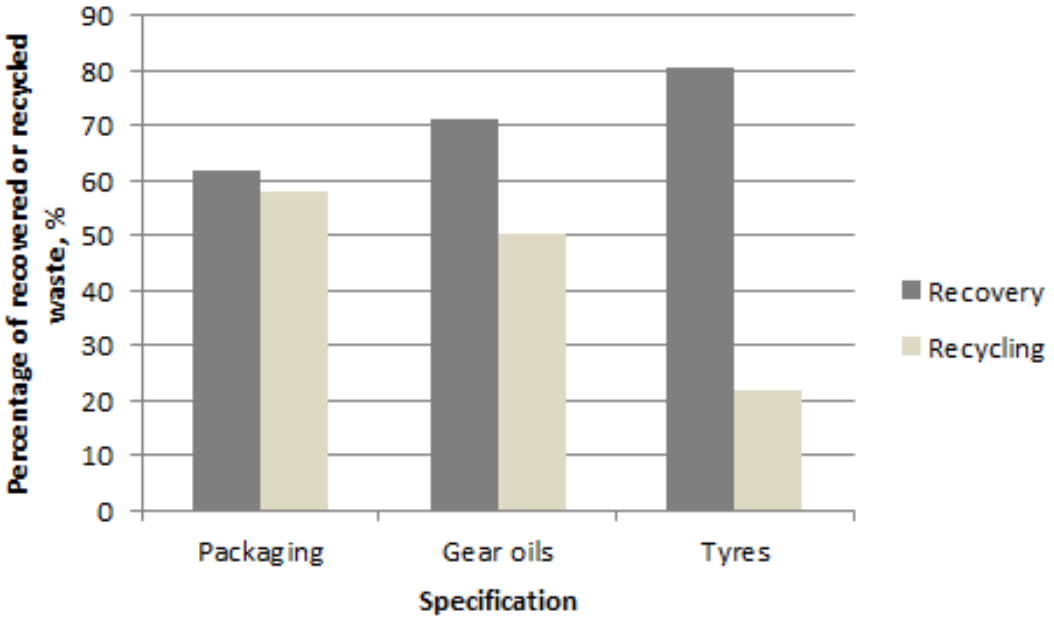

Figure 3 Achieved levels of recovery and recycling of packaging and post-consumer waste in 2017; source: modified by (Statistical Yearbook of Industry-Poland 2016, Environment 2016)

The data presented in Figure 3 shows that in 2017 almost 62% of packaging were recovered (including almost 58% recycled), over 71% of gear oils were recovered (more than half of them were recycled). In case of tyres, the level of achieved recovery was more than 80%, however only 22% of tyres introduced into the market were recycled.

Packaging waste is one of the main groups of waste. Among them there are three main types: packaging waste from household glass, packaging waste from paper and

cardboard and packaging waste from plastics. Achieved level of recycling of packaging waste by type in 2017 is presented in Figure 4.

According to data presented in Figure 4 it can be said that the highest level of recycling in Czech Republic in 2017 was achieved for packaging waste from paper and cardboard and it was almost 80% of this type of waste introduced into the market. Significant level of recycling (over 57%) was achieved for packaging waste from household glasses, while the level of recycling of waste from plastics was only over 32%.

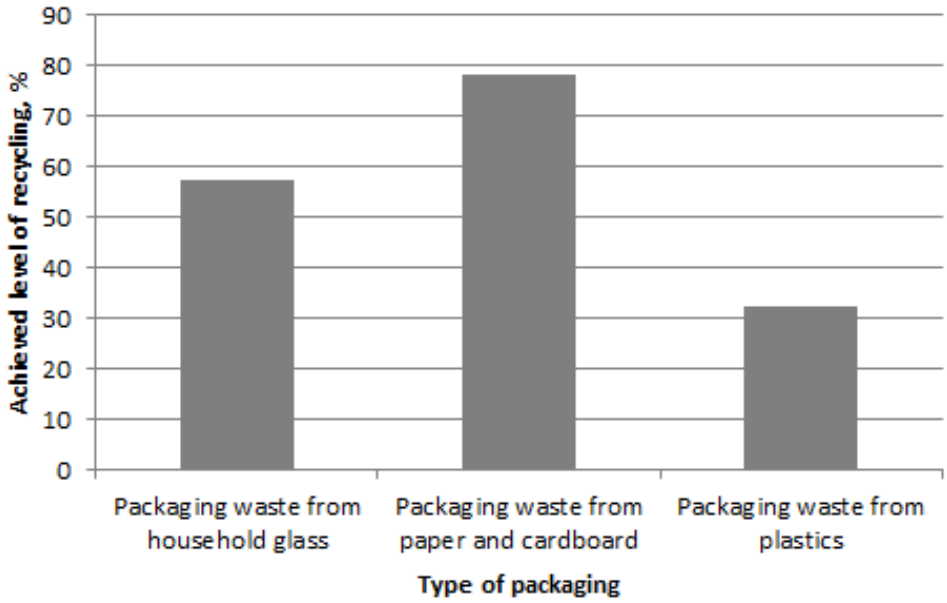

Figure 4 Achieved level of recycling of packaging waste by type in 2017;

source: modified by (Statistical Yearbook of Industry-Poland 2016, Environment 2016)

Czech Republic increases systematically the number of end of life vehicles that are recovered or recycled. During the analysis of Czech market, it is necessary to take into account the changes on regulations and the specific economic situation that occurred in Czech Republic after the accession to the European Union. As a result of these changes, the number of newly registered cars in our country, which were imported from Western countries increased considerably. These cars are mainly old and damaged, which are only suitable for scrap after a short time of the use. It means the increased need to dispose a large number of cars (Jakubiak, M., Grzesik, K., 2014).

In Czech Republic in 2015 over 83 thousand t of end of life vehicles was handed over to dismantling facilities. Over 97% of the mass of these vehicles were processed in different forms of recovery and recycling.

Descriptions waste - electronic waste - that fast technology obsolescence places great demands on the continuous innovation of electric equipment even if the existing one still works. Therefore a considerable amount of electric waste is cumulated. This waste can be partially used for renovation and repeated use for users having lower demands, partially it can be recycled for secondary raw materials. Nevertheless not small amount of this waste still ends at waste disposals. This kind of waste contains among others heavy metals, toxic substances dangerous for the environment but also precious metals that could be recycled using new processing methods.

In compliance with strategy of the Association for Waste Disposal it is necessary to support use of wastes aiming to limitation of waste amount determined for elimination and save natural sources, mainly through repeated use, recycling, composting and use of energy from wastes. Personal computers, incl. all their parts, CPU, monitor, keyboard and

mouse rank among the group "equipment of information technologies and telecommunications systems". At present personal computers that fully or partially work are scrapped because they do not suit to their users because of their parameters. Functional parts such as for example hard discs of these personal computers can be used further on as for example reserve source or they can serve to less demanding users. If it is not so, waste of electric and electronic devices originates. We can gain precious kinds of materials just from this type of electronic waste, mainly metals such as iron, copper, aluminium and other ones that can be used and recycled by common methods.

All over the Europe volume of originating electric and electronic waste is increasing. Each consumer produces on average 16 kg of waste per year, which means 6 mil. tons per year all over the Europe. It means a huge wasting of resources as well as a serious threat to the environment. Electric appliances and electronic equipment contain highly toxic heavy metals and organic contaminants. Many European countries have taken measures forbidding electronic waste disposals. Nevertheless in some European countries introduced practice in electronic waste disposal continues. Personal computers, incl. all their parts are one of the components of electronic waste (Materials Management in 2015 (2016), Statistical yearbook of the Republic of Poland, Central).

Electronic waste is one of the waste kinds with the most quickly increasing volume. Its amount is growing by 3-5 % annually all over the world. With rapid development of information technologies already functional electronic equipment that is not convenient any more is scrapped.

Every year 200,000 tons of new electric appliances are sold in the Czech Republic and at the same time 140,000 tons of electric waste originates. Majority of this waste continues to end at the waste disposals 8 mil. tons of electric appliances are scrapped in the EC.

At present there is a number of companies in the Czech Republic dealing with collection, transportation, sorting and then even processing of electric and electronic waste ((Statistical Yearbook of Industry-Poland 2016, Environment 2016).

In Czech Republic, the amount of generated and collected municipal waste is constantly increasing. In 2007 the amount of generated municipal waste was on the level of 245 kg per capita, in 2017 it reached the level of 283 kg per capita. These wastes included both groups of waste: mixed and collected separately.

Figure 5 shows the structure of collected waste, including both groups: mixed and collected separately.

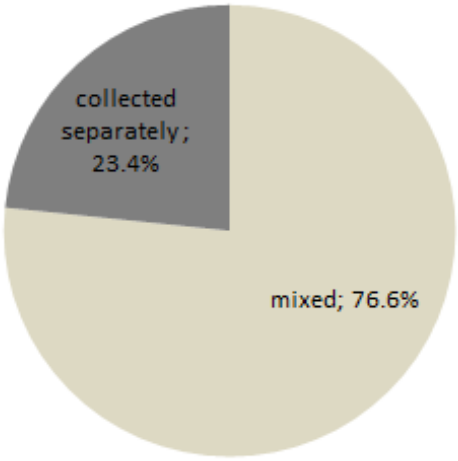

Figure 5 The structure of municipal waste collected in Czech Republic in 2007 according to the way of generating; source: modified by (Statistical Yearbook of Industry-Poland 2016, Environment 2016)

Based on results presented in Figure 5 it can be concluded that more than 76% of collected municipal waste was mixed waste. Only about 23% of waste were collected separately. Figure 6 shows the amount of waste collected separately in Czech Republic in 2017 by their type.

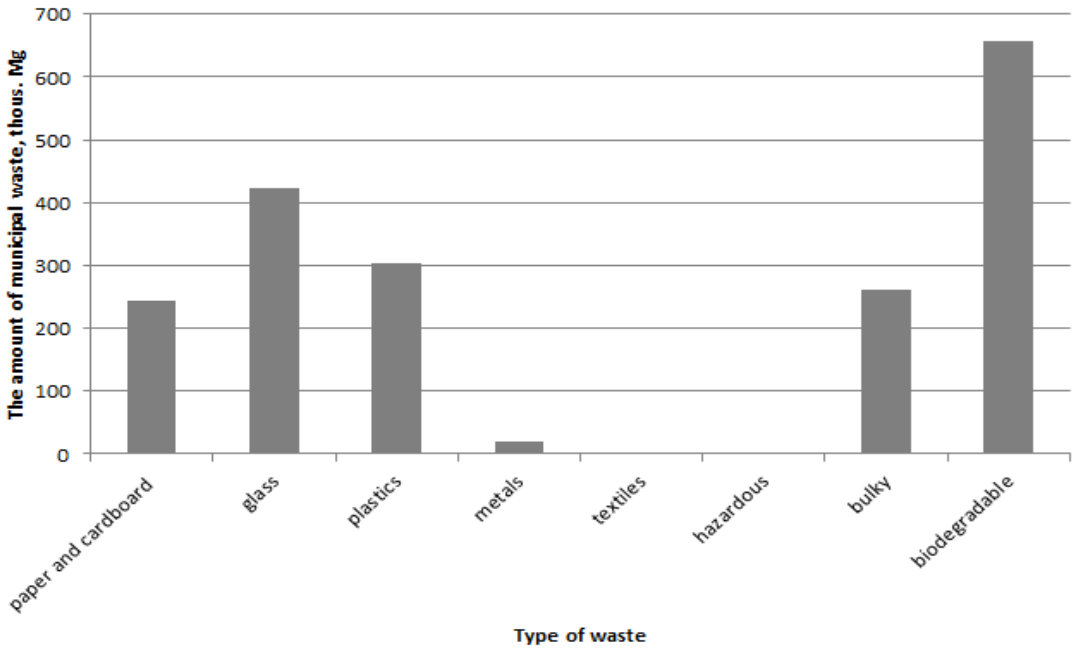

Figure 6 The amount of collected municipal waste collected in Czech Republic in 2017; source: modified by (Statistical Yearbook of Industry-Poland 2016, Environment 2016)

Figure 6 shows that the largest amount of municipal waste collected separately was biodegradable waste, the amount of this type of waste was on the level of 657 thousand t, glass (424 thounsand t) and plastics (303 thousand t). The smallest amount of waste was: textiles (1.7 thousand t) and hazardous waste (1.2 thousand t).

Municipal waste, like any other type of waste, was properly treated. Figure 6 shows the structure of municipal waste generated in our country in 2017 according to the way of treatment.

Figure 7 shows, that in 2017 over 44% of generated municipal waste was delivered to landfills, more than 26% – recycled, 16% – composted or fermented and 13% - incinerated.

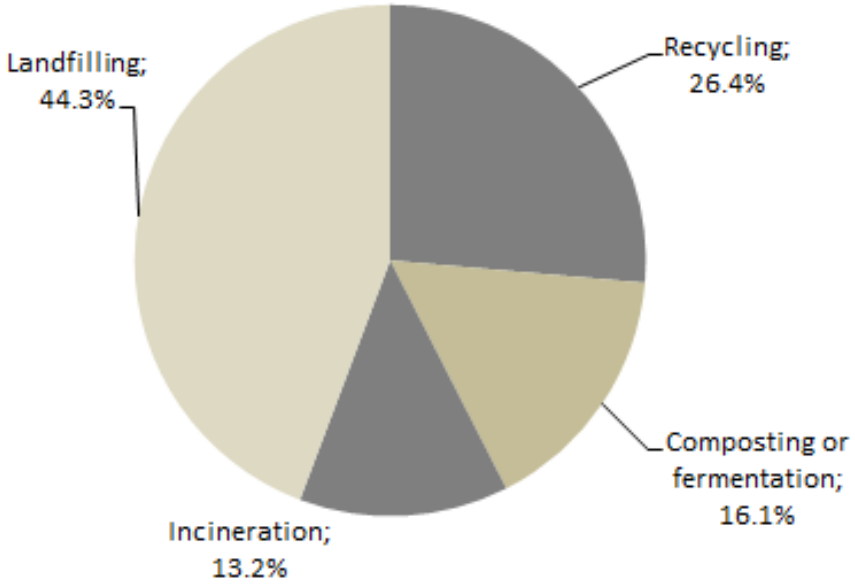

Figure 7 The structure of municipal waste generated in Czech Republic in 2017 according to the way of treatment; source: modified by (Statistical Yearbook of Industry-Poland 2016, Environment 2016)

4 Discussion

In Czech Republic in 2017 41,848 thousand t of waste was generated in total. They included both industrial and municipal waste. In the case of industrial waste, almost 22% of them were recovered, over 20% – was disposed and approx. 1.4% was temporarily stored. In the case of municipal waste: 26% of waste was recycled, 16% – composed or fermented, 13% – incinerated and 44% – delivered to landfills. However, it should be noted that in recent years the level of waste management increased. Appropriate levels of waste management, that Polish economy is currently pursuing, was adopted. It should be highlighted that a new National Waste Management Plan has been set up, in which new environmental objectives has been set for the country (National Waste Management Plan 2022 (2016).

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References

Act on waste electrical and electronic equipment (OJ. 2005, No 180, item 1495).

Act of 14th December 2012 on waste is in force (2013) *"Zákon o odpadech. MŽP",* Available at: https://www.mzp.cz/www/platnalegislativa.nsf/d79c09c54250df0dc1256e8900296e32/8fc3e5c15334ab9dc125727b00339581?OpenDocument.

Ari, V. (2016) "A review of technology of metal recovery from electronic waste", Chapter 6, In: *E-Waste in Transition - From Pollution to Resource.*

Brožová, S., Drápala, J., Kursa, M., Pustějovská, P., Jursová, S. (2016) "Leaching refuse after sphalerite mineral for extraction zinc and cobalt", *Metalurgija.* Vol. 55, No. 3, pp. 497–499.

Brožová, S., Ingaldi, M., Šperlín, I. (2013) "Economical aspects of high-temperature heating utilization for industrial waste treatment", In: *METAL 2013 - 22nd International Conference on Metallurgy and Materials, Conference Proceeding, Brno,* Czech Republic,

Brožová, S. (2013) "Possibility of using pyrolysis and plasma during disposal of plastic parts of electric waste", In: *International Multidisciplinary Scientific GeoConference Surveying Geology and Mining Ecology Management, 2013, SGEM, Albena,* Bulgaria.

Castro, L., A., Martins, A., H. (2009) "Recovery of tin and copper by recycling of printed circuit boards from obsolete computers", *Brazilian Journal of Chemical Engineering,* Vol. 26, pp 649–657.

Cui, H., Anderson, C., G. (2016). "Literature Review of Hydrometallurgical Recycling of Printed Circuit Boards (PCBs)", *Journal of Advanced Chemical Engineering,* Vol. 6, pp 1-11, 2016.

Dvorsky, R., Slíva, A., Luňáček, J., Pikšová, K. (2010) "Preparation of silicon nanoparticles by means of disintegration in a cavitation water jet", In: *2nd NANOCON International Conference. Olomouc:* TANGER, Czech Republic.

Central Statistical Office (2016) *"Environment",* Warsaw, Poland.

Jonšta, P., Váňová, P., Brožová, S., Pustějovská, P. (2016) "Hydrogen embrittlement of welded joint made of supermartensitic stainless steel in environment containing sulfane", *Archives of Metallurgy and Materials.* Vol. 61, No. 2A, pp. 709–711.

Kardas, E., Brožová, S., Pustějovská, P. (2017) "The evaluation of efficiency of the use of machine working time in the industrial company - case study", *Management systems in production engineering.* Vol. 25, No. 4, pp. 241–245.

Kardas, E., Brožová, S. (2013) "Situation in waste treatment in Poland", In: *METAL 2013 - 22nd International Conference on Metallurgy and Materials, Conference Proceedings 2013, Brno,* Czech Republic.

Jakubiak, M., Grzesik, K. (2014) "Recycling of end-of-life vehicles. Regulations, technology and practice", *Logistyka 4*. pp. 4339–4347.

Central Statistical Office (2016), *"Materials Management in 2015",* Warsaw, Poland.

National Waste Management Plan 2022 (2016) Resolution No. 88 of the Council of Ministers, July 1th, 2016.

Oujezdský, A., Slíva, A., Brázda, R. (2015) "Using ICT in education: measuring systems interfaced to computers", In: *9th International technology, education and development conference. Madrid: INTED Proceedings, 2015*.

Radziewicz J. (2010) *"Problems of waste management in Poland, Agricultural Electronic Warehouse, No 42 Ecology and Environment"*, Available at: http://rme.cbr.net.pl/index.php/archiwum-rme/13-nr-42/ekologia-i-srodowisko/12-problemy-gospodarki-odpadami-w-polsce

Slíva, A., Samolejová, A., Brázda, R., Zegzulka, J., Polák, J. (2003) "Optical parameter adjustment for silica nano and micro-particle size distribution measurement using mastersizer 2000" *MICROWAVE AND OPTICAL TECHNOLOGY, 2003,* Vol. 5445, pp. 160–163.

Slíva, A., Brázda, R., Procházka, A., Martýnková, G., S., Barabászová, K., C. (2019) "Study of the optimum arrangement of spherical particles in containers having different cross section shapes", *Journal of nanoscience and nanotechnology.* Vol 19, No. 5, pp. 2717–2722.

Slíva, A., Brázda, R., Procházka, A., Martýnková, G., S., Barabászová, K., C. (2019). "Investigation of geometric properties of modified titanium white by fluidisation for use in the process of transport, handling, processing and storage", *Journal of nanoscience and nanotechnology,* Vol. 19, No. 5, pp. 2997–3001.

Statistical yearbook of the Republic of Poland (2016) Central Statistical Office, Warsaw, Poland.

Statistical Yearbook of Industry-Poland (2016) Central Statistical Office, Warsaw, Poland.

Business Competitiveness in the Conditions of the Fourth Industrial Revolution

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Abstract

Businesses are currently facing the onset of the Fourth Industrial Revolution which is characterised by rapid changes in production methods and the implementation of previously unknown innovations. Digitization and automation are the driving forces increasing the speed and effectiveness of production as well as other related activities. Success of businesses is based on an advanced technology foundation, innovative labour force and effective processing of data. In addition to production activities, automation and digitization affect business and marketing activities with more and more emphasis being put on innovation and quality of on-line processes. New customer relationships based on the perception of customer requirements and the speed and quality of their fulfilment are one of the main pillars of company competitiveness. One of the paths, which has been already taken by a number of businesses, is the use of e-commerce. This business model offers a number of advantages to customers as well as the companies themselves. Customers do not have to go to a store to be able to purchase their selected product but instead they can conveniently order from the company's e-catalogue and pay online using any of the payment methods offered by the store. The main reason behind companies' decision to engage in e-commerce is cost reduction. This article evaluates competitive capabilities of a business specialising in products for leisure activities using the Porter's five forces model, selected indicators of the financial analysis and the SWOT analysis, and innovations for the individual components of the marketing mix for the company's portfolio are proposed.

Keywords: competitiveness; Industry 4.0; e-commerce; micro and macro environment analysis; marketing mix.

JEL Classification: M21, M31, M41

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1 Introduction

The concept of a 4th Industrial Revolution has been taking place in the world since the beginning of the 21st century; its driving force is digitalisation and automation. Automating current processes and activities results in more reliable, precise and cheaper products while using materials more efficiently. This industrial revolution is characterised by the interconnection of technology and communication with the environment, leading to a change in the shape of current businesses to a "smart factory". A typical phenomenon of industry 4.0 is the so-called "Internet of Things", which generally means linking things and people together over the Internet. In contrast, "Internet of Services" is based on on-line collaboration and data sharing in cloud storage via a web browser. (Mařík, 2015)

The position of businesses is changing within this 4th Industrial Revolution - if they want to be successful in their field of business, they must respond adequately to the new environment. Digitalisation and automation are becoming a new attribute of business competitiveness in the 21st century and part of its potential. Significant technological advances in recent decades, accompanied by the rapid development of communications technologies, are placing ever increasing demands on businesses. The changing market environment is pressing businesses to provide customers with exceptional value in order to maintain their competitiveness. The value created thus becomes a competitive advantage for the company and also a major incentive for the customer in deciding on the purchase of products or services. After thoroughly analysing its internal and external environment, assessing its strengths, weaknesses, opportunities and threats, a business can identify and gain a competitive advantage. It is equally important however to maintain a particular competitive advantage, which is very difficult in today's globalised world. The same or similar products and services are offered by competitors from different regions of the world. Thus, a rapid response to changes in customer demand is essential, as are product and process innovation in companies, and investing in the development of those capabilities that are important for creating and maintaining a competitive advantage.

In order to remain competitive, business entities are currently reorganising their marketing tools to utilise modern communications technologies, as a large proportion of customers today use the Internet for their purchasing activities. E-commerce is a form of business communication where an entire business transaction (purchase, sale, payment) is effected via the Internet. E-commerce is beneficial both for customers (simplicity, availability, convenience, price) and for businesses (cost reduction). Internet shopping is becoming more and more popular, leading to an annual growth in Czech e-commerce turnover, with a year-on-year increase of around 20 percent.

2 Material and methods

2.1 Influence of the Fourth Industrial Revolution on a Company's Competitiveness

Many authors have discussed the impact of the 4th Industrial Revolution on business competitiveness. On the one hand, the new business environment presents an enormous burden for businesses, especially in terms of the demands placed on modernising their processes and activities, and on the other hand it is a challenge for many, which may strengthen their competitiveness.

In today's globalised world, businesses must face not only domestic competition, but international competition as well. (Chen, 2017) explores this issue, looking at the impact of the Fourth Industrial Revolution on international competitiveness. He states that the competitiveness of countries is based on theories of international trade and the

factors of these countries, while business theory is based on Porter's five forces model. Involving countries and companies in the fourth industrial revolution can significantly affect productivity and prosperity of nations. Competitiveness at the national level is explored by Mercedes Delgado (Delgado et al., 2012), who defines competitiveness as the expected level of output for every working-age individual; this competitiveness is then supported by the overall quality of the country as a place of business. The basic factors of competitiveness she presents are social infrastructure, political institutions, monetary and fiscal policies, and especially the microeconomic environment. The authors Siudek and Zawojska (Siudek and Zawojska, 2014) propose the use of composite indicators to present the complexity of aspects related to competitiveness.

The competitiveness of countries and businesses is also closely linked to environmental protection. Some authors (Koneczna et al., 2011) deal with the issue of analysing the competitiveness of environmental goods and services in selected sectors in Poland in order to assess their export potential. In their study, they show that increased environmental spending has an impact on increasing the competitiveness of the sectors analysed in the international market. The topic of sustainable production in relation to competitiveness is examined by Winroth (Winroth et al., 2016), who has created a list of sustainability indicators at different levels of society. The development of the Sustainable Development Consensus for individual countries and their organisation is presented in an article by Jovane (Jovane et al., 2008), who also presents a proposal for a reference model for the active application of sustainable development at national and global levels.

The new business environment is characterised mainly by automation and robotisation of processes and activities. The driving force is digitalisation and automation, which brings higher speed and efficiency not only to production itself, but also to other activities associated with it. The Internet of Things is characterised by linking objects and people via the Internet. Many authors deal with this issue in relation to company management; Accorsi, for example, (Accorsi et al., 2017) states that designing and establishing the Internet of Things can be effectively used to manage the food chain in relation to the endogenous environment. In this context, Manavalan (Manavalan et al., 2019) has created a sustainable supply chain model that meets the requirements of the Fourth Industrial Revolution, which includes five perspectives: management, business strategy, technology, sustainable development and cooperation. Atzori (Atzori, 2010) states that the development of the Internet of Things must be the result of synergies carried out in various fields such as telecommunications, informatics, electronics and social sciences. In a manufacturing firm, using analytical methods before deploying a computer network means more flexible and efficient execution of activities, a prerequisite for setting conditions for industry 4.0. Bagheri (Bagheri, 2015) recommends an adaptive clustering method for linking manufacturing systems. In the use of the Internet of Things and Cloud Computing, Tao (Tao et al.,2014) sees the ability to intelligently perceive the connection between people and machines, as well as for efficient resource sharing. Programming robots in industrial processes is described in an article by Gadaleta (Gadaleta et al., 2019), who points out the possibility of reducing the amount of energy consumed while maintaining product quality. Cochran (Cochran et al.,2017) and Tolio (Tolio et al., 2017) focus on using the breakdown of the manufacturing system design for cost-effective decision making, with the goal of improving the development of the manufacturing system with regard to the conditions of the fourth industrial revolution.

The competitiveness of countries and organisations is also closely linked to innovation processes in businesses. In the environment of Industry 4.0, it is innovations that can make a significant contribution to a company's competitive advantages (Peiro-Signes et al., 2014). Innovative processes in small and medium sized businesses are

addressed by Forsman (Forsman, 2011), comparing production companies and service companies. Significant differences in the innovation capacities of these companies have not been found; major differences occur across sectors. Choi (Choi et al., 2018) explores the possibilities of implementing sustainable development and innovation activities for small and medium sized businesses. He notes that manufacturers often lack the resources, motivation and expertise to meet the goals set. The competitiveness of small and medium sized businesses in China and India is addressed by Rajesh (Rajesh et al., 2009), describing their position and exploring the role of government policies in developing strategies to increase the competitiveness of these businesses. Ahmedova (Ahmedova, 2015) notes that Bulgaria's accession to the European Union provides great opportunities for supporting the development of small and medium sized businesses, using programs to support them. Applying the concept of corporate social responsibility and its impact on the competitiveness of small and medium-sized businesses in Uganda, Turyakira (Turyakira et al., 2014), notes that business interest in concept implementation is increasing, but state support is needed.

2.2 Methodology for Assessing the Competitiveness of a Company

A company can use a variety of evaluation methods to evaluate the current situation with respect to competition. This chapter will describe some selected methods that will be used: a SWOT analysis, the Porter five forces model and selected parts of financial analysis.

A SWOT analysis is an open assessment of the company to focus on highlighting the strengths, weaknesses, opportunities and threats that are of strategic importance. Some strategy-related strengths are more important than others because their impact on the market is stronger and they play a decisive role in implementing an effective strategy. It is therefore very important to make the SWOT analysis conclusions related to the specific situation of the company and evaluate their impact on the selection of the strategy. In order to determine the key factors, it is necessary to carry out a thorough analysis of the current situation (internal environment) and the current situation in the surrounding environs (external environment). Strengths and weaknesses should relate to the internal success factors of the organisation in all relevant areas. It is necessary to determine whether a given factor is on the plus side or minus side. Opportunities and threats are identified and assessed when analysing the external environment. In this section the surroundings of the company are monitored. Opportunities and threats should relate to environmental impacts in all relevant areas. It is important to examine both the micro- and macro-environment of the company. The macro-environment can include economic, environmental, political, technological or legal influences. The micro-environment can include customers, competitors, suppliers or distributors. All of these components affect the company's ability to make a profit. (Kotler, 2013)

Using his model, Porter points out that an industry's profitability is dependent on five competitive factors which affect the prices, costs and investment of firms in an industry. Based on these five competitive forces, the strategic position of a company operating in a given industry can be determined. When entering a market, it is necessary to analyse the five forces that determine the attractiveness of the industry. How much these factors affect competition and the company varies according to the industry. Each sector has a structure; the importance of each factor in each sector is different. Using a five competitive forces model, a company can identify the factors that are critical to the competition and then choose a competitive strategy. In order to fulfil Porter's model, it is necessary to monitor the development of the business environment of the company; i.e.,

the micro-environment, but it is also necessary to respect the macro-environment of the company regarding the threat of customers and substitutes. (Molnár, 2012)

Financial analysis is understood as a method of evaluating the financial management of a company and diagnosing the "financial health" of the company. This method serves as a tool for defining economic systems and revealing not only their current and past effects, but also for estimating their future development. (FA, Business Economics)

3 Results

This paper includes an evaluation of the competitive ability of a company which offers products for leisure activities, using Porter's five forces model, selected indicators of financial analysis and a SWOT analysis.

XY was established as a limited liability company and has been operating on the market since 2006. The company sells goods for cycling and leisure. More than 30,000 products from worldwide brands can be found in the range on offer. The company's sales are effected via the Internet, and the customer can choose from various delivery options. All products may be delivered by means of a courier service, personal collection at a branch in Pardubice or a mail-order service. Payment options of the e-shop are standard; i.e., cash on delivery, bank transfer or cash payment for personal collection. Based on data collected from XY s.r.o., a chart has been created that includes strengths, weaknesses, opportunities, and threats. The SWOT chart is shown in Table 1.

Table 1 SWOT analysis, source (Hrdličková, 2019)

Strengths	**Weaknesses**
- Wide range of products - Affordability of the range - Quality of products offered - Worldwide leading brands - Social networking - Use of comparative portals - PPC Campaigns	- No option for online card payment - No customer service - No loyalty program
Opportunities	**Threats**
- Expansion to other countries - Expanding the portfolio of goods or brands - Mobile application - Growing trend of online shopping - Improvement in the economic level of buyers	- Entry of a new e-shop - Changes in legislation - Changes in customer behaviour - Deterioration in the economic level of buyers - Changes in preferences

For a more detailed analysis of factors influencing the market, **Porter's five forces analysis** was created, including the threat of rivalry in the industry, the threat of new competitors entering the market, the threat of substitutes, the threat of competitors' growing bargaining power and the threat of growing suppliers' bargaining power. Competition in the Internet business environment at present is immense. The main reason

for the great rivalry is the low cost and the possibility of nationwide or even foreign targeting. Most stores today struggle for customers and do so through various forms of marketing. The threat of potential new competition on the Internet market is also high. This is due to low entry barriers. Nowadays it is very easy to enter the Internet market, especially because of the low cost of entry and operation. The threat of substitutes entering the market affects at least the company in question. This is a business that only sells goods but does not produce them. Bargaining power on the part of buyers is not an essential factor. A customer who decides to place an order on the e-shop is probably interested in the goods. It is not a question of goods for everyday use or goods needed in the running of the household. The company is committed to suppliers the same as most of its current competition. Any change made to the supplier affects not only XY, but all customers in the industry.

The evaluation of competitiveness of the company also includes selected **financial indicators** - recommended for the evaluation of performance and competitiveness are ratio indicators of profitability (creation of profit) and liquidity (ability to repay liabilities). Profitability indicators recorded a relatively large increase in 2016 but deteriorated in 2017. ROE values are in the interest of company owners, as this indicator represents the rate of return of their investments. XY s.r.o. fell into minus values in 2015, as negative equity values were achieved. In 2016, the company rose into positive values due to an almost 200% increase in equity. This growth was due to a significant increase in the company's net profit. In 2017, the net profit of the company decreased and the value of return on equity decreased by 19%. In terms of liquidity, the company is below average, with a positive trend only in Current Liquidity.

4 Discussion

The authors analyzed competitive forces using Internet tools and search engines. The result is an evaluation and proposal of measures in the area of competitiveness in the marketing mix of YX s.r.o. In the product area, more detailed specifications have been identified for each product than in other companies, which is positive. In contrast, most companies offer loyalty programs to customers, unlike the company in question, which allows them to gain customer feedback on their products. In terms of pricing, XY s.r.o. has a competitive advantage by offering most of its products at prices lower than the competition, thus appearing in the leading results in price search engines. In terms of company distribution policy, companies offer not only e-shopping at their own branches, but also delivery and holding services for products purchased. XY s.r.o. does not offer this, but then again, it does offer lower delivery costs. Only one of the companies monitored offers online payments, which can also mean a significant competitive advantage. Advertising is the most used method for communication with customers among the companies monitored. Paid advertising is effected through commodity portals and Internet browsers. In this area, XY s.r.o. placed second; the reason is again lower pricing than the competition. All the companies monitored use direct marketing in the form of newsletters; XY s.r.o., along with its biggest competitor, sends a reminder of a customer's previous visit via email.

5 Conclusion

The aim of this paper was to evaluate the competitive ability of XY s.r.o. under the conditions of the fourth industrial revolution. This company sells accessories for sports activities online. A SWOT analysis of the company was carried out, as was an

analysis of competitiveness through Porter's five forces model, and as well, selected financial indicators were used to assess the company's financial performance. The SWOT analysis showed that the most important opportunities of XY s.r.o. are new payment methods for orders, sales promotion events, and customer satisfaction surveys. Weaknesses identified a lack of customer service, as well as a lack of on-line payment options, loyalty programs and major sales promotion events. The analysis of Porter's five forces model revealed that competition in the Internet business environment is currently very high. Businesses are trying to reduce their costs and also win over customers through new forms of cooperation and loyalty programs; in the current globalised marketplace, it is becoming increasingly difficult to attract and retain customers. In the financial area, the company was rated mainly in terms of profitability and liquidity, which are most often used for performance evaluation, and the company has significant fluctuations in these areas.

In addition, a competition analysis was performed using a comparison with the two largest competitors in the marketing mix. Based on this, the company was recommended to use more references and loyalty programs in the product area. The pricing policy of XY s.r.o. can be assessed as positive, which, due to its low level, is attractive to customers, but at the same time it results in a lower margin on the average volume of sales. In the distribution area, the company was recommended to introduce on-line payment and offer delivery services for the goods sold. It would be useful to supplement the company's communication policy with promotion through the placement of keywords on Internet search engines. In conclusion, it can be stated that the situation in terms of competitiveness, gaining a competitive advantage and maintaining it is increasingly difficult for businesses, especially in this fourth industrial revolution. At the same time, it is an opportunity for innovative businesses to adapt to their new environment via their products and a customer-friendly approach.

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References

Accorsi, R. et al. (2017) "Internet-of-Things paradigm in food supply chains control and management", In: *27th International Conference on Flexible Automation and Intelligent Manufacturing,* Italy.

Ahmedova, S. (2015) „Factors for Increasing the Competitiveness of Small and Medium- Sized Enterprises (SMEs) in Bulgaria", *Procedia - Social and Behavioral Sciences.* Vol. 193, pp. 1104-1112.

Atzory, L. et al. (2010) " The Internet of Things: A survey", *Computer Networks.* Vol. 54 No. 15, pp. 2787–2805.

Bagheri, B. (2015) " Cyber-physical Systems Architecture for Self-Aware Machines in Industry 4.0 Environment", In: *15th IFAC Symposium on Information Control Problems in Manufacturing,* Vol. 48, No. 3, pp. 1622–1627.

Chen, L. (2017) „International Competitiveness and the Fourth Industrial Revolution". *Entrepreneurinal Business and Economics Review*. Vol. 5, No 4, pp. 111–133.

Choi, JK. et al. (2018) „ A Pathway Towards Sustainable Manufacturing for Mid-size Manufacturers", *Proceedia CIRP*. Vol. 69, pp. 230–235.

Cochran, DS., et al. (2017) "Use of the manufacturing systém design decomposition for comparative analysis and effective design of production", *International Journal of Production Research.* Vol. 55 No. 3, pp. 870–890.

Delgado, M. et al. (2014) "The Deteminants of National Competitiveness Cluster", *Convergence and Economic Research policy*. Vol 43, No. 10, pp. 1785–1799.

Forsman, H. (2011) "Innovation capacity and innovation development an small enterprises. A comparison between the manufacturing and service sectors", *Research Policy*, Vol. 40, No. 5, pp. 739–750.

Gadaleta, M., et al. (2019) "Optimization of the energy consumption of industrial robots for automatic code generation", *Robotic and computer-integrated manufacturing*. Vol.57, pp. 452-464.

Hrdičková, A. (2019) *„Konkurenceschopnost podniku v podmínkách průmyslu 4.0"*, Diploma

Jovane, F. et al. (2008) "The incoming global technological and industrial revolution towards competitive sustainable manufacturing", CIRP annals, Vol. 57, No. 2, pp. 641–659.

Koneczna, R. et al.(2011) "Export Competitiveness of Polish Environmental Products in Select Manufacturing Sectors", *Polish journal of environmental studies*. Vol. 20, No. 6, pp. 1531–1539.

Kotler, P. et al. (2013) "Marketing Management", Grada, Praha, Czech Republic.

Manavalan, E. et al. (2019) "A review of Internet of Things (IoT) embedded sustainable supply chain for industry 4.0 requirements", *Computers & Industrial Engineering*. Vol. 127, pp. 925–953.

Mařík, V. a kol. (2015) *"Průmysl 4.0 – Výzva pro Českou republiku"*, Management Press. Praha, Czech Republic.

Molnár, Z. (2012) *"Competitive intelligence aneb jak získat konkurenční výhodu"*, VŠE, Praha, Czech Republic.

Peiro-Signes, A. et al. (2014) "Why do Services and Manufacturing Firms Envision Environmental Innovation Differently? A Path-Model Comparison", *Polish journal of environmental studies*. Vol. 23, No. 5, pp. 1691–1697.

Rajesh, K., S. et al. (2009)," The competitiveness of SMEs in a globalized economy: Observations from China and India", *Management Research Review*. Vol. 33, No. 1, pp. 54–65.

Siudek, T. and Zawojska, A. (2014) "Competitiveness in the economics concepts, theories and empirical research", *Acta Scientiarum polonorum/Oeconomia*. Vol. 13, No. 1, pp. 91–108.

Tao, F. et al. (2014) "CCIoT-CMfg: Cloud Computing and Internet of Things-Based Cloud Manufacturing Service Systém", *IEEE Transactions on industrial informatics*. Vol. 10, No. 2, pp. 1435–1442.

Thesis. Univerzita Pardubice.

Tolio, T. et al. (2017) "Design, management and control of demanufacturing and Remanufacturing systems", *CIRP annals-manufacturing technology*. Vol. 66, No. 2, pp. 585–609.

Turyakira, P. et al. (2014) "The impact of corporate social responsibility factors on the competitiveness of small and medium sized enterprises", *South African Journal of Economic and Management Sciences*. Vol. 17 No. 2, pp. 157–172.

Winroth, M. et al. (2016) "Sustainable production indicators at factory level", *Journal of manufacturing technology management*. Vol. 27, No. 6, pp. 842–873.

Increasing production process performance in the context of sustainable development

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Abstract

The generally accepted concept of sustainable development encourages other perspectives to increase the performance of production processes than the only economic one. The paper presents a holistic view of the issue and outlines the elements and methods of enhancing the performance of production processes with respect to the environmental and social pillar of sustainable development. The proposed methods and concepts can also be understood as responding to the macro-environment factors in which businesses are currently located, particularly the impact of globalization and Industry 4.0. It is not the intention of this paper to present these factors only as certain threats, but especially as opportunities for a multi-dimensional approach to increasing the performance of production processes. At the same time, they are incentives for the personal development of knowledge workers and ideas for the educational process of preparing future managers, leaders.

Keywords: Industry 4.0; sustainable development; production process.

JEL Classification: M29, O5, Q4

Article Classification: Conceptual paper

1 Introduction

In recent decades, we have experienced a number of major changes and turbulences in the world that are being transferred to us, our families, our workplaces as part of globalization processes. The world seems a little faster every year, going through radical changes in lifestyle. In response to changes in the environment, changes in corporate governance are called for to strengthen business competitiveness. Increasing the performance of business manufacturing processes is now often seen as one of the

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main sources of competitive advantage. Strong focus on working success through work performance has its rational core as long as it is understood systemically, i.e. not only "produce more per unit of time, at the lowest cost", but more dimensionally, i.e. produce more humanely, environmentally friendly, ergonomically and so on. However, assessing the correctness of such an approach will also necessarily lead us to consider whether we are not moving away from building good relationships, from the values of true humanism, from the respect of man to man, or from the respect of man to nature, for the large and unbalanced accent on all these dimensions. In the historical development of society, people have created and gradually improved the socio-economic system. However, the benefits of it are only available to a small percentage of the Earth's population. The current system does not correspond to environmental conditions, exploits it and does not serve to achieve sustainable development parameters. The great world moral authorities permanently draw attention to these serious contradictions, e.g. the contradiction between the forms of wealth production and the suicidal nature of environmental destruction, the harmful effects of excessive materialism and consumerism, and the like.

The aim of this paper is to present a systematic view of the issue of increasing the efficiency of production processes in the context of sustainable development, or at least in times of different crises, in the context of sustainable success. According to the ISO 9004 standard, we can characterize it as the situation in which an enterprise does not only produce products required by customers and other interest groups, but also considers the impacts of this production at all stages of the input-output process, at all stages of the logistics chain and throughout the product lifecycle. The ISO 26000 standard specifies sustainable development as "the ability to satisfy current needs without compromising the ability to meet future generations´ needs".

However, these "new" views on production management are not some "supernova" concepts. After all, the concept of sustainable development was adopted by the UN in 1987. It is getting very slow in corporate management, which is also the result of an unfavourable situation in the macro environment (for example, the world's biggest polluters are China, USA, Russia, Brazil), as well as in the micro-enterprise environment. Holistic understanding and ensuring sustainable development in the enterprise is largely determined by the environment. Societal indulgence, resulting from certain values that society prefers, creates good conditions for a company to make a socially responsible business or behaviour a stone in the mosaic of building an ecosystem balance, so that parallel base of development on economic, environmental and social pillars to meet the needs of current generations and not threaten generations of the future.

Corporate management can creatively develop the implementation of the concept of sustainable development only by building a high-confidence culture based on values built on all three pillars. Know, want and be able - these are the most important prerequisites for setting up the application of innovative sustainable development processes in both manufacturing and scientific research areas.

2 Results and discussion

The systematic approach to the subject matter assumes identifying the decisive factors of the macro-environment that the company cannot influence, but which it must identify in order to improve the performance of its production processes and maintain its competitiveness (Chapter 2.1), identify the individual system elements and links between them (Chapter 2.2) identify, design and apply the methods and techniques by which multidimensional sustainable development is ensured (Chapter 2.3). and which are tailor-made to the corporate culture.

2.1 The impact of macro environment on businesses

All organizations work in a real-world environment and time. A certain area of this environment - the macro environment - cannot be influenced, but as it affects them, they must monitor, analyse and respond appropriately to it. The existing macro environment is a determinant of building management systems and new management paradigms. A key shaping element of the new management paradigm is globalization, which expands the business space of businesses. Globalization has brought the need to compare with the world's top, to learn from the mistakes and positive examples of others, but also to look for its own individuality and uniqueness, resulting from its own culture, traditions and practice-tested and proven values. The characteristic feature and megatrend of globalization is the fact that the position of global economic centres is gradually changing and a more prominent position is being shifted to China, India, usually at the expense of traditional economic centres in Europe and North America. Globalization affects virtually every area of life - politics, law, economics, ecology and other sectors and disciplines, including management. Management operates globally in real time and does not respect geographically defined boundaries, it is important for the location of capital resources to increase their added value in a given geographical area (Benner, 2002, Green, 2011 and others). It is not only an offer for the businesses, but under intense (hyper-) competitive pressure, it is an imperative for them to calculate with a much wider operating space, even with a global perspective on involved supplier and customer parties. There is an era of networks and added value, a change in consumer behaviour - "individualization and emotionalization of consumption, demand for personalized products" (Kassay, 2013). A new customer enters the scene - a global customer, with his demanding requirements that lead to the uniqueness of tailor-made products. This demand implies mass customization and necessitates a move away from traditional mass production (Jenčo, 2018, Križo, 2018).

The second huge wave of changes in the environment is associated with industrial revolutions, up to date (around 2011) with the Fourth Industrial Revolution, which is commonly called a digital revolution using cyber-physical systems and robotics to flexibly optimize manufacturing processes. A more comprehensive view also includes vertical integration of manufacturing systems across the entire enterprise structure, horizontal integration across the supply chain (SMART), integration of engineering processes throughout the life cycle, acceleration through exponential technologies, new technologies for individual solutions, new business models, and so on. Industry 4.0 can bring significantly accelerated product lifecycle, increased device autonomy and simple manual processes removal, natural resource management by streamlining energy flows (SmartGrid, etc.), mass customization, dynamic response to customer requirements for unique products, transition from descriptive-diagnostic analysis qualitative problems to predictive (what happens?) and then prescriptive (what do I do?) analyses, unexpected changes can occur in the use of energy resources and the like.

The era of globalization has also brought a change in the nature of technology within the system. Technology is not just hardware, the physical structure of components and their logical layout, but also software, a set of rules for using hardware, know-how to accomplish tasks to achieve goals and brainware, the meaning, goals for using hardware and software, is knowledge-based (Zelený, 2011). But globalization, in addition to new technologies, also brings the possibility of spatial (and geospatial) capacity transfers. Determinants are people's knowledge. All these changes related to Industry 4.0 should bring a saving of living work. The question of what to do with people who were made redundant, with an impact on the development of human personality and the like, automatically arises. The accelerated lifecycle of products evokes a tremendous

dynamism of innovation processes to the point that innovation does not yet have to be economically spent, and another is already in place. At the same time, new incentives and impulses for education and science open up. The Industry 4.0 factor is primarily a technological factor in the macro-environment, but as it is clear from the above-mentioned characteristics, it is also a social, economic, environmental and political factor.

2.2 System analysis of transformational model of production process

Globalization and the requirements of sustainable development greatly expand the supply and customer spectrum of the company's stakeholders. The basic boundary between what is inside the business and what is out is being disturbed. The influx of new technologies is hampering barriers of time and distance and the number of customers, respectively interest groups is going up (Covey, 2013). Therefore, a modified SIPOC analysis model (Figure 1), in which "supplier" and "customer" are replaced by "stakeholders", seems appropriate for system analysis of production process elements.

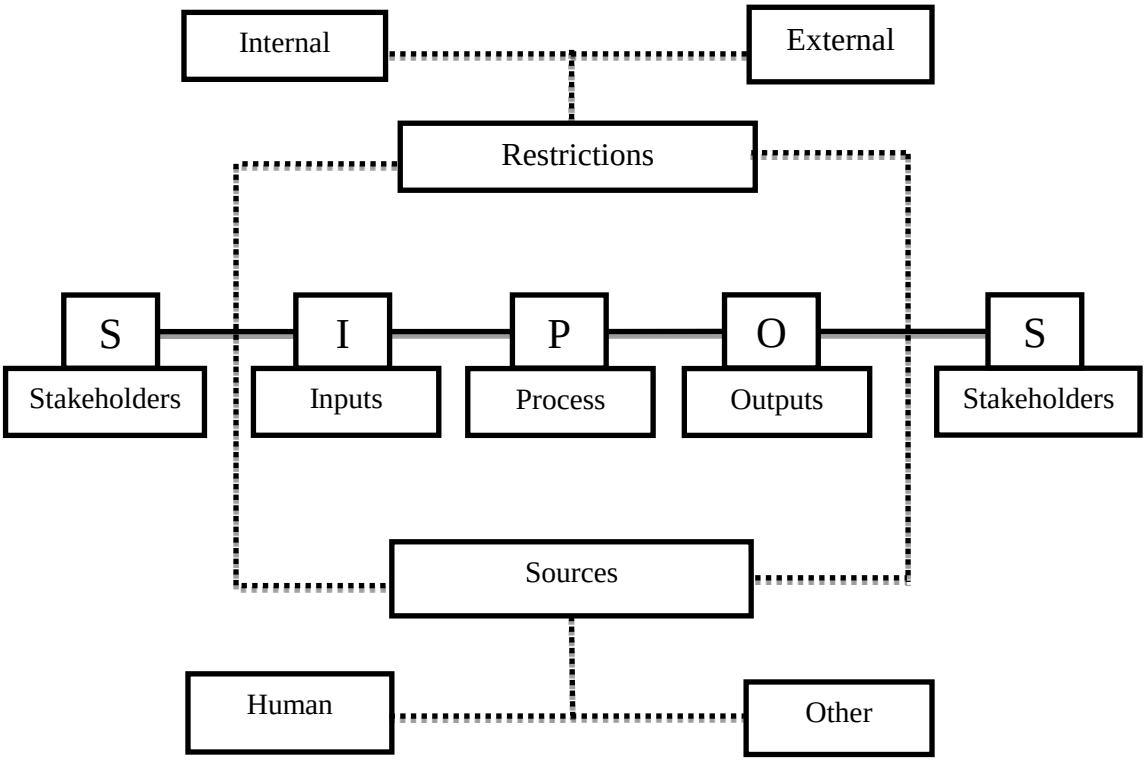

Figure 1 SIPOS model; source: own processing

Obviously, this modified model gives a more comprehensive scope for analysing the elements to ensure increased performance through the perspective of sustainable development. Different business stakeholders identified may have significantly different expectations from the business, which may even contradict and therefore create diverse pressures on the elements. The concept and requirements of sustainable development are likely to create reciprocal pressures between consumers and producers as well as between producers and suppliers. There are also new constraints and requirements for resources of all kinds. Each competitive advantage is temporary, so there is a need for continuous generation of new sources of benefits. It is expected to seek improvements in this spiral of links to the desired higher level by using the latest scientific knowledge and incorporating them into a tailor-made system, taking into account external constraints,

especially from the state's position. The limitations of internal character will be given by the mission, vision, business strategy, and in particular the preferred values that are reflected in the corporate culture and which in turn cannot be separated from the values of society and national culture.

In this era of globalization, the competitive advantage is given by the ability of knowledge-based system integration of all elements of the production transformation process. An extended solution is also the integration of the internal production chain with the supplier, respectively with the consumer one, integration with sustainable consumption, sustainable marketing, sustainable technical production preparation or sustainable logistics. Sustainable production and sustainable consumption are interconnected. A number of products placed on world markets are dependent on purchasing demand. Profit-seeking businesses try to satisfy demand. The process of satisfying customer needs results in the constant accumulation of products, often unnecessary, that burden the environment. A prerequisite for achieving sustainable production in the business environment is to assess the entire life cycle of products in terms of environmental and social impacts and the potential for disposal of worn or obsolete products. The second aspect of the assessment deals with the volume of production in terms of the renewable inputs. Sustainable production should aim to satisfy consumers' legitimate needs by fairly redistributing natural resources and man-made values. Sustainable consumption affects all people worldwide. Sustainable consumption is based on the preference of organic products and the consumption of renewable natural resources and products. The concept of sustainable marketing differs from the concept of marketing by focusing the marketing mix on defining sustainable products, setting sustainable prices, choosing sustainable distribution, building sustainable marketing communications. If sustainable marketing contains all of the above components and the company is responsible for carrying out its activities, it is possible to define a sustainable marketing mix in the company.

As a rule, sustainable profit is understood as a result of the comprehensive application of sustainable development principles throughout the logistics chain, the rejection of unfair marketing practices, the building of workers 'and stakeholders' awareness of environmental factors, occupational safety and health, and so on. This view leads us to methods that ensure profit creation. It would be more appropriate to define sustainable profit as sustainable creation and sustainable profit-sharing in the context of the issue. Promoters of "Community economies" outline their perspective on the principles of distribution of business generated by profit. The principles used here are that the profit is divided into three parts.

1. The first part is to invest in modernization, technology innovation to improve or at least maintain competitiveness, improve performance, improve the working environment and so on.
2. The second part is given for education, both for education and for the personal development of managers and employees as the driving force of the company development.
3. The third part is given to the community, the development of the environment, including the rational balancing of the personal and professional life of employees, as well as health and social services.

Considering the correctness of this economic philosophy will bring us to batism, which is now part of our scientific and cultural heritage, or even a story of three nickels, in the historical context. Consideration encourages finding support for sustainable development in our unique traditions and proven and proven values.

Already in the 1980s, Peter Drucker pointed out in visionary terms that "history will evaluate today's time and its benefits from the point of view of altered human life conditions, both in terms of significant changes in technology or other technological achievements." Thus, one of the "gurus" of management highlights the position of people. It is the role of human potential that can be seen as a key factor in enhancing both the production process performance and the SIPOS analysis. Thus, not only methods directed to machines or technological blocks can be perceived as a method of increasing performance. In the sense of Kaizen philosophy, every employee is still a potential of innovation and improvement in the Industry 4.0 era. He is an employee of a completely different quality, a knowledge worker who is oriented in the processes in the era of radical emergence of new technologies, in the era of digitization, robotization. It also raises the search for more sophisticated models for human development. However, another person is also entering the market - a global customer, or people - partners from the stakeholders. These people, too, represent the potential for participation in product or process creation, and in particular for building relationships and a culture of high mutual trust between them and the producer.

2.3 Methods of increasing production process performance

At present, we are often confronted with the need to transform the current socio-economic system as an “over-system” of the environment into a socio-economic system as a “part” of the environment. In the last decades, a number of so-called green initiatives, declarations and documents (green economy, green marketing, green public procurement, etc.) were approved. They represent an impulse and a departure from the traditional understanding of economic growth in the sense that they consider the environment as its integral part. The initiatives triggered changes not only in environmental but also in social terms. Transitioning a real, not declared, requires a transformation, respectively directing innovations, resp. innovative thinking into:

- business management by incorporating methods that take advantage of new scientific knowledge, not just in technology
- innovation of legislation at state and organizational level, supported by pressure from stakeholders
- innovation of human development models, including the role of the educational process.

Generally, manufacturing process innovations are generally characterized by productivity gains, increased flexibility and flexible adaptability, increased product and process quality, improved environmental friendliness and improved work environment quality, ergonomic standardization, redundancy and centres of waste (7 Muda - zero errors, zero build time, zero manipulation, zero series size, zero faults, zero boot time, zero fluctuations), immediate operational capability, shorter recovery times, and so on. The general feature is the application of advanced technologies, especially information and communication technologies within the 4th Industrial Revolution. It represents processes such as: integration of the digital world into physical products, reduction of the subjective influence of man on decisions, which leads to autonomous elements in the untouched version and thus the isolation of individual local subsystems without the possibility of using synergy.

The reaction of science has brought, for example, creating a machine design in such a way as to combine several operations into a single unit, i.e. instead of several CNC machines, the existence of a single machine was created according to the concept of the modal arrangement of the production cell. Production systems with breakthrough

innovations that are in the R&D stage are presented in the literature under the terms of agile manufacturing, integrated intelligent manufacturing, and the like. All groundbreaking innovations are therefore groundbreaking, because they accentuate all three pillars of sustainable development. Commonly used methods of improving the performance of manufacturing processes in enterprises are generally based on three concepts:

- The bottleneck theory (TOC) - it is a method of managing and improving the performance of a company by systematically removing restrictions. According to this theory, the reason for not achieving higher performance is that each system has at least one constraint ("bottleneck") that prevents this system from achieving a higher degree of performance (bottlenecks in production). TOC offers a five-step systematic process to improve business performance, based on improving the performance of the weakest link in the business (constraints).
- Six Sigma - aimed at reducing process variability, zero-defect quality practice, based on understanding customer needs and expectations, disciplined use of facts, statistical analysis based on beliefs that quality improvement by a few percent will significantly reduce defect costs and increase customer satisfaction.
- Lean - the "philosophy of lean thinking" - based on eliminating the waste of all kinds in production processes, wasteful counting: overproduction, excess time consumption (waiting, etc.), unnecessary transport and manipulation, losses in production process (unexploited sources, quality), redundant warehouses and insurance stocks, unnecessary movements, production of junk, unused ideas (loss of opportunity). To this end, various methods have been gradually developed (System 5S, SMED, Heijunka, TPM, Visual Management, Poka - Yoke, Jidoka and others).

As global competition grew, the pressure to improve economic survival was also increased. One of the concepts is the integration of TOC, Lean and Six Sigma into the TLS model (Figure 2), combining the key benefits of each of the three methodologies.

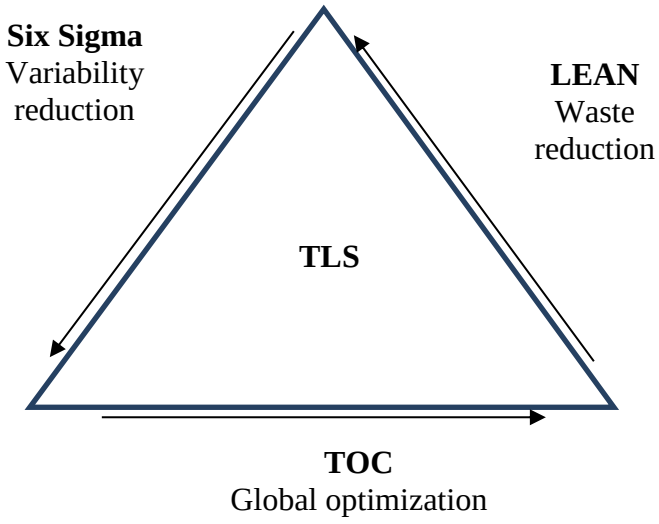

Figure 2 TLS concept; source: own processing

Synergic application TOC, Lean and Six Sigma (TLS) provides a fast and efficient approach to improving business processes. By combining them, the cost of introducing these methods individually go down sharply. In parallel, using the seven-step process to

implement this concept, it is possible to focus on bottlenecks, eliminate waste and reduce process variability.

With the implementation of Industry 4.0 and the development of other new technologies, the question was whether Lean management is still needed. In general, there is consensus in professional circles that Lean Management is the basis for Industry 4.0. It is Industry 4.0 that creates the space to create a truly lean enterprise, while Industry 4.0 technologies are the technology to create lean supply chains and processes. Without Lean there is a risk that they will only become a technological "glitter", where the benefits do not have to exceed costs. As already realized Industry 4.0 correlations into lean management, there are methods:

JIT/JIS 4.0

The aim of JIT / JIS is to deliver the right product at the right time to the right place in the required quality and quantity. Industry 4.0 tools can contribute to new, more effective results such as through automatic route optimization and optimum vehicle utilization and resource savings.

Heijunka 4.0

Heijunka is a method for scheduling production quantity and production mixes. Industry 4.0 data analysis through in-depth market analysis and data history combined with better customer understanding increases forecast quality and stabilizes planning. Some software tools can automatically balance the production program based on the product specification and the structure of technological process.

Kanban 4.0

Kanban as a basic tool for inventory management, especially in-process production, can get to the higher level if assisted by Industry 4.0. Through simulation methods and virtual real-time object representation, based on the CAD (digital twin) model, Kanban circuits can be planned more efficiently and simulated with more predictability, optimized batch size and delivery frequency.

TPM 4.0

The TPM is a set of activities to eliminate equipment failures and abnormalities and gradually increase their efficiency. Industry 4.0 logically leads to an increased number of maintenance objects whose technical complexity is growing. In order for operators to be more responsible for increasingly complex autonomous maintenance operations, state-of-the-art technologies such as virtual reality and augmented reality are being used. Using these technologies, line operators can be remotely viewed by displaying virtual elements of individual devices. The main goal is to design an intelligent maintenance system that increases equipment availability and reduces maintenance costs.

SMED 4.0

SMED is becoming a particularly important tool, as many different product variants are constantly growing. When sorting it is possible to use the same technologies as in maintenance (virtual reality). Additive production will have the biggest impact on sorting. It is precisely in additive production that the processes are not product-specific, different products can be produced with minimal alignment time.

3 Conclusion

The real direction of management towards sustainable development also requires the transformation and innovation of human development models, including the irreplaceable role of the university education process. Already today, innovations in machinery and technology have brought amazing advances in the automotive,

construction and other industries. Learning about this knowledge and practicing familiar practices and algorithms leads to the preparation of people who will not be able to compete with infallible computers. However, the computer cannot creatively develop and use innovative algorithms. Steve Jobs defined creativity as the ability to connect things. According to him, education has to do two things - to give students enough knowledge to connect, but also to help them acquire the skills they need to learn more about themselves, to know how to combine them and how to evaluate, present and present their ideas. and sell. Here is the need to add a third need. To transform the educational process into pedagogic and educational one and training managers - future leaders, to incorporate moral-value orientation into their development as a key factor in their personal management. The personal management of future leaders who can positively change the world in accordance with the principles of sustainable development is in addition to the process of self-knowledge (especially "who I am" and "where I am going") in "clarifying and choosing access to professional and private life in accordance with natural laws and such mental principles as the principle of integrity, the principle of fairness, the principle of tolerance, the principle of patience, the principle of honesty, the principle of courage and bravery, and the principle of "from the inside towards outside " (Vagner, 2019).

References

Benner, M. (2002) "*Time and the new economy. In: I. Holmberg, M. Salzer-Mörling a L. Strannegärd (eds.): Stuck in the Future? Tracing the New Economy",* Bookhouse Publishing, Stockholm, Sweden.

Covey, S. (2013) "*Třetí alternatíva",* Management Press, Praha, Czech Republic.

Jenčo, M. et al. (2018) "Assessing the quality of employees in terms of their resistance", *Quality – Access to Success*. Vol. 19, No. 167, pp. 48–53.

Kassay, Š. (2013) "*Riadenie. Vodcovia a manažéri",* VEDA, Bratislava, Slovakia.

Križo, P. et al. (2018) "Evaluation of the most frequented forms of customer feedback acquisition and analysis", *Communications in Computer and Information Science.* Vol. 877, pp. 562–573.

Vágner, I. (2019) *"Osobní management"*, Sting, spol. s r.o., Brno, Czech Republic.

Zelený, M. (2011) "*Hledání vlastní cesty",* Computer Press, Brno, Czech Republic.

Spare Parts Management in the Context of Industry 4.0

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Abstract

The contribution is focused on highligting of the importance of mainteance processes, particularly spare parts management in the context of Industry 4.0. The literature research explains the concept of the current inventory management, costs and risks associated with that, inventory management models, differentiation of inventory, determination managing inventory levels and the importance of optimizing spare parts inventory for a company operating in a highly competitive environment. The goal of the long term research of the authors is to reduce the costs related to keep spare parts in the stock. As a result of the pilot survey in organizations the advantages and disadvantages of the current spare parts inventory management are summarized, so as the recommendations for optimization.

Keywords: spare parts; logistics; TPM; inventory management.

JEL Classification: C40, M1

Article Classification: Research article

1 Introduction

Spare parts (SP) are expensive and the purchase of individual components is associated with high depreciation and other costs associated with their obsolescence. For this reason, enterprises in Industry 4.0 are forced to keep spare parts stock levels at the lowest possible level. There are a number of problems that goes totegether with engineering of spare parts management. Regarding range of personnel experience of the authores involved in spare parts inventory management, there are a lot of possible problems that companies have to face, e.g. satellite stores, rotable spares management, lead time variability, stockouts, location mix-up. These items can be structured into a number of different categories such as process, outcomes or structure. To identify the crucial problems is to look at the characteristic that is common for all items, uncertainty. According to the Slack, typical about the spare parts management is uncertainty about the

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spares usage requierement, the repair time and the reliability of the the repaired item. Another reason that the spare parts management become a topic is communication, especially lack of communication. Combination of uncertainty and lack of communication makes this topic even more complicated and discussed.

2 Spare Parts Management System

The size of the spare parts market has greatly increased in the last decade, according to estimation, reached $ 150 trillion worldwide and annually increases by five to nine percent (Patton, 2006). Companies have started to benchmark their costs for logistics operations with the best organizations in their class. The demand for logistics providers and their services has increased in this area. More and more companies realize the strategic value of a well-built logistics service, especially in the context of ensuring spare parts availability and faster response times to their customers.

The inventory of spare parts can be generally controlled by mathematical models. These methods usually focus on cost optimization of inventories and setting the required level of inventory of spare parts which is necessary to the smooth running of production. Ann effort to find a compromise among them led to the classification of inventory items by their economic value. While using information systems, complex modelling is feasible without major problems. However, the selection of input parameters, such as the allocation of control variables, purchasing decisions and individual management strategies for various types of items, still needs to be set straight. For this reason, the classification of items is an important aspect. Most authors focus on specific areas of spare parts logistics; therefore, it is useful to examine the different factors that affect the level of service, and to propose a framework that provides a holistic view.

K. Ficon, on the other hand, analyzes the logistics of supplies and characterizes management system of spare parts and components such as material stocks, also distinguishes between raw materials and semi-finished products. The author points out that some components of the machine can be made directly at the point of production so that an organization can flexibly meet their own needs (Ficon, 2008). This statement can be successfully supported by using 3D printing technologies. Another aspect of safety and reliability should be considered within the spare parts management.

Generally, the requirements for spare parts can be the result of the following factors (Bryzek, 2010):

- replacement of parts which reached the technical or warranty lifetime
- exchange due to the limit of the technical conditions, e.g. a device does not meet the parameters required for operation during the technical inspection,
- damage of the workpiece during application (damage discovered during the operation, during regular maintenance)
- damage of the workpiece during storage (loss of quality), e.g. replacement of the parts recommended by the manufacturer or an authorized person in the technical documentation with respect to the warranty period.

On the other hand, with regard to the type of production requirements for spare parts, it is possible to divide (Sabela, 2008):

- individual parts such as gaskets, screws, filters, etc.
- components assembled from various parts by the supplier which are ready for installation.

Different characteristics of this inventory items requires a different management strategy than the conventional inventory (Facio, 2010). At the same time, it is also necessary to take into account the following special conditions of storage (Kennedy, 2002):

- Delivery time requirement associated with scheduled maintenance. The event (part replacement) is especially difficult to be predicted if there is no information about the previous failures, for example due to the absence of regular inspection or in case of brand new facilities. The only way to avoid unexpected shutdowns is to constantly monitor the device status and scheduled repairs and replacements.
- Maintenance strategy determines the demand for spare parts inventory. One of the approaches is an emergency recovery of the device or replacing the defective part. A larger number of storage units enable to cover a sudden increase in demand. Lower number of storage units increases the probability of sudden supply and thus the increase of the costs.
- Costs incurred by a deficit of spare parts are the costs of downtimes and production loss.
- The purchase of partial components is more desirable than the purchase of the entire device. This is coupled with the fact that the purchase and the cost of repairing the equipment are usually higher than the cost of replacement parts. Disorder parts are usually dependent on each other, which means that the failure of one element may be the result of the dysfunction of the second one. This can represent a serious problem, especially when the relationship of the components is unknown.
- In the case of obsolete equipment at the end of the life cycle, the acquisition of spare parts is difficult. Prevention is the acquisition of a sufficient number of spare parts in advance. It is also a source of excessive capital freezing. Moreover, it is difficult to replace the component which has been discontinued. As already mentioned, by definition spare parts inventory control differs from the control of traditional warehouse inventory. In order to control the necessary spare parts effectively, lifecycle tools need to be monitored carefully and these parts should be continuously ordered and stored at a certain level. Optimum pool is then determined by a more complicated manner than by standard inventory. However, the goal is the same; to minimize the risk of losses resulting from downtime and maintenance costs and to eliminate unnecessary costs of holding inventory in the warehouse.

3 Inventory Management of Spare Parts

In the previous chapter, various kinds of spare parts were outlined including their possible typologies reported in professional literature. Regarding the methods and techniques of inventory management, most notably mentioned is ABC analysis, which is the classification based on the distribution of individual inventory items by the cash value of sales or other criteria. In practice, however, many situations require more accurate classification than just by using one of the criteria. The traditional approach has been extended by the inclusion of other classification criteria. Authors Flores and Whybark (1989) and Cohen and Ernst (1988) also introduced a clustering method, which multiplies the effect of individual criteria. This approach takes into account also other criteria than solely production factors. For example, Fuller et al. (1993) used the criteria in relation to sales volume, order size, the coordination and requirements for shipping and handling.

De Leeuw (1996) uses the properties of individual products, processes and markets and accordingly adjusts the individual criteria. The authors Van der Veeken and Rutten (1998) determined the profile of the customer's order by three attributes: according to basic data about the customer, the number of deliveries and by product attributes (its value and size).

The literature research shows focus on further categorization to improve the internal management of spare parts inventory, for example by Bragliaetala (2004). There are also studies that combine both aspects, demand and purchasing policies depending on demand. Vaughan (2003) studied the strategy orders in case of accidental failure. Specific studies concerning the categorization of spare parts depending on the strategy of supplying and purchasing portfolios were conducted by Caniels and Gelderman (2005) or Kraljic (1983). Categorization according to the type of demand for spare parts has been studied by authors Kobbacy and Liang (1999), but also by Kalchschmidtetal. In his research, he examined the impact on the demand for spare parts in times of uncertain demand. Lee (2002) created a work which combines the uncertainty in supply and demand for spare parts and accordingly suggests a strategy for reducing these uncertainties. The concept of integrating demand and supply chains is discussed in the work of D. Walters (2006).

In deciding on a strategy for inventory management, it is important to have a balanced view of both its efficiency and effectiveness. As reported by Huiskonen, it is necessary to connect the analysis of customer´s needs with management strategies, so that spare parts and the aggregate demand for a particular product will add to the characteristics of individual customers.

4 Methodology and Survey Objectives

According to the previous researches (Slack, 2017) 70 % of companies say that they do not consistently provide quidence on how to determine both the reorder point and reorder quantity. 68 % of companies say that they do not consistently provide quidance on whether or not to stock an item. 64 % of companies do not review inventory holdings as part of a formal plan of continuous improvement.

For the quantitative research, a questionnaire survey was used as a method of data collection. The pilot survey was performed on a sample of 215 enterprises from different regions of the Czech Republic in order to examine trends and levels of spare parts management. Disproportionate stratified selection was used with the same size of subgroups, where the sorting character was the size of the company and the sector. For the statistical processing of data, the descriptive statistics and the methods of statistical analysis was used. A quantitative analysis rating the survey shows the distribution of opinions in the total number of responses. It is not an in-depth survey but a statistical presentation of the respondents' answers.

5 Results and Discussion

Initially, the survey intended to map the corporate scenario of spare parts and inventory concern over Czech companies and originally contained 26 different questions, in which only 23 were considered for discussion. Right after its submission, 215 complete answers over Czech Republic’s corporate environment could be gathered for further analysis. Some demographic data results are shown. Regarding a company’s first business, the majority is automotive, representing more than 30 % of total results, followed by mechanical engineering with 15 % and services companies, with 14 % of total respondents (see Fig. 1).

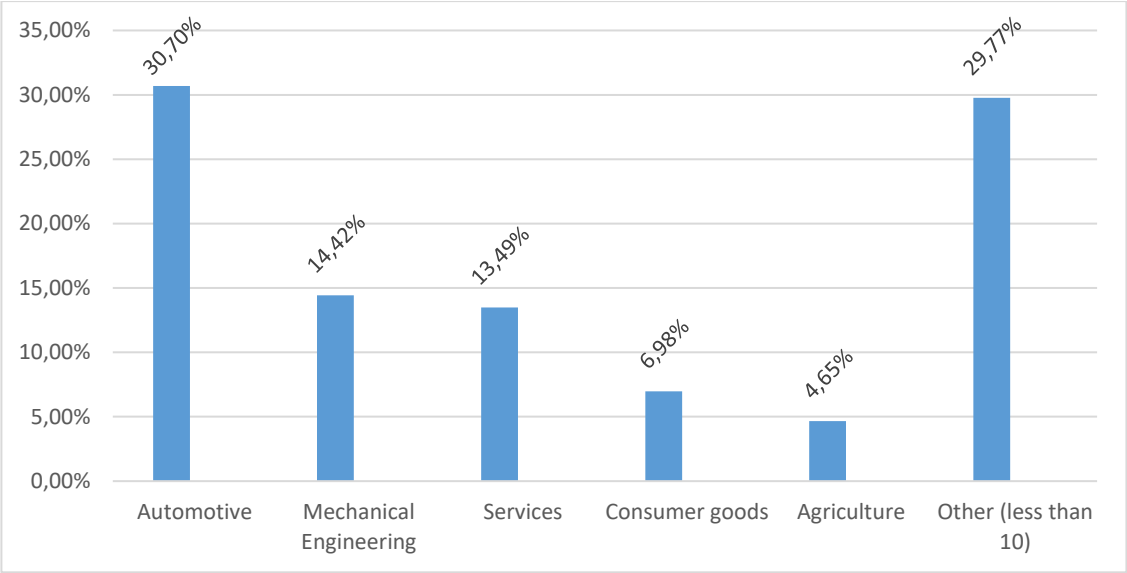

Figure 1 Company First Business; source: own processing

Changing the focus to the type of production, most companies are customized, representing more than 41 % of all answers, followed by serial, with more than 27% and then mass production, with 14.29 %.

It was also noticed that the majority of Czech companies do concern about spare parts and inventory management, represented by 59.52 % of total respondents. When it comes to the methods of inventory management, the answers vary. However, ABC curve is still the most often used method, representing 26 % of all answers, followed by qualified estimate based on historical data, which represents 24 % of total respondents (see Fig. 2).

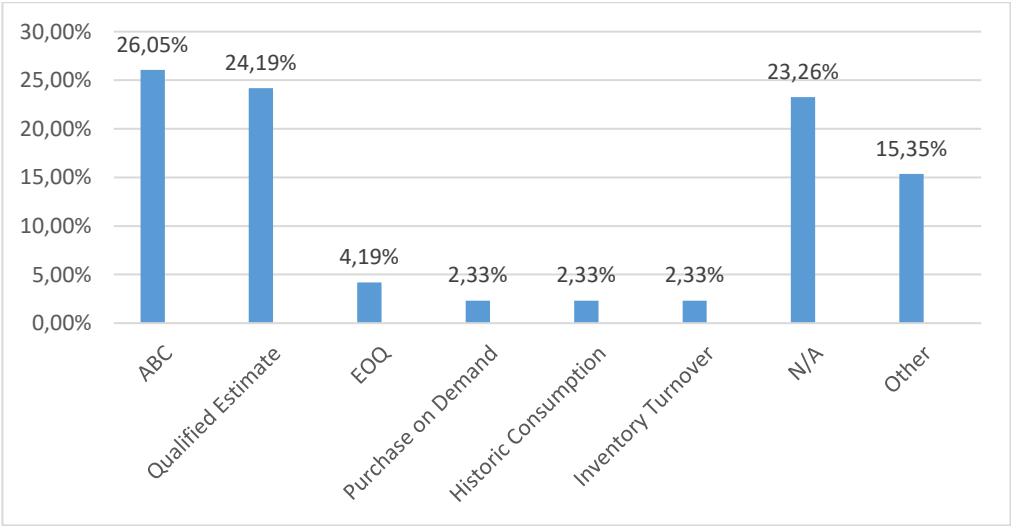

Figure 2 Methods for Spare Parts Management; source: own processing

The next question presents a scenario of outsourcing usage over enterprises, where most answers reveal that a small part of their inventories is outsourced, which shows that they prefer to manage their stocks inside doors (see Fig. 3).

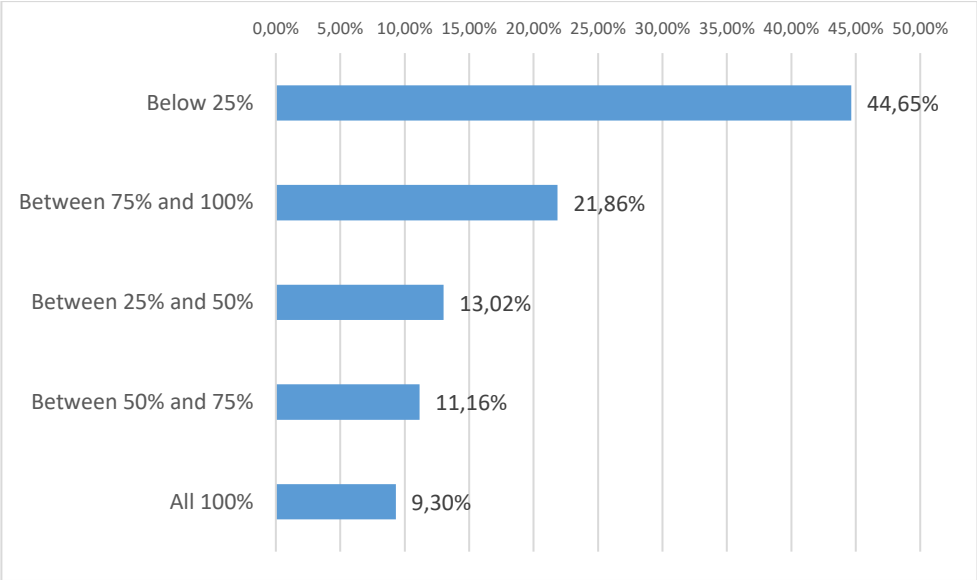

Figure 3 Percentage of Outsourced Spare Parts; source: own processing

Additionally, most of the companies plan maintenance, representing 76.19 % of all answers, which also shows an opportunity mentioned in the previous paragraph. 67.45 % adopt preventive maintenance, which is very important and directly associated with the consumption of spare parts and, at the same time, avoiding production downtimes, followed by 26.19 % of companies which only take actions after the failure happens (corrective maintenance) and the minority, shown by 6.35 %, do predictive analysis over their machinery.

When it comes to the connection and relationship of maintenance within companies' other key departments, as purchasing, procurement, logistics and production planning, the answers show that the companies mostly share information over many departments, some of them exemplified previously, with 34.92 % of all answers, followed by purchasing, represented by 20.63% of all answers, followed by production planning, with 11.11%, then controlling (also known as procurement), with 7.94 % of all answers, and further logistics, represented by 7.14 % of them, and after that accounting and warehouses, with 4.76 % and 3,94 % of all answers, respectively.

To the authors great surprise, when the discussion was related to the usage of ERP softwares for inventory management over Czech companies, the majority of them answered that they do not use ERP's, represented by 36.51 % of all answers. The second place goes to Microsoft® SAP®, with proves to be the most used ERP over Czech companies, shown in 21.43 % of all answers, followed by custom systems, represented by 3.17 % of total population.

The other part of the survey presents the aging scenario of machinery inside Czech companies, where most of them have middle-age equipment, between 5 and 10 years old, represented by 36.51% of all answers, followed by ones older than 10 years, which require more attention, predictive maintenance and proper management of associated spare parts, otherwise these will cause many production downtimes and/or delays on delivering their products. They are represented by 23.02 % of all answers. 21.43 % represent figures between 3 and 5 years old (21.43 %), then between 1 or 3 years old (16.67 %) follow, and the minority have newer equipments less than 1 year old (2.38 %).

It's very important to mention that the key factors prior to spare parts buying are also considered by most Czech companies, such as the lead time of suppliers, spare parts costs, criticality in the production process, replacement time and stock size. As expected, the cost are the most important factors, represented by 20 % of all answers, followed by

cost and delivery time as 14 % (see Fig. 4). Regarding this analysis, it was noticed that multiple factors analysis are combined prior to spare parts buying, which is clear taking into account that management departments should rank and weight their importance inside their buying matrix.

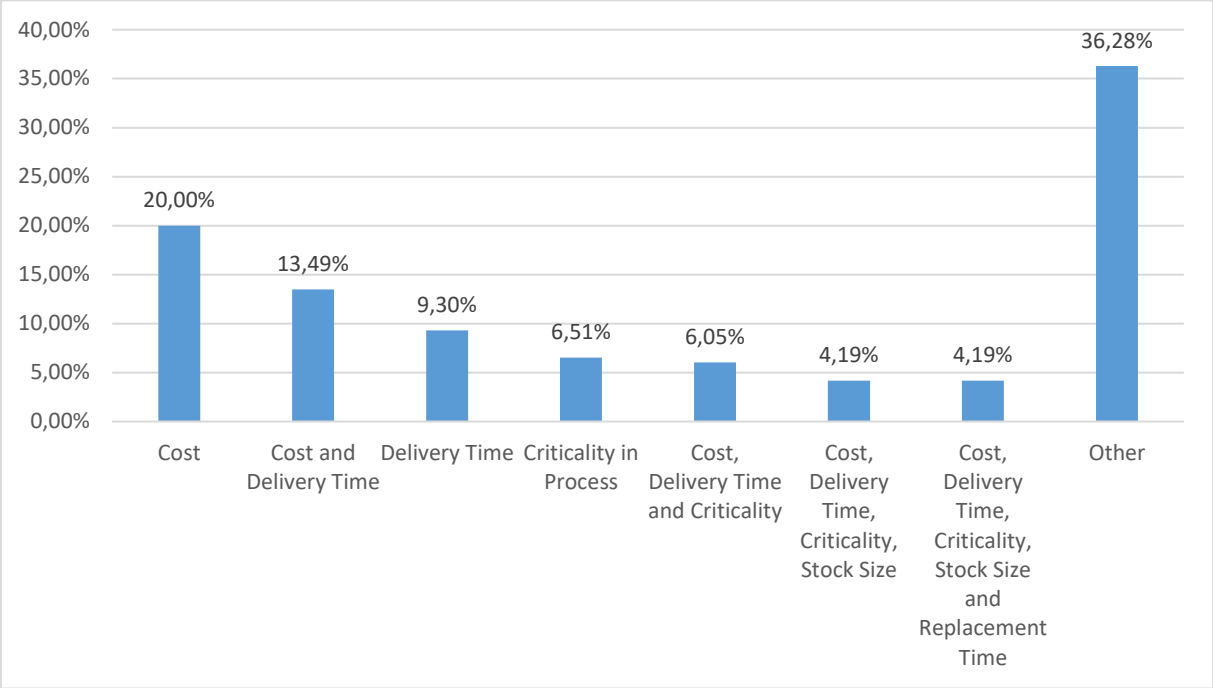

Figure 4 Factors considered for Purchasing of SP; source: own processing

When it comes to who is in charge of this whole process, the data show that maintenance, purchasing and production are responsible for inventory management of spare parts, represented by 33.33 %, 32.54 % and 22.22% of all answers, respectively. The remaining 11.90 % show varied answers. From this data, it is possible to conclude and confirm that these 3 departments are the ones that deal with spare parts on a daily basis and it doesn't mean that they deal alone. In fact, trading information between their management systems is deeply connected in order to handle their inventories of spare parts properly.

Regarding the variability of consumption of spare parts, the answers were quite close. Most respondents stated that spare parts were commonly available (35 %) and 30 % answered that they were specially ordered; or both cases can happen, also with 32 % (see Fig. 5). In another perspective, not very often their equipment and machinery outage due to the lack of spare parts, shown by 63.49 % of all answers, and none of them with 21.43 %. The minority of them (15.08 %) actually feel the impact of a lack of spare parts, which proves to be a gap and an opportunity for implementation and usage of methods for spare parts management.

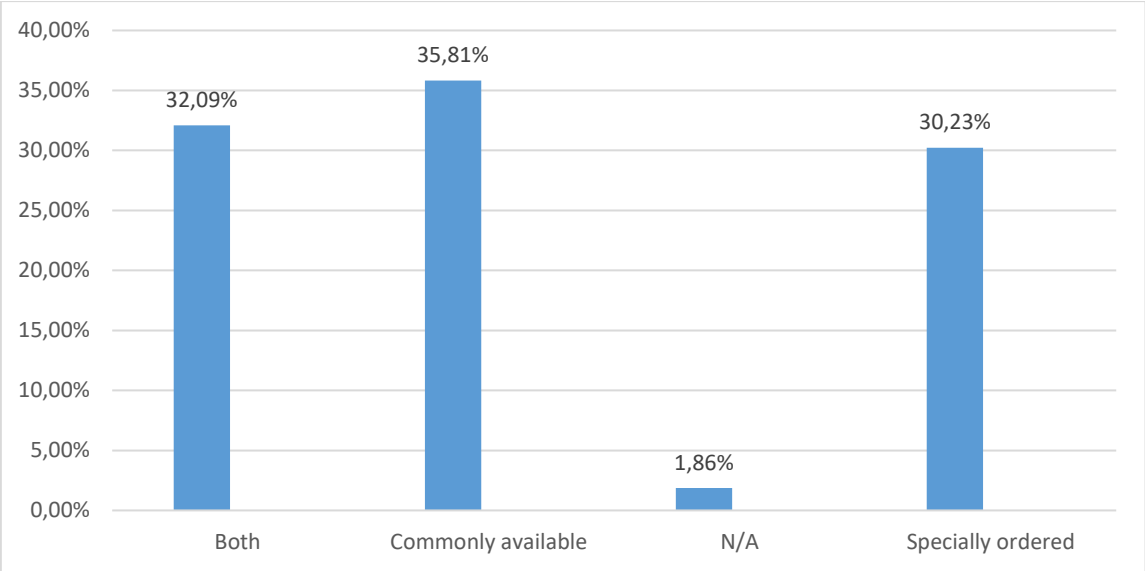

Figure 5 Variability of SP Consumption; source: own processing

Regarding suppliers of spare parts, most companies have single and multisource suppliers, depending on the type, cost and criticality of them. Level on majority of percentage with 43.65 % each are both and single, followed by multisourcing with 12.70 %.

Additionally, and also very importantly, the discussion comes to how companies deal with outdated or inefficient inventories of spare parts. Most of them have the policy of selling with a below market price, represented by 32.54 % of all answers. Closely to this come companies that prefer scrap or discard these parts, shown by 30.95 % of all answers. There are also the ones that provide exchange business with other plants, with 13.49 % of responses. 5.56% prefer to keep spare parts in stock. The remaining 17.46 % answers vary between not having any inefficient/outdated spare parts, didn't answer to this question, purchase on demand, define the usage of spare parts in another contract, do not have any stocks, or are not applicable to any of the options mentioned above.

6 Conclusion

This article intended to discuss and present data obtained by a survey regarding diverse aspects and scenarios inside corporate environment in the Czech Republic, focused on the usage and concern regarding spare parts and inventory management, connected with their size, business type, quality management, maintenance types, usage of ERP's and softwares for SP management, variability of consumption and many other aspects. All gathered information clearly confirms that spare parts management still needs to be deeply viewed and taken care of, as it can cause serious problems and negative financial impacts on companies' results. All data collected lead to further and combined analysis of these aspects and many other conclusions and diagnostics are possible.

Effective inventory management of spare parts is a challenge for many companies in Industry 4.0 that seek to maximize the use of their machinery and equipment. Determination of the optimal level of inventory of spare parts, which meets the requirements for their timely availability in repair and maintenance and balancing the costs of storage for enterprises, is a key concern. As in the case of other types of inventory, the main objective is minimizing the sum of direct and indirect costs.

Regarding the results from the survey, most companies do not have developed spare parts inventory system. Many common inventory and supply chain technique are

not applicable to spare parts inventory. Effective and efficient spare parts management requieres the collaboration of many different departments. Inventory prevention is preferable to inventory optimization. A spare parts inventory management system should encompass the entire life cycle of spare parts management. Intergrated maintentance and spare parts planning can significantly improve the spare parts inventory outcomes. Without an appropriate data governance structure, the data will lose integrity over time.

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References

Braglia, M., Grassi, A., Montanari, R. (2004) "Multi-attribute classification method for spare part inventory management", *Journal of Quality in Mantenance Engineering.* Vol. 10, No. 1, pp. 55–65.

Bryzek, A. (2010) "Metody dostarczania części zamiennych dla statków powietrznych", In: *XII International PhD Workshop OWD*. Wisła-Głębce.

Caniels, Marjolein C.J., Gelderman, Cees J.(2005) "Purchasing strategies in the Kraljic matrix—A power and dependence perspective", *Journal of Purchasing and Supply Management.* Vol. 11, No. 2-3, pp. 141–155.

Cohen, M.A., Ernst, R. (1988) "Multi-item classification and generic inventory stockcontrol policies", *Production and Inventory Management Journal.* Vol. 29, No. 3, pp. 6–8.

de Leeuw, S. (1996) "Distribution control at exhaust systems Europe", *International Journal of Physical Distribution and Logistics Management.* Vol. 26, No. 8, pp. 79–96.

Duchessi, P. et al. (1988) "A conceptual approach for managing of spare parts", *International Journal of Physical Distribution and Materials Management.* Vol. 18, No. 5, pp. 8–15.

Faccio, M, Sgarbossa, F. (2010) "*Forecasting methods for spare parts demand*", Universita'Degli Studi di Padova. Włochy, Italy.

Ficoń, K. (2008) "Logistyka Ekonomiczna", *Procesy logistyczne*. Wydaw. BEL Studio. Warszawa.

Flores, B.E., Whybark, D.C. (1989) "Implementing multiple criteria ABC analysis", *Engineering Costs & Production Economics.* Vol. 15, pp. 191–195.

Fuller, J.B., O'Conor, J., Rawlinson, R. (1993) "Tailored logistics: The next advantage", *Harvard Business Review.* Vol. 71, No. 3, pp. 87–98.

Gajpal, P.P., Ganesh, L.S., Rajnedran, C. (1994) "Criticality analysis of spare parts using the analytic hierarchy process" *International Journal of Production Economics*. Vol. 35, No. 1–3, pp. 293–297.

Ghodrati, B., Akersten, P.A., Kumar, U. (2007) "Spare parts estimation and risk assessment conducted at choghart iron ore mine", *Journal of Quality in Maintenance Engineering*. Vol. 13, No. 4, pp. 353–363.

Huiskonen, J. (2001) "Maintenance spare parts logistics: special characteristics and strategic choices", *International Journal of Production Economics,* Vol. 71, No. 1–3, pp. 125–133.

Jouni, P, Huiskonen, J. Pirttila, T. (2011) "Improving global spare parts distribution chain performance through part categorization: a case study". *International Journal of Production Economics,* Vol. 133, No. 1, pp. 164–171.

Kalchschmidt, M., Zotteri, G., Verganti, R. (2003) "Inventory management in a multi-echelon spareparts supply chain", *International Journal of Production Economics,* Vol. 81–82, pp. 397–413.

Kennedy, W. J., Patterson, W. J, Fredendall, L. D. (2002) "An overview of recent literature onspare parts inventories", *International Journal of Production Economics*, Vol. 76, No. 2, pp. 201–215.

Kobbacy, K.A.H., Liang, Y. (1999) "Towards the development of an intelligent inventory management system", *Integrated Manufacturing Systems.* Vol. 10, No. 6, pp. 354–366.

Kraljic, P. (1982) "Purchasing must become supply management", *Harvard Business Review*, pp. 109–117.

Lee, H. (2002) "Aligning supply chain strategies with product uncertainties", *California Management Review.* Vol. 44, No. 3, pp. 105–119.

Patton, J. (2006) "Service Parts Profits with Best Practices" In: *International Conference Proceedings*, The Educational Society for Resource Management.

Petrovic D. et al. (1992) "SPARTA II: Further development in an expert system for advising on stocks of spare parts". *International Journal of Production Economics.* Vol. 24, No. 3, pp. 291–300.

Sabela, W. (2008) "*Zarządzanie produkcją*", Wydanie 11. WSB Dąbrowa Górnicza, Wydaw, Poland.

Slack, P. (2017) "*Spare Parts Inventory Management*", Industrial Press, New York.

Vaughan, T.S. (2005) "Failure replacement and preventive maintenance spare parts ordering policy", *European Journal of Operational Research*, Vol. 161, No. 1, pp.183–190.

Walters, D. (2006) "Effectiveness and efficiency: the role of demand chain management", *The International Journal of Logistics Management*, Vol. 17, No. 1, pp. 75–94.

Reasons of insufficient payment ability of Slovakian companies

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Abstract

Monitoring of the financial indexes is important for the management, mainly during economic decisions making, since positive financial indexes have influence to business success. Especially when company does not have positive payment ability, it is threatened by bankruptcy. Presented contribution describes development and reasons of payment discipline in Slovakia, comparing with other chosen EU countries. Results speak about the fact that from the view of payment discipline Slovakia took bottom place among the European countries. This demands therefore to decrease payment disability of Slovakian companies, as well as future research of such situation.

Keywords: business activity; financial situation; financial indicator; payment ability; liquidity; Slovakia.

JEL Classification: F61, G32, M21

Article Classification: Research article

1 Introduction

In business there is very important to concentrate to the creation of positive financial indexes, as for example liquidity of the company, its profitability, indexes of activity and indebtedness, etc., to cover debts and liabilities (Kovaľová et al., 2018). Mainly following of such indexes is important for management to help during various important economic decisions (Pawliczek et al., 2015). Reliable statement of the financial situation can be obtained by analysis of its ability to pay the debts. It means that company that is financially stable, is able to pay its liabilities and debts and on the other hand company with financial difficulties has first of all problems with payment ability.

Such ability can be measured by index of liquidity, which presents ability to change property to financial means. But there is a considerable difference between single payment ability or solvency and liquidity. Liquidity is seen more than long term ability to change assets of the company to financial means and it is given by sufficient volume

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of finances. It´s state and development is conditioned by made cash flow in the company. On the other hand payment ability or solvency presents ability to pay debts in certain time.

Vulnerability of the company rises in case of bad financial management. In this case there is weakened liquidity, when its analysis must be done. It can consist from vertical analysis (assets and liabilities liquidity) or horizontal liquidity (golden balance rule, financial rate indexes of liquidity, cash flow). During vertical analysis individual elements of property and capital are evaluated individually. It means searching the assets and capital structure, which means their individual liquidity. When company does not have positive payment ability (solvency) and liquidity, it is threatened by bankruptcy. In the research of payment ability there is important to distinguish between payment ability and payment willingness (Gerardi et al., 2018). Changes in ability to pay have large estimated effects. Strategic motives to pay are also important.

Therefore, there is given great attention to follow up ability to pay the debts (Chodasová, 2014). In this area there is important to follow up various indicators, influencing liquidity and solvency, for example short-term liabilities, length of production cycle, sectors structure, business area, external economic environment, etc. (Kislingerová et al., 2010). During liquidity management companies use various strategies, as for example aggressive, conservative and neutral strategy. Neutral strategy presents defensive approach that is typical for smaller companies that depends on its key consumer (Tóth and Mura, 2014). To solve payment ability demands analysis of individual elements that enters to liquidity, which means using of inventory policies. In this connection Corbett (2001) derived the buyer's contracts when the supplier has private information about setup cost. Consignment stock can help reduce the impact of this information asymmetry. Consignment stock helps also reduce cycle stock by providing the supplier with an additional incentive to decrease batch size, but simultaneously gives the buyer an incentive to increase safety stock by exaggerating backorder costs.

A problem with payment ability is determined mostly from the side of consumers. Exposing consumers to extreme prices can influence the price they are willing to pay for both related and unrelated products (Adaval and Wyer, 2011). The ability to classify customer-to-business payments enables retail financial institutions to better understand their customers' expenditure patterns and to customize their offerings accordingly (Mateush et al., 2018). In recent years alternative payment means have been expanding rapidly (Dimitriadis et al., 2018) since there is a need to identify the segments of customers that are targetable for both financial and nonfinancial institutions is growing.

It is very necessary to search payment defaults in individual sectors. For example Chen et al. (2018) studied payment defaults in area of tourism, proposing strategies for payment risk decreasing, especially when a tourism service provider trades with unfamiliar tour operators. Ability to pay is a special problem in clusters financing (Ludwig, 2019). Whether clusters manage to survive strongly depend on their ability to uncouple from initial public funding. This is the current problem of clusters and cluster policy, since companies are not willing to contribute to the clusters with an adequate level of payments.

Due to the importance of payment ability in the companies presented contribution searches reasons of insufficient solvency in Slovakian companies, which could be obstacle for effective business environment (Khouri et al., 2018).

2 Material and methods

Contribution is orientated to the analysis of payment ability of the companies that is characterized as sufficient creation of cash flow, necessary for covering of liabilities. Great influence to the cash flow without problem has also a capital investment to the individual elements of current assets. It depends therefore also on the liquidity of the company – fluent ability to change individual elements of assets to cash flow.

Payment ability and liquidity of the companies had been searched in relation to the business activity, demanding timely cash inflow, as well as in relation to the surroundings, which means companies must create sufficient cash outflow.

During the research payment disability was determined as situation, when company is not able to pay its liabilities in time and in full volume (Verlag Dashöfer, 2010). Insolvency was analysed in two levels:

- as primary insolvency – expressing lower state of cash flow in comparing with liabilities due to the not economic behaviour of the company – incorrect decisions, damage of assets, bad determination of production and sales volume,
- as secondary insolvency – expressing considerable increasing of claims over liabilities, caused by not observing of payment terms from the side of consumer, as well as by underestimation of financial risk of possible payment disability of the future business partner (Kráľovič and Vlachynský, 2011).

The basic index for the analysis was insolvency, expressing primary and secondary payment disability as a rate between liabilities and claims.

$$Insolvency = \frac{Liabilities}{Claims} \quad (1)$$

Idea of insolvency does not have legal definition in Slovakian legislation. During the research Law No 7/2005 about restructuring was observed, as well as Decree No 643/2005, which gives the way of determination of insolvency. The law determines that company is insolvent when it has more than one creditor and is no table to pay its liabilities to 30 days after payment term. During evaluation of insolvency claims had been considered as claims with more than 90 days of the payment term.

According the indexes of liquidity and solvency the reasons of their negative development was determined by the way of analysis and synthesis, as well as trend and index method. Individual indexes had been illustrated by tables and figures to illustrate development of the area with interpretation of achieved results. The results had been compared with research of EOS group that is the international provider of individual financial services, orientated mainly to the claims management. The indexes must be adapted to specific conditions of competition (Rosova, 2017).

3 Results and discussions

The reasons of insufficient solvency in Slovakian companies had been search by results from representative EOS study „European Payment Practices“ in 2017, comparing with 2016 (Business Insolvency Worldwide, 2018). The study was constructed by answers from 3 000 respondents from management in 14 European countries. In the frame of research countries from Eastern Europe had been analysed, such as Russia, Poland, Slovakia, Bulgaria, Romania, Greece, Hungary and Croatia (www.podnikam.sk).

According the research, Slovakian companies have bad payment discipline mainly due to the temporary problems with cash flow (Tóth and Mura, 2014). Yet 49% of

commerce consumers mentioned this as a reason that they cannot pay their invoices in time or they are totally unable to pay the debts in 2017, while in year-to-year comparison the situation presents growth by 5%. Such situation was found mainly for commerce consumers, which presents segment B2B (Business to Business).

The other reason is that companies do not pay, since their consumer did not pay them. It is reason of delayed payment of invoices. 39% of requested mentioned payment outages at own clients. The next reasons are using of supplier loan (38%), situation of own orders (23%), or insolvency (21%). In whole Eastern Europe temporary problem with cash-flow dominates also due to the bad payment morality – 51% of respondents from commerce clients mentioned this reason. This reason in Eastern Europe is over any other reasons in comparing with Slovakia.

Reasons, as for example temporary problem with cash-flow and shortages in payment of own clients are connected together. Companies are entering to the secondary payment disability, which means not having paid invoices, and therefore companies cannot pay the incoming invoices. Due to the mentioned they record shortages in cash-flow and enter to a temporary liquidity crisis. All reasons are mentioned by the graphical illustration in Figure 1.

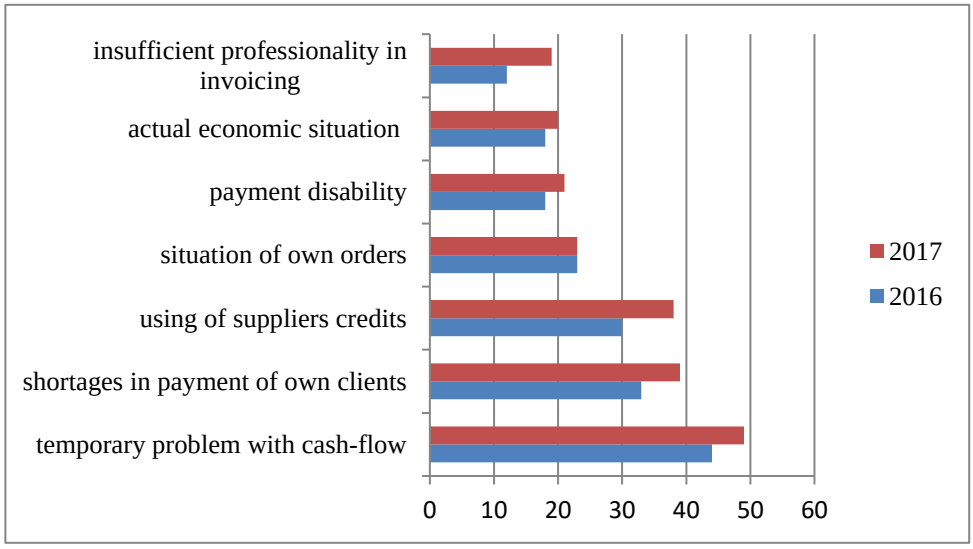

Figure 1 Reasons of insufficient liquidity of commerce clients in Slovakia (B2B in %); source: modified by (Business Insolvency Worldwide 2018)

Invoices in the frame of Europe as a whole sample of the research are paid on time only in 76% of companies, at the eastern part of Europe it is less – 73%. The worst situation had been recorded in Bulgaria – 70% of payment in term, following by Greece and Romania (equally 72%) and Slovakia and Russia – 73% of paid invoices in term.

One of the solutions how to overcome such situation can be professional administration and management of claims. Late payment of invoices in the worst situation is not paid at all. Terms of payment in relation to final clients and business are long; yet a worse situation is during business among single business subjects. Due to the mentioned there are rising volumes of cash-flow shortages in business, businessmen do not have sufficient money for business making, or they are unable to pay employees. Such situation rises mainly due to the long raw of debtors that delay to pay invoices.

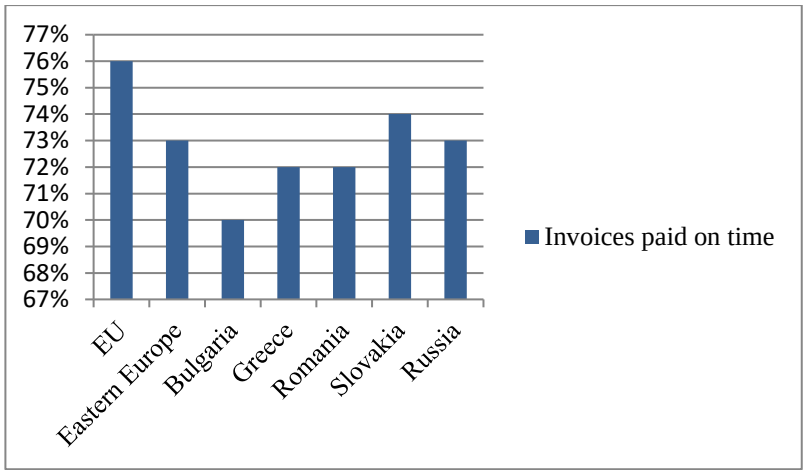

Figure 2 Comparing of invoices paid on time in chosen EU countries (B2B, in %); source: own elaboration according Business Insolvency Worldwide, 2018

According the study in 2016, constructed by 2 800 respondents from European countries, every fifth invoice in Western Europe was paid late or unpaid at all. In Eastern Europe according actual data 26% of invoices are late paid. Clients in Slovakia are paying on time only in 74% of invoices.

If changing mentioned factors to number of days, when invoices are paid, in B2C segment it was 26 days. In B2B segment it was even more – yet 38 days. Concretely Slovakian businessmen recorded situation at the level of average in Eastern Europe – payment to 40 days. Longer payment periods have only Russian companies – (41 days) and Greece (51 days). As for the Slovakia, also other factor is very warning; mainly majority of paid invoices is yet after 40 days, which presents 61%).

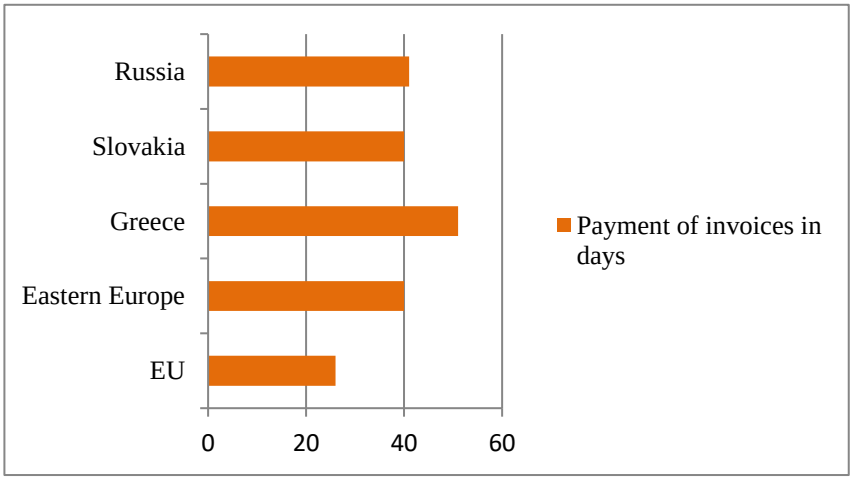

Figure 3 Comparing of invoices payment in chosen EU countries (B2C, in days); modified by (Business Insolvency Worldwide 2018)

Mentioned has its consequence. Companies do not have provided liquidity to its operation and further business plans activity. At the same time guarantee of long term success depends absolutely on secure, regular and stable cash-flow.

A responsible company that thinks to the future must think therefore how to provide liquidity and fluent cash-flow. One of the solutions can be mentioned professional administration of claims, which could contribute to the solvency of the company. The research show to the trend that leading managers perceive such situation mainly after economic crisis, and there is therefore rising number of companies that outsource administration of their claims.

Advantages of cooperation with an external partner are several (Simonidesová et al., 2015). Except of liquidity providing of given company and increasing of its credibility, there is space of reduction of undercharges, profit from higher level of providing and by this way also possibility to orientate to the main subject of the business. Outsourcing offers potential savings at level 30-40%. The reason is a higher level of standardization and automatization of processes, as well as concentration of knowledge of specialized companies. To compensate unpaid invoice there is necessary to make more sales. Mentioned is illustrated in Table 1.

Table 1 Effect of payment loss; own elaboration according SBA (2017) and SITA (2016)

Margin	2%	3%	4%	5%	6%	7%
Written off amount in €	Extra sales needed	Extra sales need	Extra sales needed	Extra sales needed	Extra sales needed	
€ 500	25,000	16,667	12,500	10,000	8,333	7,143
€ 10,000	500,000	333,333	250,000	200,000	166,667	142,857

Unpaid invoices (bad debt) are very costly, and their compensation demands following:

- sufficient effort to make additional sales,
- additional costs on administration and human sources,
- negative cash flow.

As for the payment discipline, the trend is positive and improving, but in comparing with Czech Republic the situation in Slovakia is worse (sees Table 2). Table shows that in 2018 yet 38% invoices in Slovakia had been paid after payment term. In Czech Republic situation in 2018 is smoothly improved.

Table 2 Payment discipline in Slovakian and Czech business; source: (EOS, Slovakia, 2018)

Invoices rate	Czech Republic (1.-6.2018)	Slovakia (1.-6.)	Czech Republic (7.-12. 2017)	Slovakia (7.-12. 2017)	Czech Republic (1.-6. 2017)	Slovakia (1.-6. 2017)
in payment terms	67%	62%	66%	56%	64%	57%
after terms	33%	38%	34%	44%	36%	43%
to 7 days after term	18,1%	16,9%	16,2%	17,8%	16,9%	19,01%
7-15 days after term	6,3%	10,3%	6,7%	12,5%	7,1%	10,7%
16-30 days after term	4,5%	4,5%	5,0%	6,2%	5,3%	5,3%
over 31 days after term	3,96%	6,4%	5,9%	9,0%	6,5%	7,6%

4 Conclusion

Slovakia took bottom place among the 17 European countries from the view of payments on time, included in the latest European Payment Practices survey. It results from not effective payment discipline, but it may be connected with the law enforcement as clients simply think that if they don't pay an invoice, nothing can happen. Such a situation demands effort from the side of government, to increase payment discipline of organizations, as well as single companies. The tools for credit risk decreasing can solve the situation as well.

The findings are limited to the country of the study, but it has its practical application – suggestions for financial managers to find proper payment mechanism. Future research can be orientated to the relation between size of the company and financial discipline, since management of receivables depends largely on the size of the company. While large companies can afford a separate department dealing with receivables management, small and medium enterprises do not have such possibility. Late payment of invoices may however, causes far greater problems in companies than in large enterprises; therefore, the effective management of receivables becomes a necessity.

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References

Adaval, R., Wyer, Jr., R.S. (2011) "Conscious and nonconscious comparisons with price anchors: Effects on willingness to pay for related and unrelated products", *Journal of Marketing Research*, Vol. 48, No. 2, pp. 355–365.

Business Insolvency Worldwide. (2016) "Economic Outlook no. 1230-1231 November-December 2016", Available at: http://www.eulerhermes.com/economic-research/blog/EconomicPublications/ insolvencies-the-tip-of-the-iceberg-economic-outlook-dec16.pdf

Chen, Y.J., Tsai, H., Liu, Y. F. (2018) "Supply chain finance risk management: Payment default in tourism channels", *Tourism Economics*, Vol. 24, No. 5, pp. 593–614.

Chodasová, Z. a kol. (2014) "Sledovanie ukazovateľov konkurencieschopnosti pre zlepšenie riadenia podniku", *Časopis znalostí společnosti*. Vol. 1/2014, No. 2, pp. 109–121.

Corbett, C.J. (2001) "Stochastic inventory systems in a supply chain with asymmetric information: Cycle stocks, safety stocks and consignment stock", *Operations Research.* Vol. 49, No. 4, pp. 487–500.

Dimitriadis, S., Kyrezis, N., Chalaris, M. (2018) "A comparison of two multivariate analysis methods for segmenting users of alternative payment means", *International Journal of Bank Marketing.* Vol. 36, No. 2, pp. 322–335.

E-Document. (2010) "Platobná neschopnosť stavebných firiem", Verlag Dashöfer, Available at: http://img.dashofer.sk/cif/dashofer/ukazky/ONGPNSF.pdf/

EOS Slovakia (2018) "For a debt free world", Available at: https://dlh.eos-ksi.sk/wdp/advise/

Gerardi, K., Herkenhoff, K.F., Ohanian, L.E., Willen, P.S. (2018) "Can´t pay or won´t pay? Unemployment, negative equity and strategic default", *Review of Financial Studies.* Vol. 31, No. 3, pp. 1098–1131.

Khouri, S., Istok, M., Rosová, A., Straka, M. (2018) "The break-even point calculation in onshore and offshore businesses in regards to taxation", *Transformations in Business and Economics.* Vol. 17, No. 3, pp. 347–365.

Kislingerová, E., a kol. (2010) "*Manažerské finance",* Nakladatelství C. H. Beck, Praha, Czech Republic.

Kovaľová, M., Hvolková, L., Klement, L., Klementová, V. (2018) "Innovation strategies in the Slovak enterprises", *Acta Oeconomica Universitatis Selye*. Vol. 7, No. 1, pp. 79–89.

Kráľovič, J., Vlachynský, K. (2011) *"Finančný manažment",* Wolters Kluwer (Iura Edition), Bratislava, Slovakia.

Ludwig, A. (2019) "From free to fee: A behavioral perspective on why companies avoid paying for cluster services", *International Journal of Globalisation and Small Business*. Vol. 10, No. 2, pp. 143–162.

Mateush, A., Sharma, R., Dumas, M., Plotniková, V., Slobozhan, I., Übi, J. (2018) "Building payment classification models from rules and crowdsourced labels: A case study",

Lecture Notes in Business Information Processing of the international conference of Tallinn, Estonia. Vol. 316, pp. 85–97.

Pawliczek, A., Kozel, R., Vilamová, Š., Janovská, K. (2015) "On the strategic planning, innovation activities and economic performance of industrial companies", *Acta Montanistica Slovaca.* Vol. 20, No. 1, pp. 16–25.

Podnikam.SK, MV. (2014) *"Platobná disciplína na Slovensku nie je najlepšia"*, Available at: https://podnikam.sk/platobna-disciplina-na-slovensku-nie-je-najlepsia/

Rosova, A. (2017) "Methods and approaches to the evaluation of company performance" In: Madzík, P.: *International Scientific Conference on the Poprad Economic and Management Forum*, p. 31–36.

Simonidesová, J., Manová, E., Stašková, S. (2015) "Societas Europaea as a new form of enhancement the quality of business from the perspective of the application of tax optimization", *Investment Management and Financial Innovations.* Vol. 12, No. 4, pp. 171–175.

SITA. (2016) "Za zlou platobnou morálkou firiem sú problémy s cash-flow", Available at: https://openiazoch.zoznam.sk/cl/172174/Za-zlou-platobnou-moralkou-firiem-su-problemy-s-cash-flow

Slovak Business Agency. (2015) "Analýza ukazovateľov finančnej výkonnosti malých a stredných podnikov v roku 2015", Available at: http://www.sbagency.sk/sites/default/files/analyza_ukazovatelov_financnej_vykonnosti_msp_2015.pdf/

Tóth, Z., Mura, L. (2014) "Support for small and medium enterprises in the economic crisis in selected EU countries", In: *Hradec Economic Days 2014: Economic Development and Management of Regions, PT V*, pp. 424–429.

Information as a quality management tool in accommodation services

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Abstract

The basic measure of the quality of accommodation services in tourism is the satisfaction of the customer - guest. Based on the experts' claims the evaluation of the quality of accommodation services is the result of the difference between the guests' expectations and his perception of the services actually provided. Potential guests' expectations can be influenced directly: by information they receive from the host or indirectly: by ratings given by previous guests. From the above it is clear that the information provided by the accommodation provider is a tool by which the accommodation facility can directly influence the customer's expectations and thus the quality of its services. The information provided by the accommodation facilities can positively affect the quality of service if complete, truthful, and relevant, while the relevance depends on the guests' preferences.

Keywords: tourism; accommodation services; information; guest; quality management.

JEL Classification: M21, M31, Z32

Article Classification: Research article

1 Introduction

The quality of accommodation services depends primarily on two basic factors: 1. on customers' expectations and 2. a quality of service perceived by the customer. Parasuraman, Zeithaml and Berry (1985, 1988) developed a GAP model, that is based on a premise, that customers' satisfaction is a reflection of the difference between the two mentioned factors. In this context the GAP can have both positive and negative values depending on guests' experience. If the quality of service perceived by customer exceeds his expectations, the GAP has a positive value. If not, the GAP has a negative value.

Customer expectations are formed on the one hand by their own experience, on the other hand by available information. Tourism information about accommodation

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services is mostly represented by global web sites like "www.booking.com, www.trivago.com, www.airbnb.com" and others. Also national web sites like "www.ubytovanienaslovensku.eu" or "www.megaubytovanie.sk" can be used for gaining information by potential clients of accommodation facilities. In the context of mentioned, the "online information" is the first quality management tool, which can be used in the provider – customer interaction. Nevertheless, nothing can replace personal communication in a process of information providing. This means, that there are two main ways of providing the information to the customer in accommodation services. From this point of view, information can be divided into "online" and "offline information", while "online" one can be used for providing of wide spectrum of general information and the "offline" one for providing of concrete information for concrete customer. It is not easy to find the right ratio between the two types of information. Only experience can bring the accommodation provider to the right way to use it, but even an experienced provider can spend a goal.

The paper highlights the importance of information for satisfaction of the guests. It is assumed that the good informed guest creates more objective expectations and consequently he is more satisfied with the realization of the accommodation services. Hypothesis, that there is a mild to strong dependence between the completeness of the published website as an information basis for potential guests and the satisfaction of the guests with the accommodation services (shown by guest ratings), will be verified. The next two attributes as truthfulness and relevance of the information in tourism business build a subject of following discussion.

2 Material and methods

The article was processed using the methods of observation and hypothesis verification by means of a correlation method.

2.1 Observation

Observation is based on the five-year experiences of the paper authors. Both authors are running small business in accommodation services in High Tatras, as well as they cooperate with some bigger accommodation facilities in Tatra region. This allows them to observe an information flow between customers and accomodation service providers and find out, how the information can influence guests satisfaction.

The basis for observation is built by number of served guests during five years (2014-2019) in accommodation facilities (namely Guesthouse PAVILON D and Vila Anna in High Tatras region of Slovakia), where both authors offer an accommodation in apartments and studios. It means that the basis is built by more than 1000 guests pro year, as well as more than 300 guest ratings pro year.

2.2 Correlation analysis

To verify the hypothesis of dependence between the completeness of the published website and the satisfaction of the guests, the statistical method - correlation coefficient calculation - was used. A sample of 29 accommodation facilities from High Tatras region was taken into account when the correlation coefficient was count. Generally the correlation coefficient r (x, y) expresses the correlation for a pair of variables x and y. In this paper the x = the completeness of the published website and the y = the guest satisfaction score of 0-10 points.

Table 1 Dependence between the completeness of the published website and the satisfaction of the guests; own elaboration

Nr.	Name of accommodation facility	Completeness of the content of the published page in %	Score of guest satisfaction on a scale of 0-10 points
1.	Guesthouse PAVILON D	100	9,5
2.	Vila Anna	100	9,8
3.	Penzión Sibír	100	9,6
4.	Apartmán. dom Tatra Travel Smokovec	100	9,5
5.	Apartmánový dom Familia Smokovec	100	9,2
6.	Penzión High Tatras	100	9
7.	Vila Grand	100	9,7
8.	Vila Mudroň	100	8,9
9.	Miramonti penzión	100	9
10.	Apartmány Renomal	100	8,9
11.	Tatragolf Mountain Resort	100	8,4
12.	Penzión Reitmeyer	100	9,5
13.	Vila Credo	100	9,1
14.	Penzión Darinka	100	9,5
15.	Penzión Fantazia	100	9,4
16.	Tatra Hotel	100	8,2
17.	Hotel Cafe Razy	100	7,9
18.	Hotel Satel	100	8,1
19.	Aplend B&B Júlia	99	9
20.	La Chata	98	9,4
21.	Hotel Villa Siesta	95	8,5
22.	Penzión Podlesanka	94	9,3
23.	Penzión Slávia	93	8
24.	Penzión Pod bránou	92	9,5
25.	Pension Aqualand	91	8,6
26.	Hotel Poprad	91	7,8
27.	Apartmán pod Slavkovským štítom	81	9,3
28.	Pionier	75	9,4
29.	Penzión Gabriel	69	8,1
	Correlation coefficient		**0,191850021**

For calculating the correlation coefficient, following formula was used:

$$r(x,y) = \frac{k(x,y)}{s_x s_y} \tag{1}$$

The k (x, y) is statistical covariance, which is calculated:

$$k(x,y) = \frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y}) \tag{2}$$

If the x and y characters are independent, the correlation coefficient is zero. If the degree of linear dependence of x and y is:

- small, then $|r(x, y)| \leq 0,3$
- mild $0,3 < |r(x, y)| \leq 0,8$
- strong $|r(x, y)| > 0,8$.

In this case its value indicates the degree of dependence between two variables, namely the completeness of the content of the published page in % and the score of guest satisfaction on a scale of 0-10 points. In the scale the 0 means dissatisfaction and the 10 points evaluation means full satisfaction. However, the correlation calculation needs to be supplemented by observation that allows the determination of the cause-effect relationship.

3 Results and discussion

Using the above mentioned formula and values from the Table 1, the value of the correlation coefficient is 0.191850021. This means that the correlation between the two mentioned variables is small, i.e. the hypothesis, that there is a mild to strong dependence between the completeness of the published website and the satisfaction of the guests, is not valid. Based on the correlation analysis and the observation, it can be stated that completeness of the published website has only a small impact to the guest satisfaction, i.e. to the quality of accommodation services.

3.1 Process of information transfer

The findings from observations confirm the argument that this is largely the result of imperfections in the process of communication, i.e. in the process of information transfer. The way, how information flows between an accommodation provider and a customer, is shown in the following figures.

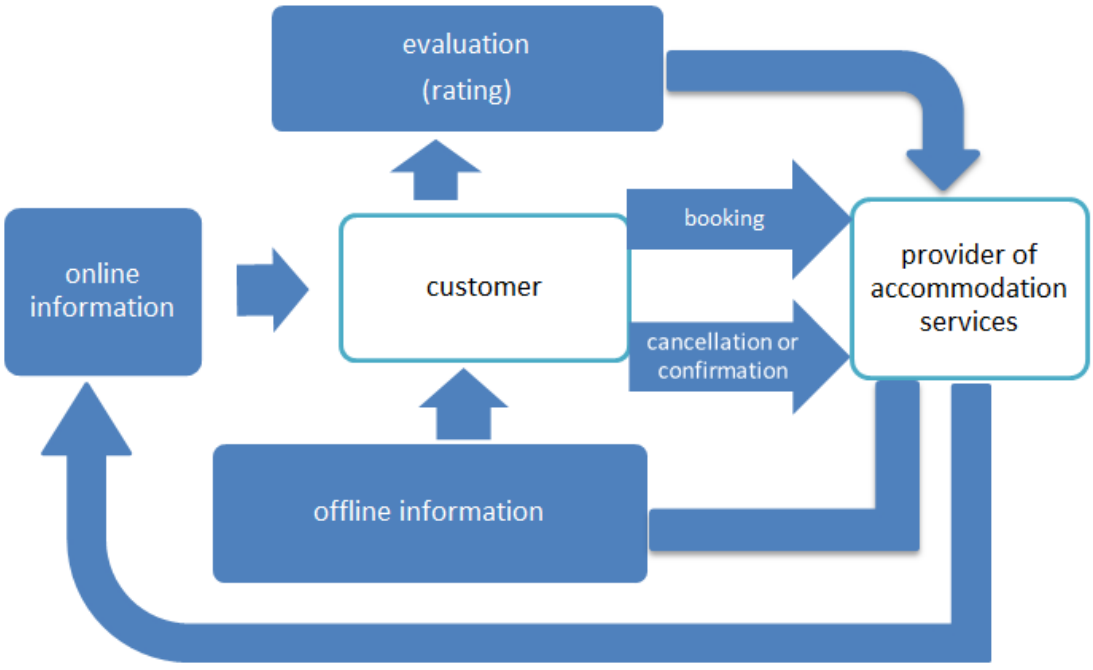

Figure 1 Flow of information between small accommodation services provider and customer; source: own elaboration

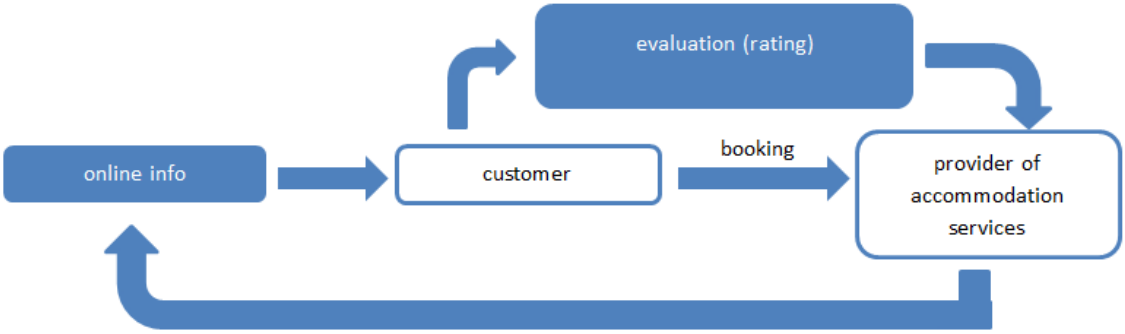

Figure 2 Flow of information between big accommodation services provider and customer; source: own elaboration

The first problem in communication can occur at the level of customer perception of online information. The so-called selective perception makes the primary information provided by the accommodation facility perceived by the customer distorted or incomplete. This can be the result of several external and internal factors. As an example of external factor, the processing of information by the host may be mentioned. It is understandable that accommodation providers present first of all their strengths through online information, as well as they use the most inviting forms for presentation. Thus, on a panoramic photo, a small room can look larger than it really is. Therefore, providing accurate and truthful information about the equipment and room size of the accommodation is necessary for creating objective expectations. There can be also internal factors affecting the selective perception of online information. First it is a previous experience of the guest and references of his friends or previous guests. With the increase in positive ratings, the expectations of incoming guests are also growing. In this context, it is difficult to achieve positive GAP values. On the contrary, if the ratings of previous guests are objective or even negative, positive GAP values are easier to achieve.

The second problem in the process of providing information to a greater extent affects large accommodation facilities. The above mentioned pictures show two different ways of communication between accommodation services providers and customers.

The first way, typical for small businesses, includes in addition to online information also offline information. This helps them to recognize customer expectations better then in bigger businesses. The way of small businesses communication consists of: 1. recognizing customer needs according to a booking form delivered to the provider (booking forms usually include place for special guest requests, where the customers can specify their requirements). 2. customer needs assessment (the provider of the accommodation services finds out, if he can or cannot meet the special requests of the potential guest) and 3. communicating of possibilities of the needs satisfaction. In case, the provider cannot meet the customer expectations defined in the booking form, he can decide to contact him offline. Using the offline communication allows the small businesses to avoid misunderstandings and thus eventually dissatisfaction of the guests. This way of individual approach to a potential guest is typical for small businesses. Through the offline communication a high quality of accommodation services can be reached.

The second way is typical for bigger accommodation facilities like hotels or apartment houses. In terms of the number of provided services and served customers, large accommodation facilities cannot carry out the offline communication in such a quality. Although, in a luxury hotels a person named concierge is for the accommodated guests to disposal. The concierge is a representative of guest-relations for the guests in a

hotel. In large accommodation facilities the receptionists can also provide offline communication with potential clients. However, this is usually possible only in top-class hotels with enough staff.

3.2 Relevance and truthfulness of information

Except of completeness, another two attributes of information, which influence the quality of accommodation services, can be formulated. Relevance and truthfulness of provided information have an impact to the guest satisfaction. While truthfulness can be easy to reach, the relevance requires more practice of information provider. The truthfulness is objective, but the relevance of information depends on guests' preferences. According to their information preferences, the following basic guest types can be recognized:

1. price oriented guest,
2. comfort oriented guest,
3. availability oriented guest,
4. guest oriented on relations and experiences and
5. a guest oriented on equipment.

The first type – the price oriented guest - is usually searching for cheap accommodation without a special service. This guest needs to know, if any discount is available and if any taxes or fees will be paid on the place. Sometimes requires an information on the method of payment. Often asks for the information about "total price" including city tax. This type of guest would appreciate further information about possible discounts, free services or products offered by accommodation provider and other tourism institutions in the region.

The second type – comfort oriented guest – usually needs to know, if services like breakfast, late check-in or check-out is available. This guest would like to know all information about additional and special services like ski-rental, wellness or baby-sitting, as well as information about services provided by other facilities in the destination. He may also be interested in parking possibilities and new technologies, like Smart-TV or wide offer of TV programmes in various languages. This guest asks for information about air-conditioning or further services (lift, porter, laundry service) providing him enough comfort.

The third type – availability oriented guest – needs to know how to get to the destination and to the accommodation facility. This type of guest usually travels by public transport. He is interested in the distance of the nearest train or bus stops. It may be important for him to be close to the airport and to get information about airport transfer options. Availability oriented guest appreciates information on train departures, buses, ski buses, cableways or lifts. He is also interested in information about the distance and availability of local tourist attractions. Clients with reduced mobility belong to this type of guest, too. Nowadays, when senior tourism is growing, it is important to take this into account. These clients need to know in advance, whether the accommodation facility is located in the field, or it is not, whether the rooms are situated on the upper floors without a lift access. This information helps them to decide for concrete accommodation facility, so that during the stay they can reach it without any problems.

The fourth type – guest oriented on relations and experiences – travels often with family or friends. Information about possibilities of booking family room or extra beds can help him to decide for concrete accommodation facility and concrete type of apartment or room. This guest often informs an accommodation provider in advance, that he travels with family, children or friends. Information about discounts for children,

seniors and groups can be useful for him. If there are any special services like animation, this guest should be informed about it. This type of guest is usually interested in attractions and sights in the destination. He will appreciate information about local specialties and about the attractions that are not commonly available and generally known.

The fifth type – a guest oriented on equipment – usually contacts the accommodation provider few days before arrival to find out, what equipment the accommodation facility offers. He needs to know if there is for example hairdryer, bedlinen, towels or toiletries to disposal. Information about kitchenette and bathroom equipment can be useful for him. If there is a washing machine or microwave oven in apartment or studio, this guest should know it. Sometimes the guests' requirements hang on his situation. To this group of customers belong the long travelling guests, who need to minimize their luggage. Also parents travelling with baby belong to this group of guests. All information about special equipment like baby cot or baby chair will be useful for them.

Generally, the above mentioned guests belong to the basic types. In practice, different types of guests can be recognized. Often the guest types are mixed, and experienced provider of accommodation, receptionist or concierge can identify them and can provide them useful and relevant information.

Completeness, truthfulness and relevance of provided information in accommodation services can help to avoid misunderstandings and thus a possible dissatisfaction of the guest. This way the information can be used as a one of the quality management tools in accommodation services. It may not be difficult to ensure the completeness and truthfulness of the information, but its relevance can be a subject of discussion. While one of the guests can appreciate an information about new opened Aquapark in destination, the other one needs to know, when the last bus departures the city. In a process of information transfer, the online information is the first to disposal to the potential guest. After that the offline information can help to specify the guests' requirements. Usually the small businesses can better to handle this offline information as they have better staffing for that, i.e. the number of guests served per employee is usually lower than for large accommodation facility.

References

Gončárová, Z. Piteková, J. (2018), "Rodinný podnik ako konkurenčná výhoda podnikania v cestovnom ruchu", In: *Hotelnictví, turismus a vzdělávání : sborník mezinárodní vědecké konference, 2018*, Vysoká škola hotelová v Praze, Praha, Czech Republic.

Habrmanová, S. (2018), *"Concierge - nemožné na počkanie, zázraky do troch dní",* Available at: https://hotelier.sk/hotelier/clanky/concierge-nemozne-na-pockanie-zazraky-do-troch-dni

Kuzevičová, Ž., Bindzárová Gergeľová, M., Kuzevič, Š. (2017), "Data model design for applications in tourism", *Ekonomika a manažment podniku.* Vol. 15, pp. 23–29.

Parasuraman, A., Zeithaml, V.A., Berry, L.L. (1988), "SERVQUAL: A Multiple-Item Scale for Measuring Consumer Perceptions of Service Quality", *Journal of Retailing.* Vol. 64, No. 1, pp. 12–40.

Parasuraman, A., Zeithaml, V.A., Berry, L.L. (1985), "A Conceptual Model of Service Quality and Its Implications for Future Research", *Journal of Marketing.* Vol. 49, No. 4, pp. 41–50.

Rašovská, I., Ryglová, K. (2017), "Management kvality služeb v cestovním ruchu", Grada Publishing, Praha, Czech Republic.

Geographic information system as the foundation of support decisions of managers of territorial authorities and businesses in food distribution

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Abstract

Modern geographic information system enables to prosess a large volume of data marked as big data. To have in disposal actual data about retailer units is a requirement of geographic information systems of towns and territorial authorities as well as enterprises. That is why it is inevitable to have in disposal information of geographic information systems to ensure its accuracy and timeliness in concept of territorial development. The aim is to direct the location of retail units on the concrete territory within the interest of smooth supply of the population mainly in the assortment of food. The greater the territory and more sources of information, the greater need to process the big data. Better data means the possibility to have an access to quality information which serves as basics for forming knowledge and make better decisions. The aim of the article is to point at the possibilities of the use of technologies of big data in Slovakia and demonstrate on the example the use of spatial data in geographical localization of retail units on the territory of the capital city of Slovakia- Bratislava.

Keywords: geographic information system; spatial data; territory; retail unit; databases of information; new consumption.

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Article Classification: Research article

1 Introduction

The role of territorial authorities but also of executives in companies is to make the best decisions in solving different problems from the point of view of time and financial minimalization. To behave in the spatial and territory means to behave in its accordance. To understand the mechanism which generates purchasing flow on the territory suppose to use the technologies based on cartographic programmes, databases of information and maps but also on new models of consumer behaviour linked with new consumption. Big data , analysis of large quantity of structured, non-structured and half-structured data is a significant tool in marketing of territorial institutions and enterprises which enable to acquire information about customers´ behaviour.

2 Material and methods

Retail can be considered to be a fast changing sector of economy. Sustainable development, globalization, customers´ behaviour, changes in society, competitiveness, technology, extending of the activities of trade companies and erosion of boundaries of trade systems cause the changes of retail units on the territory and necessity of evaluation of the trends in retail sphere from the time and spatial aspect. The goal is to direct localization of retail units on the territory in order of accessibility of the food stores.

2.1 Characteristics of a concrete area

Choice of the city Bratislava as a research territory is related to the fact that Bratislava is economically the strongest region in Slovakia what contributes to the development of retail sphere. Retail network is characteristic by deepening internationalization – impact of various transnational retail networks and influenced by the consequences of cross-border shopping. Bratislava citizens have a possibility to do shopping abroad (Lessay, 2015, p 59-74) in the chains not operating in Slovakia and also compare the offer mainly of Austrian retailers with home retailers (Križan, Zeman, Bilková, Kita, Barlík, 2017, p 124-136). The area of Bratislava is 367, 7 square kilometres.

Location of Bratislava together with its function as the capital contributed to strengthening of its position as the gate for foreign investors and innovation after the year 1989. Economic reforms (Kitová Mazalánová, Kita Pavol, Matulčík, Strelinger 2015, p 560-572), privatization, direct foreign investments, stabilization of the political scene, entry of the European Union and eliminating of state border as a barrier (thanks to entering Shengen) contributed to increasing of attractiveness of the region Bratislava for extensive transregional business chains (Šveda, Križan, 2012, p. 463).

2.2 Methods

An article is based on the secondary data dealing with characteristics and significance of big data and geographical information systems in decision making. Other

parts of the article are focused on the research and reached results on the basis of using databases characterizing development of retail network in Bratislava. Geographic information were combined with specific locations on the territory of the capital city of Bratislava. Data were processed and evaluated in the programmes Microsoft Excel 2010, SPSS, ArcGISTM (version 9.2).

Spatial data are based on databases of the research which involve information about customers in 17 urban parts of the capital of Slovakia Bratislava divided into 263 urban districts. This database includes:

- demographic data about customers (gender, number of members of the household, age, income, education, type of economic activity),
- identification of territorial area, address of the respondent with the aim to to make analysis of moving with respect to transport network in the city of Bratislava and identification of time dedicated to moving of retail unit in the same or other territorial area where the store is located,
- realization of the purchase: location of the store where respondent did shopping, popular days for shopping, frequency of shopping, time spent in the store,
- choice of the format of the store: conditions of shopping and accessibility of the store, the way of coming to the store and the time necessary for coming to the store, opinions on the store in which respondent regularly do the shopping and on other stores which he visits.

Based on this data it was possible to develop maps of spatial localization of retail network on the territory of the city and create a database of retail chains. At the same time databases of further research also enabled to update acquired results and expand new knowledge in purchase of food in alternative distribution channels. Evaluation of the format of the store, respectively alternative distribution channel was made according to Likert scale which enables respondent to express the level of importance attributed to a given store and use this qualitative information in quantitative analysis with the help of multidimensional scaling. Scale has 5 levels within the range 1 – the best to 5 – the worst.

Output of multidimensional scaling is described in a multidimensional map which enables to compare positions of studied objects and name dimensions in a way to show most clearly the differences between them.

Retail chain mapping has enabled the identification of a wider type of a large-format of grocery stores – a supermarket. Data of a further database enabled to extend reached results and new knowledge linked with purchase of food in alternative distribution channels.

3 Results

The number of supermarkets in Bratislava has risen dramatically in recent years. This result can be estimated as a business success of format of a store in the situation when occur changes in consumption due to sustainable development. Within this context we focus on the concentration of supermarkets as the most spread format of a store and as well we evaluate the spatial distribution of supermarkets as the most widespread format of store and evaluate spatial layout of supermarkets in Bratislava in the years 2011 and 2016 with the help of the method of relative entropy. Based on the results is possible to state that all circuits in Bratislava are sufficiently covered with supermarkets even though during the monitored period occured changes in the distribution of supermarkets. There have been shifts from the centre to the suburbs. These changes will continue and will reflect changes in demand for healthy food, changes in settlements and creating of new

urban areas. Figure 1 illustrates localization of the chain of stores in Bratislava in the years 2011 and 2016.

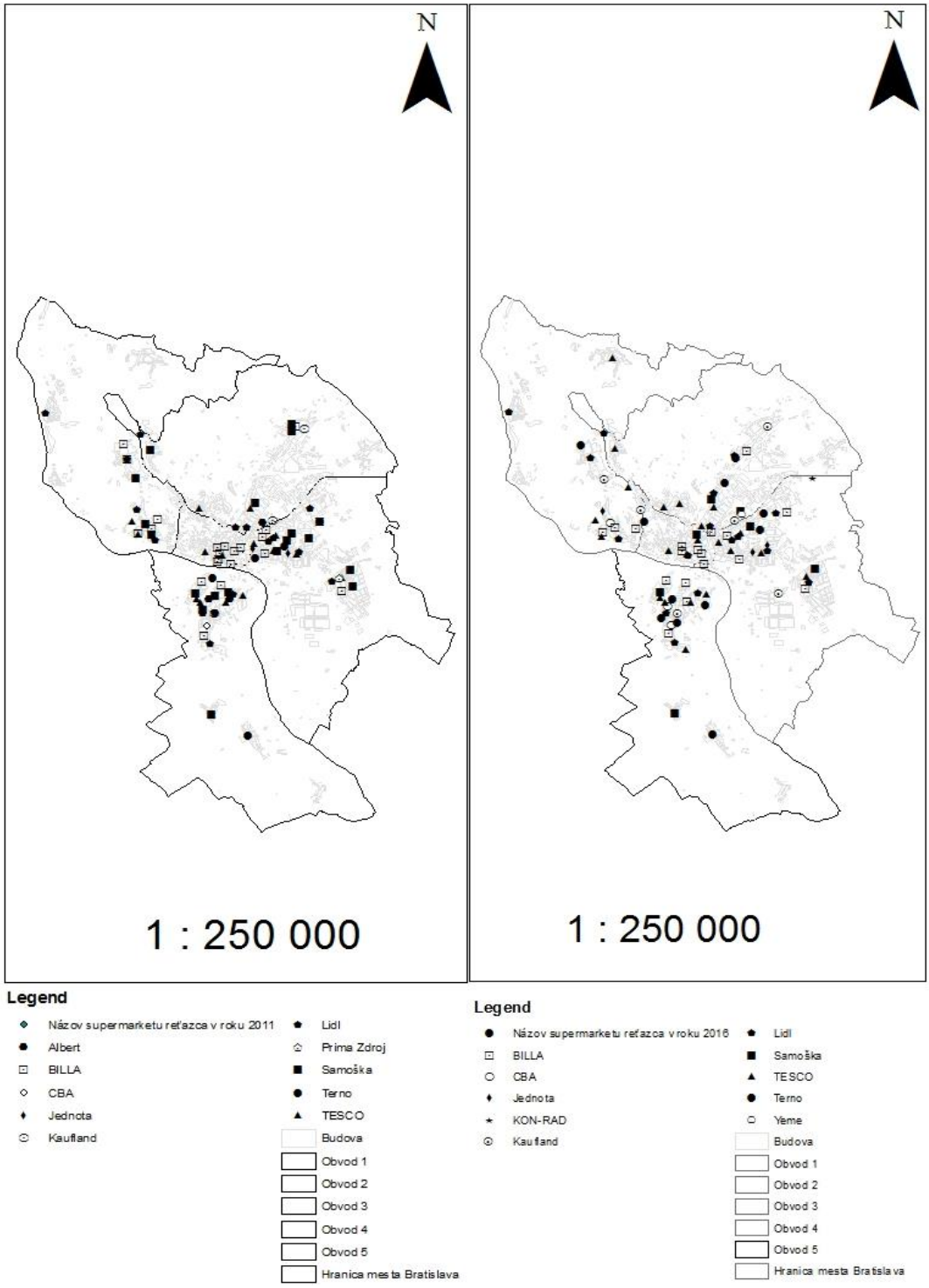

Figure 1 Chain of supermarkets in Bratislava in the years 2011 and 2016; source: (Kita et al. 2017)

Based on available data it is obvious that supermarkets with the highest number of stores are supermarkets Billa and Tesco. Some changes happened also in other supermarket chains. Supermarket chains Albert, Prima Zdroj belonged to the supermarket

chains only in the year 2011. Chain Yeme on the contrary existed only in the year 2016. Other chains of supermarkets overlapped in both time periods.
Tables 1 and 2 illustrate calculation of the relative entropy in the year 2011 and 2016 due to competitive chains of supermarkets which existed in Bratislava in above mentioned years. Calculations are made on the basis of five Bratislava circuits.

Table 1 Calculating the relative entropy in the year 2011 for all competitive chains of supermarkets in Bratislava; souce: (Kita, et al. 2017)

Mestská časť	Fi	log fi	fi log fi	E	k	log k	RE
Bratislava 1	0,121212121	-0,916453949	-0,111085327				
Bratislava 2	0,292929293	-0,533237197	-0,156200795				
Bratislava 3	0,151515152	-0,819543936	-0,124173324	**0,67823647**	5	0,69897	**0,97033701**
Bratislava 4	0,191919192	-0,716881594	-0,137583336				
Bratislava 5	0,242424242	-0,615423953	-0,149193686				

Values *fi* and *fi* log *fi* were calculated for each chain. The lowest values of relative entropy on the level 0 from all chains reached in the year 2011 chains Terno, Prima Zdroj, Jednota, Albert due to imperfect territorial coverage in Bratislava. In the year 2016 with zero territorial coverage was the chain KON-RAD. On the contrary the highest level of relative entropy in the year 2011 reached company Billa and in the year 2016 company Tesco.

Table 2 Calculation of relative entropy in the year 2016 for all competitive chains of supermarkets in Bratislava; source: (Kita et al. 2017)

Mestská časť	fi	log fi	fi log fi	E	k	log k	RE
Bratislava 1	0,168067227	-0,774516966	-0,130170919				
Bratislava 2	0,268907563	-0,570396983	-0,153384063				
Bratislava 3	0,168067227	-0,774516966	-0,130170919	0,687224	5	0,69897	0,983195102
Bratislava 4	0,151260504	-0,820274456	-0,124075128				
Bratislava 5	0,243697479	-0,613148963	-0,149422857				

Company Tesco has a representation of its outlets in all circuits of Bratislava. In the circuit of Bratislava 2 in the year 2016 Tesco had 7 stores and reached frequency *fi* 0,269230769 and value for *fi* log *fi* – 0, 153427968. In the circuit Bratislava 1 had Tesco 3 stores and frequency *fi* 0, 115384615 and value *fi* log *fi* - 0, 108213703. For supermarket Tesco the value of entropy *E= 0,680623155 and* relative entropy *RE = 0,973752.* As far as this fact a relative entropy reaches the values from 0 to 1, that means that if we take into consideration chain of Tesco stores it covers almost all territory of Bratislava. We can state then that territorial coverage of Tesco stores in Bratislava is at an excellent level.

At the same time we can state that all circuits in Bratislava are at present sufficiently covered with supermarkets. This fact was confirmed with the results from above mentioned calculations, as relative entropy in both monitored time-periods reached level 0, 970337 in the year 2011 and 0,983195102 in the year 2016. But there are the circuits in which there is a lower quantity of supermarkets when following calculations

per capita. There are circuits: Bratislava 4, Bratislava 5 in the year 2011 and in the year 2016: Bratislava 4 and Bratislava 5.

As it is possible to see from the map (picture1) which demonstrates a distribution of supermarkets in the years 2011 and 2016, changes occured in territorial localization of supermarkets - a shift from the centre towards suburbs. In the year 2011 supermarkets were more oriented on the centre of the city. The centre was more densely covered with supermarkets and on the contrary suburbs were much less covered. This change happened due to combination of construction of new residential areas in the suburbs and more expensive rent in the centre.

The basic and easiest identification element of differentiation of stores from the point of view of the customers is how a concrete format of retail unit secure providing of value offer to the customers based on availability and purchasing conditions of the customer. Research found out that customers prefer shopping in concrete retail units more than in other ones. From this reason the choice of the format of the sale is a strategic choice. The way the customers understand retail unit is closely linked with what is sold and how it is sold. (figure 2).

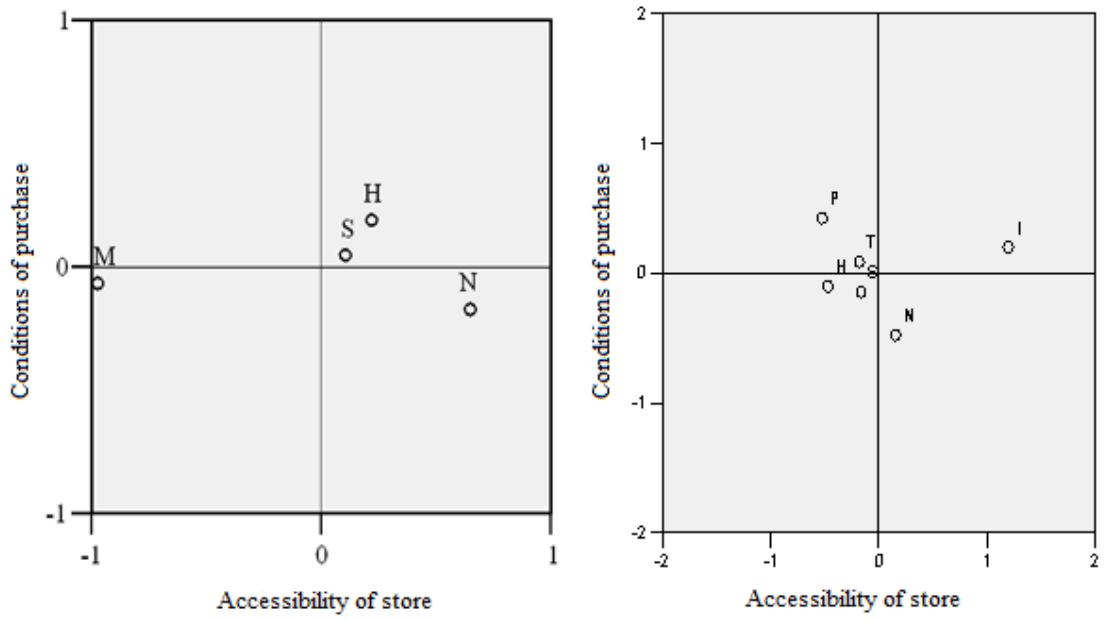

Figure 2 Comparing of understanding of format by the consumers in the years 2011-2016; source: (Kita, Kollar, 2018) Explanatory notes: (2011) M: small-scale shop, S: supermarket, H: hypermarket, N : no format preferred. (2016) P: small shop, S: supermarket, H: hypermarket, N: neither of these formats preferred, T: market, I: internet shop

The analysis of databases shows that there is a shift in rating of supermarkets and hypermarkets towards their new competitor, small-scale farm shops and marketplaces selling fresh food and in which the customers can buy fresh goods all the day. These changes in the value menu are related to the important challenge of today – sustainable development. From the researches carried out is clear that the citizens of Bratislava most often buy fresh food on the farmers´markets (category includes also farmers´shops), that is 55,26% respondents. In the future the role of internet in the sphere of distribution of fresh food will increase being able to provide the offer of the local production of food and non-food goods and its distribution to the customers. The customers buy at least via box

sales system (2,10%). Box sales and community garden play a complementary role and exapand the form of direct sales. The future can bring the growth of its popularity.

The rising demand for fresh and high-quality home –made food represents for many small farmers a real challenge. Bratislava citizens understand health and taste as individual forms of alternative distribution differently.

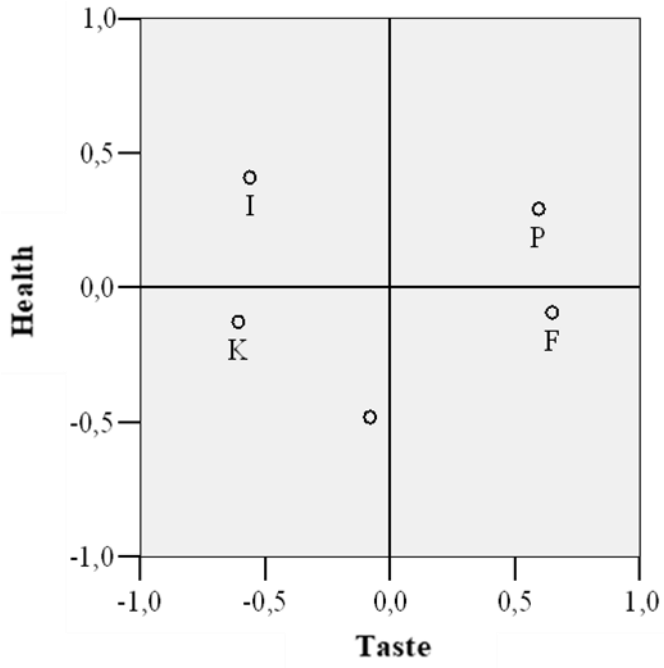

Figure 3 Map of perception of alternative food distribution channels; source: (Kita, Kollar, 2018); Explanatory notes: D: box-sales system: F: farmers´market, K: community garden, I: internet shops, P: sale from the yard

4 Discussion

Current retail units offer a wide scale of goods to the customers. The question is which advantages and market spatial exist for such an offer? The answer can be the offer of socially responsible products, in the production of which does not cause damage to the environment and which respect collective interests of society. It follows that the sphere of values is expanding and retailer is expected to react on them. Ecological and social values supported by sustainable development are at the forefront. In the sphere of retail with food these tendencies are being pursued by dual way:

- response of retail chains to emerging trends in consumption by gradual expanding the range of community-responsible products with the goal of attracting customers and getting profit,
- by alternative distribution channels in the sphere of food representing supplementary form of distrbution in relation to existing distribution systems which are not able to provide fresh and tasty food.

Growing interest of consumers in healthy and fresh food and healthy diet in the last decade was caused thanks to big food scandals which dramatically contributed to the rise of interest in food safety. It is related with the change in consumer behaviour, who less and less trust the practices of food-processing or stopped to like anonymous

environment of supermarkets and shopping centres and are aware of growing number of announcements about unsuitable food in retail sales.

As the result of these tendencies is the fact that the offer in large-format retail units gradually converges to the offer of ecological products. Width of the offer, price, atmosphere and image of the store also determine preferences and frequency of visit (Hauser, Koppelman, 1979, Donovan, Rossiter, 1982, Finn, Louviere, 1996). Future pays to big shopping-centres which is also confirmed by the study of Brengman et al. (2005) according to which consumers prefer shopping centres even to more modern and revolutionary internet shopping what indicates that experienced ´touching´purchase shouldn´t be underestimated. Besides that large-format stores and shopping-centres also influence development of surrounding urban areas. Territorial division of large-format retail units will reflect the changes in population settlement and creation of new urban and residential areas.

Another trend is a cross-border shopping that can be linked with economic situation of the residents. In the context of saturation of the citizens with long-lasting uniformity offer of retail chains is obvious that customers want the change of the sortiment. Consumers have been for a long time perceiving the differences in the product compositions from the point of view of the quality and price which are sold under one brand in Austrian and Slovak market. It can be assumed that Slovak consumers expect from shopping in Austria higher added-value that is why they have a more critical access to the offer in retail units in Slovakia.

Economic power of the consumers represents a hope for new alternative channels offering fresh food. Innovative trade models of new types of retail units oriented on value offer for market slits, which several years ago didn´t seem to be economically interesting, they can expect the growth of sale and of profit from the long-time perspective (Christensen, Bower, 1996, pp. 198-218). A significant ability of a trade model is forming of innovation of a value offer and commercialization approach which can influence consumer and find a possibility of the growth of the sale.

Conclusion

By comparing acquired data can be stated that the Slovak retail is significantly influenced by globalization processes, which form consumers preferences and a lifestyle of the consumers. These processes at the same time brought significant changes as building the chains of supermarkets, hypermarkets and discount stores as well as large-scale outlets which to a great extend influence retail chain of the city. Sustainable development causes extensive changes in a value offer (Kita, 2014, pp. 396-397) and in the development of retail chain towards socially responsible products. There are the changes of the model of consumption of customers which lead to the new formats of stores with a new value offer.

In analysis were used geographical information systems. With the help of them can be evaluated mainly spacial domension of the problem. Application of the techniques of geographical information systems in the research of retail showed as suitable not only cartographical but also an analytical tool with a wide range of applicability.

Akcknowledgements

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References

Brengman, M, Geuens, M, Weijterrs, B, Smith, S. M., Swinyard, W. (2005) "Segmenting Internet shoppers based on their Web-usage-related lifestyle: a cross-cultural validation", *Journal of Business Research*. Vol. 58, No. 1, pp. 79–88.

Christensen, C. M., Bower, J. L. (1996) "Customer power, stregic investment and the failur of leading firms", *Strategic Management Journal*. Vol. 17, No. 3, pp. 192–218.

Hauser, J. R., Koppelman, F. S. (1979) "Alternative Perceptual Mapping Techniques: Relative Accuracy and Usefulness", *Journal of Marketing Research*, Vol.16, No. 4, pp. 495–506.

Kita, P. (2014) "Multiple value for the customer - part of a new business model for sustainable development context", In: *The proceedigs of the 7Internatioal Scientific Conference for PhD and Young Scientists Karvina,* Silesian university, Opava, pp. 396–406.

Kita, P. et al. (2017) **"**The Influence of Economic Geography on Supermarket Concentration", *AD ALTA Journal of Interdisciplinary Research*. Vol. 7, No. 1, pp. 68–72.

Kita, P., Kollár, P. (2018) "*Geomarketing in Food Retail",* TSP, Kraków, Poland.

Kitová-Mazalánová,V., Kita, P, Matulčík, J., Strelinger, J. (2015) "Policy of privatization in the context of neoliberal changes", In: *Pour une Europe forte: renover les structures économiques, entrepreneuriales, politiques, territoriales et éducative*, Belianum, Banská Bystrica, pp. 560–572.

Kollár, P. (2018) "Threats and Opportunities for Rural Retail in the Conditions of Dunajska Streda District", *Ekonomické rozhľady*. Vol 47, No. 2, pp. 250–261.

Križan, F., Zeman, M., Bilková, K., Kita, P, Barlík, P. (2017) "Cezhraničné nákupné správanie spotrebiteľov zo Slovenska: prípadová štúdia z Hainburg an der Donau (Rakúsko)", *Geographia Cassoviensis*. Vol. 11, No. 2, pp. 124–136.

Lessassy, L. (2015) "Living in Bratislava and making shopping in Vienna: a cross-border approach to the catchment area", *Management & Governance*. Vol. 13, pp. 59–74.

Šveda, M., Križan, F. (2012) "Prejavy komerčnej suburbanizácie vo vybraných odvetviach hospodárstva v zázemí Bratislavy", *Ekonomický časopis*. Vol. 60, No. 5, pp. 460–481.

Consumer Behaviour in Slovakian Food Market

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Abstract

The objective of the article is to provide results of analysis of consumer behaviour on the market with food in the Slovakia. The article is focused on identification of factors, which influence the behaviour, and suggest recommendations applicable for businesses operating on the market of food and created comparison with consumer in Czech Republic. Secondary data were obtained from the available studies, surveys and statistics in order to get a basic overview of the retail market in the Slovak Republic and put into context with the results obtained from primary research conducted in Slovak Republic (n = 1170, 2013) and Czech Republic (n = 5809, 2013). The results are introducing the complex of characteristic features of Slovak consumers, which differ from the Czech consumer.

Keywords: agribusiness; consumer behaviour; demand; food market; preferences; retail chains; segmentation; Slovakian market; decision making process.

JEL Classification: M31, M37, L66, N30, P46

Article Classification: Research article

1 Introduction

Slovak food (retail) market has passed a significant development after the split of former Czechoslovakia. These changes are also closely linked with consumer preferences, which are still evolving. Retail chains are initiating these changes by the nature of their marketing offer while tailoring, they are also result of exogenous events (such as the economic situation and market structures not only in Slovakia, however across the EU legislative changes, weather-related) that affect them. In the case that the retail chain is determined to streamline its marketing activities, then it is cardinal to know their customers. By adapting offers to their needs and expectations can more effectively achieve their greater satisfaction. We can say that knowledge and understanding of consumer behaviour can be a source of competitive advantage. The objective of this paper is to contribute to the research of consumer behaviour on the Slovak market. Slovak

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market has been chosen because of cultural, linguistic, historical, economic and other similarities with the Czech Republic. Another reason was also the intention of the comparison of information obtained from the Slovak consumers with the results available for the Czech Republic. The work is to provide to enable operators operating on the Slovak adequate information for a better understanding of customer needs and the preparation of their business strategy. They will be able to streamline their marketing activities. The objective of this paper is to identify and characterize consumer preferences on Slovak retail food market. Substantial partial goal is to identify segments of Slovak consumers and their characteristics. Actors operating on the Slovak (retail) food market will gain useful data for a better understanding of customer needs, thanks to which they can streamline their marketing efforts. The knowledge and understanding of the consumer behaviour (way of thinking, evaluation, selection between the different variations in the buying process, as it is influenced by external factors such as process information, what is its motivation, etc.), It is necessary to obtain relevant information about the system's decision (Solomon, 2016). This information is obtained by detailed analysis of consumer shopping decision-making process. This process is by Kardes (2014), the result of successive decisions involving questions of what goods to buy, and whether, where to buy, in what quantity, etc. Most often are distinguished 5 phases of the decision-making process.

Problem recognition

Purchasing decisions are usually initiated by the awareness of a certain state of imbalance between the real and desired state. This discrepancy is known as cognitive dissonance. It is an unconscious reaction to mind the contradictions between attitudes (knowledge, belief, behavior) and the actual state of affairs. This situation has been for the first time defined by Leon Festinger (Slater, 2008). According to Solomon (2016), the problem may arise in two ways. The first of these may arise in the case when the quality of the current state of the consumer is reduced by the fact that the product is completely consumed, or that the product is not adequately satisfy his needs, or even when it creates a completely new needs:

Information search

After realizing the needs of the consumer can search for specific information in the market before the purchase (pre-purchase search). On the other hand, the consumer can also search for information during the shopping process (on-going search). From the above we can conclude that consumers do not always realize the extensive information and rational exploration, during which it would carefully consider every alternative before choosing the right one. Kardes (2014) found that the level of external search of information for the majority of the product is surprisingly low. Also in case that any additional information is benefitial for consumer. Shiffman and Kanuk (2009) supported Karde´s (1999) theory and added that people with low incomes, who may thus making bad decisions far more to lose, in fact, seek information before the purchase less than affluent people.

Evaluation of alternatives

As a very important moment in the purchasing decisions considered Kardes (2014) moment when it is necessary to decide and choose from the available options. Plays an important role in "positioning" of the product. It's the way a product is perceived

knowledge of the target group (Patrick De Pelsmacker, 2003). Kotler (2007) defines positioning as the formation of the mind as a potential customer or product placement in his mind. In other words, the categorization of the product can affect the consumer's expectations. If the product clearly does not fit into categories, so the consumer's ability to recall the product significantly reduced, says Solomon (2016).

Purchase decision, purchase

Solomon (2016) considers the purchase decision for selecting a product from the options. Shiffman and Kanuk (2009) identify three types of purchases, such as: purchase on trial, repeat purchase and long-term purchases (long-terms commitment Purchases). In the case of purchase to test consumer buys the product was first purchased a quantity of the product is smaller than usual. Repeat purchases is closely linked to the concept of brand loyalty that many companies are trying to promote because of its stabilizing effect on the market. Consumer satisfaction or dissatisfaction is based on overall feelings and attitudes that consumers have after buying your product. Consumers at this stage, compares the price you paid for the product, with the value that he brought the product. At the beginning of the shopping process, we can see cognitive dissonance, but in post-purchase behaviour, this phenomenon is known as post-purchase dissonance (post-decisional Dissonance).

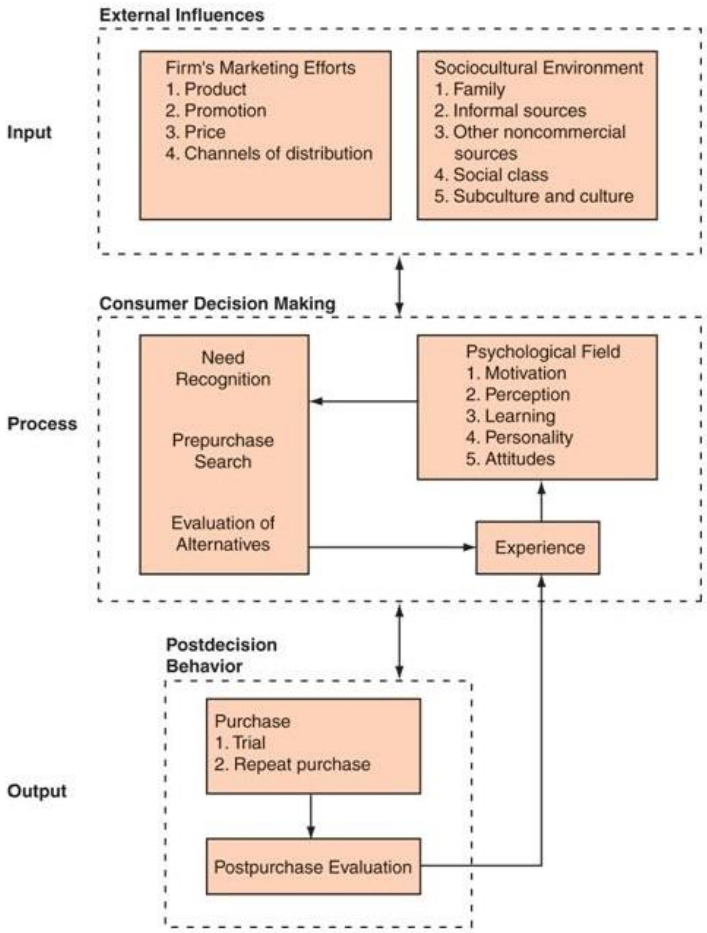

Figure 1: Description of shopping behaviour and its influences; source: modified by author (Solomon, M. R. 2016)

In the literature, at some authors (for example Koudelka, 2006; Vysekalová, 2011) can be also find out the sixth phase called "swapping product."

The retail food market

Czech and Slovak retail food market has undergone in the last 20 years an important development. The consumer preferences have significantly changed. Retailers such as changes initiated by the nature of their marketing offers, so they too must adapt, because they are also the result of exogenous factors (changes in legislation, market structure, economic situation, the development of the European market, etc.). Cimler, Zadrazilova et al. (2007, p. 12) defines retail as *"an undertaking involving the purchase of wholesale or manufacturer and its sale without further processing to the final consumer. Retailing generates an appropriate grouping of goods - selling range - of the types, quantity, quality, price positions - creating a ready supply of sales, provides information about products, providing a suitable form of sales and marketing transmits information to suppliers."* As the most concentrated is considered food retail, which usually has the largest average size of stores and developed information and logistics systems.

2 Material and methods

To fulfil the primary objective of the paper was used available secondary data, and primary data based on studies of Faculty of Economics and Management of Slovak Agricultural University in Nitra. Secondary data were obtained from the available studies, surveys and statistics in order to get a basic overview of the retail market in the Slovak Republic and put into context the results obtained from primary research primary conducted in Slovak Republic (n = 1170, 2013) and Czech Republic (n = 5809, 2013). These secondary data sources include, for example Incoma GfK, Department of Agricultural Economics, Czech and Slovak Statistical Institute, as well as servers ec.europa.eu etc. The quantitative questionnaire investigation allowed to get answers from a large number of respondents, and makes it possible to fulfil the objectives. Quantification is thought process, which serves to allow data on the quality measure, quantify, transfer quantity. Quantitative research uses the hypothetical-deductive method, while qualitative rather than (Kozel, 2011).

The objective of the questionnaire was to obtain data, which would allow us to describe the behaviour of consumers in the food market in the Slovak Republic, to identify their preferences and buying behaviour characteristics. The target group included respondents in all specified age categories: 12 – 17 years, 18 – 24 years, 25 – 34 years, 35 – 54 years, 55 – 64 years and the last category 65+. Other demographic identifying information (gender, highest education completed, type of household, occupation, income, nature of food shopping size of the municipality, region) have been chosen to represent as diverse as possible representation. Respondents also used for assessing household income scale, which included four categories and a weak (one where the domestic short-term borrowing since monthly income is not enough), Low (basic needs of the household cover, but they shall save, or to restrict) Sufficient (household has basic needs – eg. food, housing, clothing, curtail the others), Matching (household covers all needs within a reasonable range), high (possibility of greater investment and the purchase of luxury goods).

The individual questions in the questionnaire had the form of assertions, which were expressed opinions, attitudes, characteristics, judgments about those issues. With

these allegations and the respondent expressed the degree of agreement or disagreement. For this purpose, was selected Likert Scale, which was formed a scale from 1 (strongly disagree) to 10 (totally agree). This scale allowed respondents to express their degree of agreement on a relatively fine scale and enables otherwise difficult to measure characteristics converted into measurable. Thanks to the even number of values, respondents could express an attitude, that adhere to either more for assent (10 – 6) or disapproval (5 – 1). For better reproduction of the said values, the results were divided into three intervals according to preference evaluation affirmative (10 – 8), neutral (7 – 4) and discordant (3 – 1). The questionnaire was divided into two batteries with questions. These questions were complemented with characteristics of the respondent (sex, age, highest education completed, permanent residence, the size of the municipality and region, household type, occupation, income, nature of the purchase of food). After the formulation of questions ran translation into Slovak language, including the implementation of proofreading.

Data collection took place in all regions of the Slovak Republic. It was conducted a sample survey. The data collection was conducted by Slovak Agriculture University in Nitra in cooperation with the Institute of Marketing and Trade FBE MENDELU by author. The average time to fill out a questionnaire accounted about 5 minutes. After the implementation of the questionnaire, were data from the questionnaire exported to XLS and MS Excel program has been modified and refined. Adjusted data have been made to adjust the input data processing system Statistica, coding individual questions, edit formal typing errors, eliminate incomplete data (respondents who have certain questions answer, will the investigation eliminated) specification and editing options "other". After the adjustment the data were subsequently processed and analysed in statistical software Statistica version 12 by StatSoft Ltd.

For all variables were calculated absolute and relative frequency and cumulative options. To calculate the frequency were used procedures resulting from the following formula for the relative frequency (Hindls et al., 2018):

$$\boldsymbol{p_i} = \frac{\boldsymbol{n_i}}{\sum_{\boldsymbol{i=1}}^{\boldsymbol{k}} \boldsymbol{n_i}} \tag{1}$$

After separation of identification data were for quantitative variables analysed the statistical characteristics such as: arithmetical mean, median, mode, variance and standard deviation.

Table 1 Identification data of respondents; own processing

Identification data of respondents	Absolute frequency	Relative frequency (%)
Sex		
Female	660	56.41
Male	510	43.59
Age (in years)		
12 – 17	85	16.07
18 – 24	287	29.83
25 – 34	188	12.31
35 – 54	349	24.53
55 – 64	144	10.00
65+	117	7.26
Highest education level		
Elementary School	112	9.57
Secondary School	170	14.53
Secondary School with GCSE	561	47.95
Higher Professional	77	6.58
University	250	21.37
Place of residence (number of inhabitants)		
Less than 3 000	416	35.56
3 000 to 89 999	607	51.88
90 000 and more	147	12.56
Predominant occupation		
Student	329	28.12
Employee	503	42.99
Other	52	4.44
Pensioner	171	14.62
Self-employed	115	9.83
Subjective evaluation of the respondent's household income		
Inadequate	24	2.05
Low	170	14.53
Sufficient	421	35.98
Satisfactory	473	40.43
High	59	5.04
The predominant character of food shopping		
Not only for myself, often for the whole household	379	32.39
Mostly for myself, only exceptionally for household	546	46.67
Not specified	245	20.94

3 Results

The structure of food retail sector in the Czech and Slovak Republic underwent a major evolution in the early 90's. These changes occurred mainly due to price liberalization, followed by the privatization process. Thereafter the entry of multinational retail chains, which translates into a change in the number of large outlets, and there was a significant drop in the share of small stores. Most of the retail turnover is currently made up of only a small number of companies (most of which with foreign capital). This fact is reflected in the overall form of the market structure of the food industry. Currently they have the demand for the formation of decisive influence traders and this is also reflected in changes in the position of food producers in the market (Shopping Monitor CEE 2014 Incoma GfK in Bulletin ÚZEI, 1/2014).

Consumer demand for the range and quality of the food are growing and lead to a differentiated approach to shopping (large differences in demand are differentiated by educational attainment, age and income groups). It also changes over time the importance of quality alone (i.e. what is regarded for the quality). Differences in consumer demand and purchasing patterns of different consumer groups have considerable dynamism and deepened (e.g. For younger consumers no longer simply satisfaction of nutrition a priority, let more influenced by advertising and health education than the older, etc.).

Consumer demand may affect the marketing and communication policy of retail chains (Bulletin ÚZEI, 1/2014). Marketing strategy of food producers must therefore reflect that significantly changed the terms of the supply, the overall atmosphere of commerce, logistics system and capital base, because these changes are bringing with them changing requirements for food products. A substantial increase in market share and competitiveness of specific producers against foreign producers can lead to innovation and targeted marketing communications.

Table 2 The order and importance of variables in the decision-making process; own processing

Variable	Arithmetic mean	Median	Mode	Variance	Standard deviation
1. Expiration date	8.73	10	10	3.75	1.94
2. Quality	8.61	9	10	2.78	1.67
3. Characteristics and parameters	7.61	8	8	4.11	2.03
4. Low price	7.58	8	10	4.92	2.22
5. Composition	7.52	8	10	4.78	2.19
6. Special Offer	7.32	8	10	5.47	2.34
7. Healthy food	7.05	7.5	10	5.72	2.39
8. Slovak origin	6.98	7	10	6.04	2.46
9. Brand	6.82	7	8	5.29	2.30
10. Friends recommendation	5.95	6	5	5.92	2.43
11. Experts recommendations	5.78	6	5	6.85	2.62
12. Packaging	5.61	6	5	6.09	2.47
13. Energy value	5.61	6	5	7.41	2.72

From the results of the research can be interpret the characteristics of the buying behaviour of Slovak consumers. Consumers in the Slovak Republic, according to this

research consider when choosing products for the priority date of consumption (8.73). Likewise, they prefer a close second quality of products (8.61). An exception, however, consists of properties and characteristics of the product (7.61) by Slovak consumers deem important than low cost (7.58) products. From all the resources used it shows that Slovak consumers assign quality and expiry dates of products purchased cardinal importance. These preferences also reflected during the selection of shop. For a purchase the Slovak consumers are choosing a shop where they can buy very good quality and fresh food. We can also say that Slovak consumers are more interested in the properties and characteristics of the product than on its packaging. Product packaging plays in consumers' decision-making process more prominent role. Slovak consumers also pay much more attention to its composition.

The results of the research also indicate that consumers in the Slovak Republic are more interested in the purchase of the characteristics (properties and characteristics, composition) of the product itself than on its price (low price, special offer). However, the price is still a very important factor. It is obvious that most consumers before buying like figuring out whether a particular product is on sale. Slovak consumers thus appear to be more thrifty consumers. In the Slovak Republic, consumers primarily choose the shop depending on whether they can buy fresh products. Slovak consumers choosing food shops like the Czech consumers, they also manage its location and size, giving priority to acquire larger and more easily accessible shops.

Furthermore, we can say that Slovak consumers when buying food realize larger and less frequent purchases and in addition also often buy food stocks. They also give priority to durable food products due to longer the expiry date. Slovak Consumers also have a very positive attitude towards healthy food products. They are interested in the composition of the products they buy. Therefore, it may be said that the Slovak consumers during the purchase process have a high interest in health.

Slovak consumers can also be described as very loyal consumers. For Slovak consumers can be also watched a little fluctuation between different shops and thus high fidelity to particular store. The survey of GfK Czech and GfK Slovakia (2014) shows that most customers are generally transferred to a competitor because of price (41 %), access to the customer (26 %), quality (22 %) and choice of another product (15 %). In terms of appreciation of customers in Slovakia are the best retail chains (59 %), telecommunications operators (56 %) and banks (38 %). In the case of customer care are on the first place telecommunications operators (53 %), retail chains (48 %) and banks (41 %).

We can say that consumers in Slovakia are playing in the buying process a significant patriotism. Slovak consumers are characterized by a large degree of preferences of Slovak food on their purchases they prefer local food (local and regional products). Likewise, they prefer more frequently products with Slovak origin. The results of the research also show, that Slovak consumers are during the purchase process strong and thoughtful. Slovak consumers think over in advance before the shopping and they do not rush. They excel when buying by rationality and do not subject to impulsive purchases. Furthermore, we noted that references play for Slovak consumers in the decision-making process significant role. They are often (before shopping) influenced by opinions (recommendations) of other people (friends and experts).

Table 3 The order and importance of variables in the decision-making process; own processing

Variable	Arithmetic mean	Median	Mode	Variance	Standard deviation
I always prefer shop where I can buy fresh food.	**8.42**	9	10	486	1.91
Larger stores with a wider assortment are better for me.	**8.01**	9	10	389	2.14
I prefer stores that are closest to the place where I live (or work).	**7.87**	8	10	367	2.20
When shopping, I always try to save as much as possible.	**7.43**	8	10	289	3.66
I have a favourite store where can I buy food regularly, stores often do not alternate.	7.36	8	10	255	2.39
I always think about what I buy in advance. I never hurry.	7.07	7	10	214	2.35
I prefer food of Slovak origin.	6.92	7	10	211	2.38
I prefer durable food products.	6.90	7	10	192	2.37
I buy food rather large (economic) package than smaller.	6.84	7	10	232	2.60
I prefer to buy less frequent and larger purchases.	6.76	7	10	262	2.75
When I do I buy food, I prefer the the proven products, novelties do not attract me.	6.69	7	8	198	2.27
I buy food supplies rather do than only when it is necessary due to running out.	6.59	7	10	197	2.66
When I have a choice, I prefer local foods (foods typical of the region in which I live).	6.51	7	10	196	2.65
Food advertising in magazines or other media have inspired me to purchase.	6.34	7	8	190	2.73
Before shopping, I first inspire myself by current offer in leaflets.	6.01	6	8	169	2.78
I choose stores based on how friendly staff is.	5.82	6	8	166	2.64
I try a new product, only if my friends or family recommend it to me.	5.77	6	8	154	2.68
Tastings usually convinces me to start buying a product.	4.73	5	1	187	2.76

Slovak consumers choose shops, where they can buy quality fresh food and are also easily accessible. For these reasons, we see that the choice of stores in the Slovak Republic, consumers are showing increased preferences of supermarkets and small shops. Consumers are closer to the supermarket and can, for example, to respond flexibly to special quotation or shopping only those goods that they just need. In addition to the close distance of shops, convenience, offers quality and fresh products for which the research results Slovak consumers prefer to just these stores may be the reason for their popularity and also offering of products with Slovak origin.

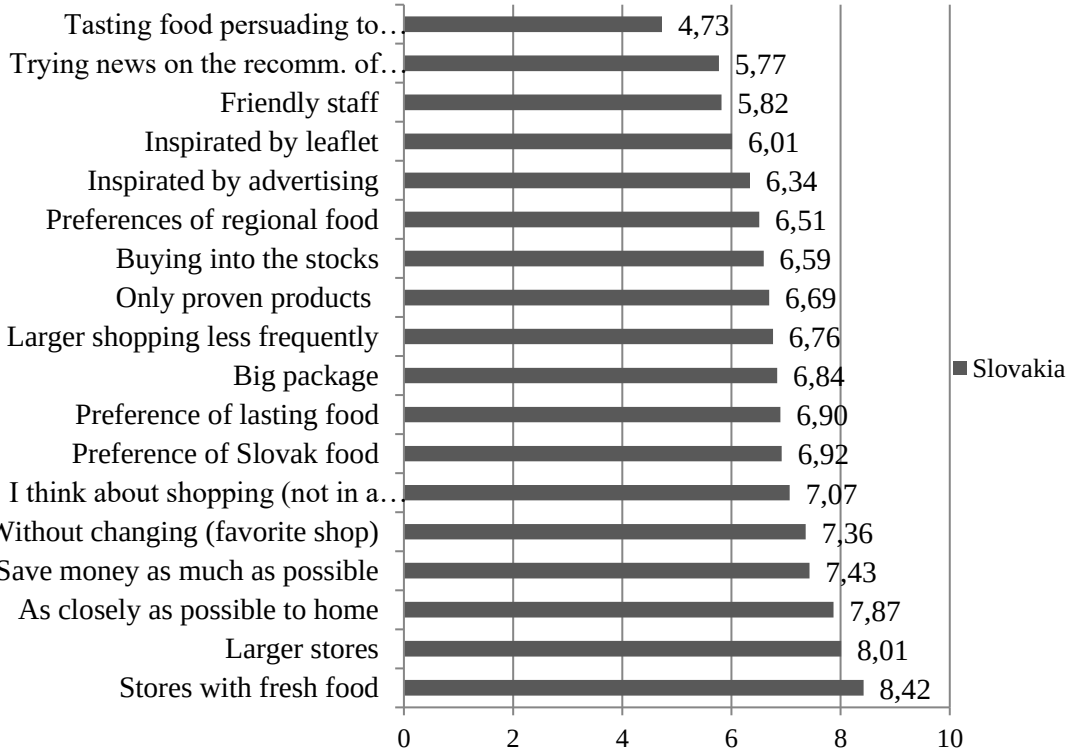

Figure 3 Importance of selected variables when choosing food products (mean), all respondents (higher value means higher importance); own elaboration, initial claims are for clarity shortened

3.1 Influence of advertising

The field research has also focused on analysing the perception of promotional tools to the consumer. Investigated instruments were set frequently used communications tool in the marketing mix of food retail chains. Specifically, the perception of advertising messages disseminated by means of leaflets, advertising, tastings or references from relatives or experts. Acquired outputs could be important in the development of the communication strategy of retail chains.

We can see slight shift in attitude in consumer behaviour. In 2014 (GfK Slovakia, 2014) leaflets in their mailboxes receive 93 % of the population of Slovakia. Most consumers (73 %) then the leaflets read. About the actual purchase by leaflets decides 29 % of consumers. A similar percentage from the Visegrad Group only found in the Czech Republic, where, according to leaflets decides 36 % of consumers.

Recent data from same source (GfK Shopping Monitor Slovakia, 2017) indicates that 33,3% of Slovak consumers are shopping according to leaflets promotions. Also 43 % of consumers declares that they quickly went through leaflet at least before shopping. Than 25% of consumers are reading leaflet on internet (store internet pages) and 20% of consumers are reading email with electronic leaflet (newsletters) with promotions. In case

of Czech consumers we can see slightly decreasing impact of leaflets in Czech Republic. We can see that 61 % of consumers are reading printed leaflets but only 30% of consumers decided according to them (GfK Shopping Monitor, 2018).

Furthermore, the study GfK Shopping Monitor (2014) implies, that leaflets are the source of information about good bargains for all socio-demographic groups in Slovakia. Independently of education and income is read by both men and women. Slightly larger preferences of advertising leaflets can be seen among consumers over forty years.

According to research results, leafleting campaigns are more effective in Trencin, Banska Bystrica and Nitra region, where is a larger proportion of consumers who follow them. A total of 68 % of the Slovak consumers uses the largest part of their income for food purchases in hypermarkets (28 %) and supermarkets (27 %) and discount stores (13 %). In these types of stores are according to the GfK Shopping Monitor (2014) advertising leaflets the most widely used communication tool.

When looking at the use of resources information in the form of printed leaflets offering products within our research, we can see their significant use among Slovak consumers. A total of 77.61 % of Slovak respondents agreed (score 4-10), with the statement " before buying, I let myself be inspired by the offer in leaflets". Very similarly we can assess the influence of advertising on decision-making process (more precisely advertisement as a source of information in decision-making process). The trend as well as the percentage difference of those, who admit that when buying and shop selecting they let themselves be inspired by advertising, is almost the same as in the case of the use of leaflets. According to results of the survey conducted by GfK Slovakia (GfK Shopping Monitor 2017), the key roles in the initial stages of the purchasing process (information gathering and inspiration) play newspapers and magazines. The survey shows that the greatest influence they have on purchases in fields such as fashion, jewellery, housing, furniture, cosmetics and perfumes, where set the trends and inspire and motivate the customers the most. Magazines, however, also significantly influence shopping behaviour in health, nutritional supplements, drugstores. Newspapers have the strongest influence in finance, sport and food.

4 Conclusion

Based on acquired primary and secondary data has been established a complex model of Slovak consumers and their behaviour in the food market. From the results of the analysis we can summarize that consumers in the Slovak Republic consider the selection of products for the priority expiration date. On the second place they prefer product quality. An exception constitutes properties and characteristics of the product, which are by the Slovak consumers construed as more important than low price of products. From all the used resources results that Slovak consumers assign to the quality and expiry dates of products purchased a cardinal importance. The consumers reflect their preferences when choosing a store. Slovak consumers choose for their purchase those stores where they can buy very good quality and fresh groceries. We can also conclude that consumers in the Slovak Republic heed more of the features and characteristics of the product than of its packaging. Product packaging does not play in consumers' decision-making process more prominent role. Slovak consumers also pay much more attention to its composition.

5 Discussion

Consumers in the Slovakian food market plays in the buying process an important role besides traditionalism also patriotism. Slovak consumers excel a high degree of preference of Slovak food when in their purchases prefer local and regional products. Likewise, they prefer rather products with Slovak origin to foreign products.

On the other hand, the statistics show the supply-side negative balance. According to Eurostat statistics for 2016 (updated in May 2019) Slovakia has 1.25 mld. euro deficit of agribusiness product and food. Food import is counted for 4 mld. euro and food export is 2.75 mld. EUR. Mainly were imported can meat and meat products (20%) and sweet product (cacao, chocolate, sweets) around 10%. On the other hand, primary export commodity were cereals (20%). In 2017 was deficit 1.46 mld. euro.

In the field of domestic production is the Slovak Republic at the 22 place (-37% balance) from 28 countries monitored the European Union. In comparison with the Czech Republic (15 place with -14% balance). The Slovak Republic therefore imports almost 63 % of all food. So we see here the excess of demand over supply of food of Slovak origin.

The most of Slovak products occurs in small stores (61 %) and supermarkets (51 %). According to our research Slovak consumers choose for their purchase a shop where they can buy good quality and fresh groceries and also where foodstuffs are easily accessible. For these reasons we can also see that the choice of store in the Slovak Republic, consumers are showing greater preference of supermarkets and small shops. Popularity of supermarkets in the Slovak Republic is significantly higher than in the Czech Republic and there is even an opposite trend in comparison with preferences of hypermarkets. Consumers have a closer distance to supermarkets today and can, for example, flexibly respond to special price offers or buy only those goods, which they just needed. Besides the short distance of shops, convenience, offers of quality and fresh products, for which according to the research results Slovak consumers prefer these store, may be the reason for their popularity now also offer of products with Slovak origin.

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References

Cimler, P., Zadražilová, D. (2007) "*Retail Management",* Management Press, Praha, Czech Republic.

Hindls, R, et al. (2018) *"Statistika v ekonomii",* Professional Publishing, Praha, Czech Republic.

Kardes, F. R. (2014) *"Consumer Behavior",* Cengage Learning, Boston, USA.

Koudelka, J. (2006) *"Spotřební chování a segmentace trhu",* VSEM, Bratislava, Slovakia.

Kozel, R. (2011) *"Moderní metody a techniky marketingováho výzkumu",* Grada Publishing a.s., Praha, Czech Republic.

Shopping Monitor (2012) *"Češi a Slováci jsou závislí na slevách*", Available at: https://www.gfk.com/sk/insights/tlacove-spravy/tretina-ludi-nakupuje-podla-letakov/

Shopping Monitor (2018) *"Podle papírových letáků nakupuje už jen 30 procent domácností",* Available at: https://www.gfk.com/cz/insights/press-release/podle-papirovych-letaku-nakupuje-uz-jen-30-procent-domacnosti/

Shopping Monitor Slovakia (2017) *"Tretina ľudí nakupuje podľa letákov",* Available at: https://www.gfk.com/sk/insights/tlacove-spravy/tretina-ludi-nakupuje-podla-letakov/

Slater, L. (2016) "*Opening Skinner's Box: Great Psychological Experiments of the Twentieth Century",* Bloomsbury Publishing, London, UK.

Solomon, M., R. (2016)*"Consumer Behavior",* Pearson, London. UK.

Štiková, O., (2014) "Shrnutí výsledků studie Shopping monitor 2014" In: *Bulletin ÚZEI, No. 1/2014*.

Vysekalová, J. (2011) *"Chování zákazníka",* Grada Publishing a.s., Praha, Czech Republic.

Session B

Human potential development

Cooperation of firms and secondary vocational schools in the area of entrepreneurial - economic skills (case study)

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Abstract

The system of dual education is regulated by Act No. 61/2015 Coll. about vocational education and training, the aim of which is to facilitate the smooth transition of students from education system to the labor market and to increase the applicability of secondary school graduates on the labor market. This act enables the preparation of students in the dual education system from the 2015/2016 school year, which gives employers the opportunity to prepare a pupil for a precise and specific profession or job position according to their needs and requirements. From the perspective of students, this form of education is an attractive part of the teaching process, when they confront their theoretical knowledge directly with practice. In the current conditions of Slovakia, most companies cooperate with technical vocational schools, but even secondary schools, which are focused on services or economic education, do not lag behind in this trend. In this case, these schools work more with companies that offer entrepreneurship and economic education for students. The acquisition of such skills takes place in secondary schools mainly through training programs aimed at developing entrepreneurial - economic skills. The aim of the paper is to evaluate the offer of selected educational programs focused on entrepreneurial - economic skills, which are provided by companies for secondary vocational schools and at the same time their evaluation from the point of view of students and teachers themselves on the example of selected secondary vocational schools in Slovakia.

Keywords: entrepreneurial-economic skills; dual education; regional education; cooperation of companies and secondary vocational schools.

JEL Classification: A20, M20

Article Classification: Case study

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1 Introduction

Entrepreneurship is widely recognized as one of the basic skills to be acquired through a life-long learning. The European Union, under the guidance of the Oslo Agenda, promotes several initiatives to develop entrepreneurship culture in Europe. One of them is education in the area of entrepreneurship. This education can make a significant contribution to start entrepreneurship, encouraging the development of entrepreneurial attitudes and skills of young people (Fonseca, et al., 2012). It also confirms this Oosterbeek et al. (2010) who notes that increased levels of entrepreneurship can be reached through education and especially entrepreneurship education. Therefore, such education is promoted and implemented into school curricula in many of the European member countries. Also the European Commission asks its Member States to create conditions for the acquisition of entrepreneurship and finance knowledge for students before the end of compulsory schooling. In the conditions of Slovakia, this issue is created within the framework of elementary schools within the framework of teaching already existing subjects and secondary schools are trying to solve this also through entrepreneurial - economic educational programs. Despite of this Čulková et al. (2017) state that number of people wants to start up business in Slovakia, but there is lack of economic education, especially of students that study technical study programs and they are not sufficiently prepared for starting of successful business.

Entrepreneurship in education has grown exponentially in popularity since the first entrepreneurship class was offered at Harvard in 1947. Over the last 70+years, the field has grown from one course to more than 5,000 spanning more than 3,000 institutions (Morris and Liguori, 2016). In the USA, the last decade has seen an emergence of entrepreneurship-themed high schools (e.g. the Patino School of Entrepreneurship in Fresno, CA). Common practical entrepreneurial activities include creation of mini-companies, idea generation exercises, project work, challenges and collaboration with the surrounding community (Liguori, et al. 2019). In order to prepare students for self-employment, numerous universities have been offering courses covering topics such as: personality of the entrepreneur, entrepreneurship as a process, business strategies, tactics and plans, etc. (Omerbegovic-Bijelovic and Ljamic-Ivanovic, 2009). Colleges and universities become the main force of innovation and entrepreneurship educational work. In order to adapt to new situation and new requirements, solidly advance innovation and entrepreneurship education reform, they provide to student's innovation entrepreneurship courses through learning platform. Many colleges and universities in China opened entrepreneurship education courses for students (Qian, 2016). Zhang et al. (2011) adds that entrepreneurship education also an imperative option to deepen the market-oriented reform of China's education system. According to Macmillan's competency theory, common professional knowledge and skills are only the basic qualities for college student entrepreneurs; the decisive element for successful entrepreneurship is one's self-concept, personality, motivation and values. But Horehajova nad Marasova (2016) note that now many think that economics is taught as an abstract axiomatic discipline too far removed from economic reality. This would explain the multi-annual decline of student´s interest in economic sciences and the weakening of their position in the curriculum. It is therefore necessary to develop the teaching of economics not only in higher education institutions. According to Calvo and Alpi (2016) education is playing an increasingly strategic role in the building and the renovation of the new Europe because labour market is seeking more and more professional skills, abilities and specific aptitudes, training from the employees. Improving job quality and productivity at work is according to Dirgová and Lysá (2017) an important means of achieving the strategic goal of transforming the entire European Union into the most competitive and dynamic economic area capable to achieve

sustainable economic growth with more and better jobs and social solidarity. Országhová et al. (2017) note that the professional education of the future managers is a multi-factor process where the different subjects and objects of the educational process interact in the certain terms of the educational environment. So the human factor thus become a valuable resource and important competitive tool which business results depend on. It also confirm Daňková and Droppa (2015), Hudáková (2014) who note that the effectiveness of human resources management is one of the significant issues discussed in the context of managerial work, entrepreneurship, business services, marketing and many other areas of the economic environment. Entrepreneurship education plays an important role in maintaining the level of development of companies and in their further development. In developing countries, entrepreneurship education is seen as the key to open the door for modernizing the business environment as a determining factor in all aspects of business (Dzisi and Odoom, 2017).

Kuratko (2005) indicates that entrepreneurship is a learning process that encompasses risk taking, tenacity, and opportunity seeking. These entrepreneurial knowledge, students could get through learning - entrepreneurship education. Entrepreneurship education can motivates students to start their career in the area of entrepreneurship or to become self-employers. Entrepreneurship is considered a basic competency, and in some countries is included explicitly in the curriculum promoted by national and other organizations outside the education system, in cooperation with the schools. However, the integration of entrepreneurship education in the curriculum requires incentives and support, given that schools and teachers have a wide degree of autonomy. It is important that the school environment is conducive to education for entrepreneurship (European Commission, 2004). Khulafa (2017) notes that entrepreneurship education is important from an early age. Entrepreneurship in Early Childhood Education according to Diana et al. (2017) refers to foster entrepreneurial spirit which refers to some entrepreneurship values such as honesty, discipline, hard work, and creative, innovative, independent, responsible leadership, tenacious, courageous, risk-taking, and commitment, realistic, curiosity, communicative and appreciative of achievement. Entrepreneurship program in early childhood is more directed to life skill, but does not close the possibility of a teacher as a child facilitator to provide them insight into the economic system. Musrifah (2017) researched to determine the application of entrepreneurship learning model in improving the spiritual intelligence of students in elementary school. His results show that using the entrepreneurship model in teach bring the positive impact in improving students' spiritual intelligence can be seen and also in the communication between them and teachers. It also confirms this (Dzisi and Odoom, 2017) who notes that entrepreneurship education teach students to think about potential new ventures (whether social or business) and teach them to analyse opportunities available to them. Wilson (2008) believes that entrepreneurship is the future of business schools and that it is beginning to move into leadership role. Greene (2011) highlights a portfolio of four complementary techniques for teaching entrepreneurship: (1) starting businesses; (2) serious games and simulations; (3) design-based learning, (4) reflective practice.

2 Material and methods

The dominant entrepreneurship education program in secondary schools and colleges in the US and Europe is the Junior Achievement Young Enterprise student mini-company (SMC) program. In Europe, it is effective in 40 countries and more than 2

million students have participated in the year 2005/2006. The growth rate of the number of students per annum amounted to 25% in the year 2005/2006 (Oosterbeek, et al., 2010).

The aim of the paper is to evaluate the offer of selected educational programs focused on entrepreneurial - economic skills, which are provided by companies for secondary vocational schools and at the same time their evaluation from the point of view of students and teachers themselves on the example of selected secondary vocational schools in Slovakia. For research we choose programs offered by the company Junior Achievement Slovakia for secondary vocational school and programs offered by the Foundation for Children of Slovakia.

Junior Achievement Slovakia is a non-profit organization with international participation that provides economic education to people in Slovakia through practical school programs. It enables students to make ethical choices and to orient themselves in the market economy before engaging in the workforce through interconnection with the business sector and a professional approach. Junior Achievement Slovakia is a leader in business education in Slovakia. Education works on the principle of "learning by doing", and practitioners are involved into activities. Junior Achievement Slovakia is part of a global network consisting of 118 Junior Achievement Worldwide countries and a part of 40 European countries Junior Achievement Europe.

Junior Achievement Slovakia provides education through two programs: Junior Achievement Applied Economics and Junior Achievement Tourism Business which simulates real business. Junior Achievement Applied Economics is intended for first to fourth year students of all types of secondary schools and the subject can be one or two years. Junior Achievement the Company is taught as part of Junior Achievement Applied Economics programs. This phase of teaching consists of establishing of real company, namely the simulation of a joint stock company.

The Foundation for Children of Slovakia to offer Program "The Know Your Money" from since 2001. The vision of the program preceded the period of the financial crisis and reflected the need to understand personal finance. The program is based on the idea that money is part of life and learning about money should be part of education. Based on this, the first innovative e-learning training program for students in the area of personal finance management was created in Slovakia. Support for the development of socio-financial literacy of secondary school students is carried out through the subject "Personal Finance Management" and proven forms of implementation into teaching. The program provides schools with meaningful and methodically elaborated learning for life and an attractive and motivating form of learning for students.

For empirical research we obtained data through a questionnaire survey conducted among students and teachers at selected secondary vocational schools. The questionnaires consisted of open, semi-closed and scaled questions. Data collection was carried out in February and March 2019 at the Secondary School of Technology and Services in Nitra, at the Business Academy in Nitra, at the Business Academy in Sereď, and at the Business Academy in Pezinok.

17 teachers in secondary vocational schools participated in the questionnaire survey. Six teachers took part in the survey at the Business Academy in Nitra, the same as at the Business Academy in Sereď. Four teachers participated on the survey at the Secondary School of Technology and Services and only one teacher at the Business Academy in Pezinok took part.

The research sample of students consisted of 32% of students from the Business Academy in Nitra, 27% of students from the Business Academy in Sereď, 27% of students from the Secondary School of Technology and Services in Nitra and 14% of students from the Business Academy in Pezinok (figure 1).

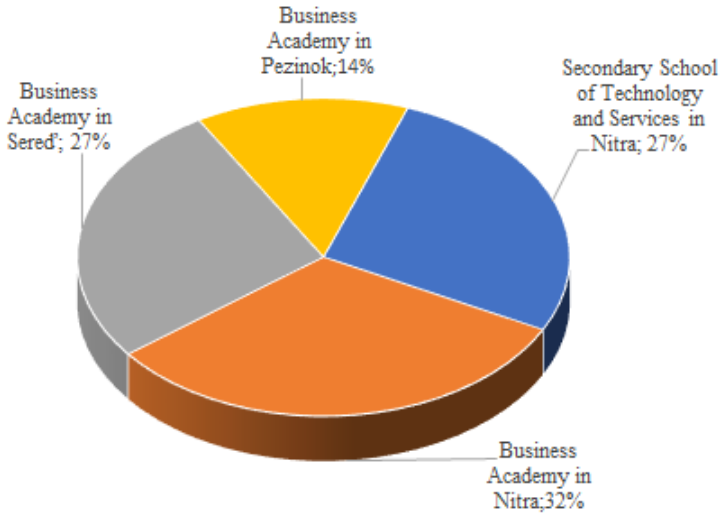

Figure 1 Representation of students in terms of individual secondary vocational schools; source: own processing

3 Results

In the current period, demand for professional knowledge and skills in the labor market is growing sharply, which should be acquired by secondary school students during the learning process. It also confirms this also Tej and Taha (2011) who note that the level and quality of vocational education is an important determinant of economic and social development of the country as well as its employment and competitiveness. Therefore, we focused our survey on assessment on the entrepreneurial - economic education programs. We evaluated them from several points of view. First of all, it was in terms of the offer of these programs. Another aspect was the evaluation from the perspective of the students themselves and the teachers on the offer itself as well as the implementation of these programs in schools.

3.1 Evaluation of offer of selected entrepreneurial - educational programs in selected secondary vocational school

Junior Achievement Slovakia is a non-profit organization and has been operating in Slovakia for over 25 years. It is currently implementing eight educational programs at primary and secondary schools.

Table 1 Participation in Junior Achievement programs in Slovakia in 2015 - 2017; Annual reports Junior Achievement Slovakia for 2015-2017, source: own processing

Year	2015	2016	2017
Number of teachers	782	874	992
Number of students	16 274	22 132	23 354
Number of schools	671	789	915
Number of experts	635	777	780
Number of graduates	280 885	300 939	321 381

By the end of 2017, a total of 321,381 students from all over Slovakia were involved in the Junior Achievement Slovakia programs. Every year, 20,000 students in primary and secondary schools attend programs. Between 2015 and 2016 there is a

significant increase of the number of students participating in the programs. Approximately one hundred new teachers and schools are involved in the programs every year. On the basis of these data we can claim that the interest about Junior Achievement Slovakia programs is increasing every year (table 1).

The subject of our research was two of the programs of this organization, namely "Junior Achievement More than Money" and "Junior Achievement Applied Economics." Between 2015 and 2017, the number of schools involved in the program dropped by 18%, and the number of teachers implementing the program fell accordingly. Despite the fact, that the significant number of schools stopped implement this program or the schools were abolished, the number of students in 2017 was 7% higher than in 2015 (table 2).

Table 2 Participation in the program "Junior Achievement More than Money" in 2015 – 2017 in Slovakia; Annual reports Junior Achievement Slovakia for 2015-2017, source: own processing

Year	**2015**	**2016**	**2017**
Number of teachers	271	213	235
Number of students	5614	5308	6025
Number of schools	221	183	182
Number of classes	361	274	364
Number of experts	55	60	60

The students in the program "Junior Achievement More than Money" undergo regular financial literacy testing. At the beginning of the program, the students pass the entrance test and also pass the final test at the end. In the school year 2014/2015, 5614 students of primary and secondary schools participated in the testing. Only 5% of the tested students successfully passed the entrance test. After completing the program, the percentage of successful students increased to 65%. Testing also took place in the school year 2015/2016 where only 6% of students successfully passed the entrance test and 65% of the students tested passed the test at the end of the year. In the 2016/2017 school year, only 8% of the students tested were successful in the testing program. After completing the program, the success rate increased to 71% (Annual reports Junior Achievement Slovakia for 2015-2017).

Table 3 Participation in the program "Junior Achievement Applied Economics" in 2015 – 2017 in Slovakia; Annual reports Junior Achievement Slovakia for 2015-2017, source: own processing

Year	**2015**	**2016**	**2017**
Number of teachers	113	111	123
Number of students	2 051	2 085	2 387
Number of schools	98	98	110
Number of classes	130	132	152
Number of experts	97	90	93

The number of students involved in the program "Junior Achievement Applied Economics" increased every year from 2015 to 2017, as was the number of classes. In view of this, the number of teachers involved in the implementation of the program in secondary schools has also increased (table 3).

3.2 Evaluation of entrepreneurial-economic education programs from the perspective of students of selected secondary vocational schools

Entrepreneurial and Economic Education Program Junior Achievement Applied Economics graduated 49 respondents, ie 53% of all students surveyed. As part of the evaluation of individual aspects of the program, students could to evaluate individual statements using the Likkert scale from 1 to 5, with 1 (1-best, 5-worst).

Figure 2 Evaluation of program "Junior Achievement Applied Economics" by students; source: own processing

The best evaluation aspect of this program (figure 2) was acquiring the ability to cooperate in the team (2,18) and also the aspect that assessed whether if the students through the program had understood the functioning of business (2,20). Students positively appreciated that thanks to the program they fixed their theoretical knowledge by using them to solve practical tasks (2,27). The worst average rating was given to improve students' soft skills (2,59).

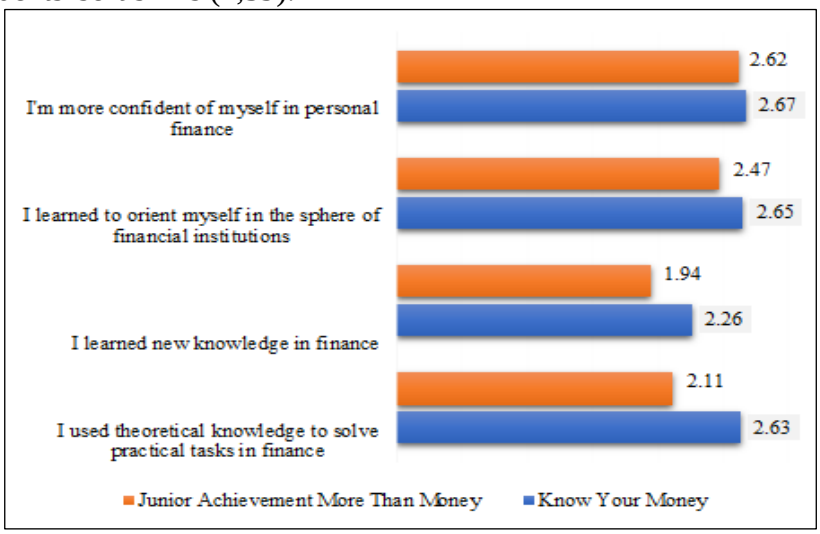

Figure 3 Evaluation of program "Junior Achievement More Than Money" and program "Know Your Money" by students; source: own processing

Program Junior Achievement More than Money and program Know Your Money focuses on developing financial literacy for secondary school students. From the figure 3 above, based on average student scores, Junior Achievement More than Money has achieved a

better score at every point than the program Know Your Money. The most diverse average rating has gained the aspect of using theoretical knowledge to solve financial problems. In the program Know Your Money students rated this aspect more negatively than in the program Junior Achievement More than Money. In both programs, students rated best the aspect of acquiring new knowledge in finance.

3.3 Evaluation of entrepreneurial-economic education programs from the perspective of teachers of selected secondary vocational schools

Seven teachers who taught this program answered questions about Junior Achievement Applied Economics through the questionnaire survey. In particular, teachers appreciated the realistic simulation of a joint stock company and the linking of theoretical knowledge with practical activity. As a positive, more than half of them perceived work with real funds. Two teachers appreciated that in the program students were creating their own product or service and selling it real. Asked teachers considered this concept beneficial to students, as it allowed them to perceive entrepreneurship as a coherent system and also provided space for direct contact between students and customers. In terms of the student's personal development, teachers have seen as beneficial teamwork and the development of creative thinking. They also positively perceived the possibility of participating in Junior Achievement Talent Fair.

The questions in our questionnaire survey were answered by eight teachers who taught program Junior Achievement More than Money. More than half of the teachers evaluated positively the quality of the textbooks for the students. This is a very important aspect, because Vavrek et al. (2015) notes that in the pedagogical process the teachers present to the students the information most frequently by informative teaching. They also viewed as positive the tests that students used in the program. Thanks to the tests, students were able to test their knowledge and knew the results right after the test. Teachers appreciated that the program replaces textbooks and workbooks and provides learning texts that are accessible to the learner throughout the programme's learning.

All teachers perceived the program as beneficial to students in terms of increasing financial literacy. Students had the opportunity to participate in various competitions and to get the certificate at the end of the Junior Achievement More than Money, which was appreciated by most of the teachers.

As the entrepreneurial and economic education program Know Your Money is realized only at two out of four selected schools where we conducted a questionnaire survey, so only five teachers answered our questions. The program gives students the opportunity to learn the knowledge they need to manage their personal budgets. In particular, teachers appreciated the playful form of tasks and the textbooks of the program. This finding is also confirmed by Dzisi and Odoom (2017), who say that the use of active learning methods is complicated, but more advantageous than traditional teaching methods because it requires student involvement in the learning process. They also positively perceived quality materials for acquiring knowledge in the field of financial literacy and its development.

4 Conclusion

Schools provide through business-economic education programs for the implementation of financial-entrepreneurship education, which has so far been attended by a number of primary and secondary school students. Through the survey, we found that all entrepreneurial - economic programs that were the subject of our research are

perceived by students and teachers as beneficial and have an important place in the educational process at secondary vocational schools. However, it is still necessary to evaluate the offer and quality of these programs in order to increase their efficiency and ultimately to improve the quality of secondary vocational education.

References

Annual reports Junior Achievement Slovakia for 2015 – 2017 Available at: https://www.jaslovensko.sk/vyrocna-sprava/

Calvo, E., Alpi, D. (2016) "Training: a Tool For Stratigic Development of the Individual, the Profession and Company", In: *21st Int Sci Conf of PGV Network - For Stronger Europe Renovation of the Economic, Entrepreneural, Political, Teritorial and Educational Structures, proceedings paper of the interntional conference in Banská Bystrica, Slovak Republic, 2016,* Matej Bel University, Banská Bystrica, pp. 314–325.

Čulková, K., Hrehová, D., Janošková, M. (2017) "Business competencies of non-economists students in conditions of Slovakian universities", In: *Conference Proceedings from International Scientific Conference "The Poprad Economic and Management Forum 2017: Trends in Quality of Work, Production, Services and Life", Poprad, Slovak Republic, 2017,* Verbum, Ružomberok, pp. 150–161.

Daňková, A., Droppa, M. (2015) "The Impact of National Culture on Working Style of Slovak Managers", *Procedia Economics and Finance.* Vol. 34, pp. 164–171.

Diana, W.R., Astuti, H.P. (2017) "Developing Enterpreneurship Activity Based on Local Culture in Early Childhood", In: *Proceedings of the 9th International Conference For Science Educators And Teachers (ICSET 2017) in Indonesia, 2017, Atlantis Press, France,* pp. 502–507.

Dirgová, E., Lysá, Ľ. (2017) "Education as a determinant of applicability in the labour market", In: *Conference Proceedings from International Scientific Conference "The Poprad Economic and Management Forum 2017: Trends in Quality of Work, Production, Services and Life", Poprad, Slovak Republic, 2017* Verbum, Ružomberok, pp. 171–178.

Dzisi, S., Odoom, F. (2017) "Entrepreneurship Education and Training in Higher Educational Institutions in Ghana", *Journal of International Entrepreneurship,* Vol. 15, No. 4, pp. 436–452.

European Commission (2004) *"Final Report of the Expert Group "Education For Entrepreneurship" Making progress in promoting entrepreneurial attitudes and skills through Primary and Secondary education"*, European Commission, Brussels.

Fonseca, B., Morgado, L., Paredes, H., Martins, P., Gonçalves, R. (2012). "PLAYER – a European Project and a Game to Foster Entrepreneurship Education for Young People", *Journal of Universal Computer Science,* Vol. 18, No. 1, pp. 86–105.

Greene, P.G. (2011) "Four Approaches to Teaching Entrepreneurship as a Method", Available at: http://entrepreneurship.babson.edu/four-approaches-to-teaching-an-entrepreneurship-method/

Horehajová, M., Marasova, J. (2016) "Teaching Economics at the Service of Economic Recovery", In: *21st Int Sci Conf of PGV Network - For Stronger Europe Renovation of the Economic, Entrepreneural, Political, Teritorial and Educational Structures, proceedings paper of the interntional conference in Banská Bystrica, Slovak Republic, 2016,* Matej Bel University, Banská Bystrica, pp. 326–336.

Hudáková, J. (2014) "Financial literacy in the 21st century", In: *Economics and management 2014 proceedings from international scientific conference Nitra, Slovak Republic, 2014,* Constantine the Philosopher University in Nitra, Nitra, pp. 38–49.

Khulafa, F.N. (2017) "Models of Enterpreneurship Education in Elementary School" In: *Proceedings Of the 9th International Conference for Science Educators and Teachers (ICSET 2017) in Indonesia, 2017,* Atlantis Press, France, pp.469–472.

Kuratko, D.F. (2005) ”The emergence of entrepreneurship education: development, trends, and challenges”, *Entrepreneurship Theory and Practice*, Vol. 29, No. 5, pp. 577–598.

Liguori, E., Corbin, R., Lackeus, M., Solomon, S.J. (2019) “Under-Researched Domains in Entrepreneurship and Enterprise Education: Primary School, Community Colleges and Vocational Education and Training Programs“, *Journal of Small Business and Enterprise Development,* Vol. 26, No. 2, pp. 182–189.

Morris, M.H., Liguori, E. (2016) “Preface: teaching reason and the unreasonable”, *Annals of Entrepreneurship Education and Pedagogy*, Vol. 2, pp. 14–22.

Musrifah, S. (2017) “Entrepreneurship Learning Model in Improving Student's Spiritual Intelligence“, In: *Proceedings of the 1st International Conference on Intellectuals' Global Responsibility (ICIGR 2017) in Sidoarjo, Indonesia, 2017,* Univ Muhammadiyah, Sidoarjo, pp. 219–222.

Omerbegovic-Bijelovic, J., Ljamic-Ivanovic, B. (2009) “Entrepreneurship Course Introduction On Faculty“, In: *Management of Technological Changes, Vol 2, Proceedings Paper in Alexandroupolis, Greece, 2009,* Gheorghe Asachi Tech Univ., Alexandroupolis, pp. 315–318.

Oosterbeek, H., van Praag, M., Ijsselstein, A. (2010) ”The impact of entrepreneurship education on entrepreneurship skills and motivation”, *European Economic Review*, Vol. 54, pp. 442–454.

Országhová, D., Horváthová, J., Hornyák Gregáňová, R. (2017) ”Selected Professional Competences of Future Managers”, In: *7th International Scientific Conference on Managerial Trends in the Development of Enterprises in Globalization Era (ICoM), Nitra, Slovak Republic, 2017,* Slovak Agriculture University in Nitra, Nitra, pp. 408–414.

Qian, MZ. (2016) “Innovation and Enterpreneurship Education and Specialized Education“, In: *Proceedings of the 2016 2nd International Conference On Economy, Management, Law And Education (EMLE 2016) in Moscow, Russia,2016,* Atlantis Press, France pp. 472–475.

Tej, J., Taha, VA. (2011) ”Analytical Insight into Problems of Vocational Education in the Slovak Republic“, *Problems of Education in the 21st Century,* Vol. 34, pp. 162–169.

Vavrek, R., Kravčáková Vozárová, I, Kotulič R., Bednárová, Ľ., Adamišin, P. (2015) “Communication tools and their use by teachers and students at the university”, In: *7th World Conference on Educational Sciences, (WCES-2015), Athens, Greece, 2015,* Novotel Athens Convention Center, Athens, pp. 1335–1339.

Wilson, K.E. (2008). “Entrepreneurship education in Europe. Available at: https://www.researchgate.net/profile/Karen_Wilson12/publication/228316581_Chapter_5_Entrepreneurship_Education_in_Europe/links/00b4953beaf11a9d99000000/Chapter-5-Entrepreneurship-Education-in-Europe.pdf

Zhang, J., Wu, QC., Ren, C., Liu Y. (2011) “Enterpreneurship Education System Research in China's High School Based on Competency Model“, In: *Conference On Creative Education (CCE2011) in Wuhan, China, 2011,* Wuhan Univ., Wuhan, pp. 9–14.

The way to the spiritual dimension in personal management

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Abstract

This paper deals with the initial managerial focus on the spiritual dimension of a socially mature person within his personal management, which is one of the three pillars of an individually modified holistic management system. In accordance with the above-mentioned focus of the paper, the emphasis is on the choice of a socially mature person regarding access to his professional and private life respecting timeless supernatural laws and mental principles.

Keywords: individually modified holistic management system; mental principles; socially mature person; spiritual dimension; timeless supernatural laws.

JEL classifications: M12

Article Classification: Viewpoint

1 Introduction

Every human being has within him/her four dimensions: physical, mental, spiritual, and socially emotional, whether or not he/she is aware of it. The more mature one is, his/her desire for a fuller and more harmonious life naturally increases and at the same time, expressed by economic terminology, his/her awareness of the need to make an effort to achieve a relatively harmonious expansion of all four dimensions.

The subject of the paper is the issue of the spiritual dimension of a socially mature person (hereinafter referred to as a person, or an individual), who, in the opinion of the author of the paper (hereinafter the author), has a significant position in choosing a person's approach to professional and private life without their mutual contradiction.

The aim of the paper is to support a unique professional effort to link rational and irrational thinking to the formation of an individually modified holistic management system and try to convince the relevant professional public of the necessity of the renaissance of the spiritual dimension with an emphasis on respecting timeless supernatural laws and mental principles as a premise for desirable functioning the individually modified holistic management system.

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2 Formation and functioning of individually modified holistic management system

The formation of the individually modified holistic management system (hereafter the system) illustrates figure 1. The formation of the system begins with the pillar of the personal management (hereafter PM). Within PM, the process of self- knowledge is first realized and, based on its outputs, decisions are made and an individual's approach to his/her professional and private life is chosen. Obviously, this does not exclude the possibility or even the necessity to innovate the relevant future choice. The chosen approach of an individual to his/her life creates the prerequisites for his successful role as a self-manager, thus adopting individually applicable managerial techniques related to the individual management components within the individual management pillar. If an individual reaches the desired level of the individual management, he/she can, respectively rightly must to focus his/her mental efforts on becoming a modern self-leader. This basically requires the acquisition of the principles of strategic thinking and thus be able to strategically predict the perspective future development of a personal mission, define his/her own value orientation and to energize oneself to be prepared to implement strategic goals and strategies.[1]

The functioning of the system (see below figure 2) can be briefly described as follows: One and the same individual, by performing a role of the modern self-leader, "demands" the self-manager "doing things the right way". Along with the performance of both roles the modern self-leader and the self-manager, an individual gains the knowledge and experience that contributes to improving his/her PM.

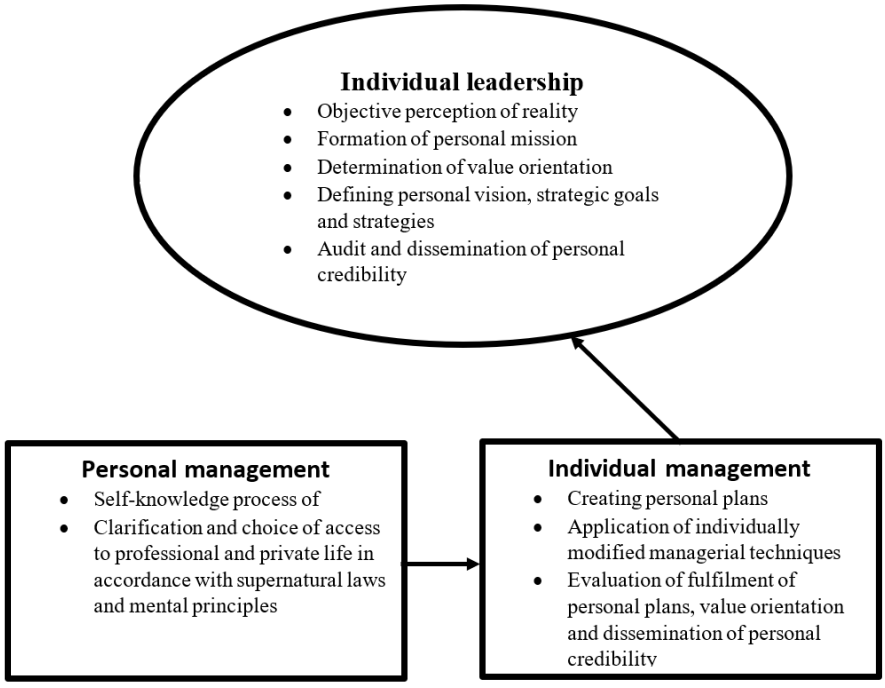

Figure 1 Formation of individually modified holistic management system; source: own processing

[1] The author considers the division of the individual management according to management components and their links to be the most appropriate, because it is truly systemic and, moreover, includes components that are missing in other divisions and are essential. Specifically, these include moreover: components surroundings of his/her own influence, managerial processes and especially individual culture! An overview of the contents of the top pillar of the system is given in figure 1.

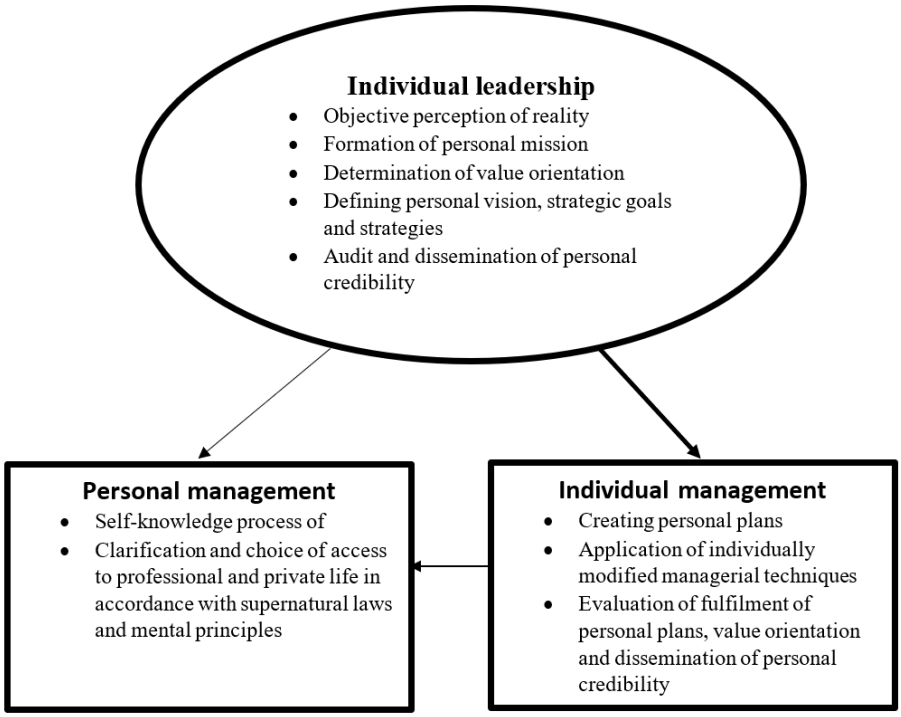

Figure 2 Functioning of individually modified holistic management system; source: own processing

In both of the above figures, the PM content is indicated. Whatever the concept of OM, the first item in their content must always be the process of self-knowledge.[2]

3 Framework characteristics of universal PM concept

Given the managerial focus of this contribution on the spiritual dimension of a person, the next text of the paper must be linked to the universal notion of PM, in which the so-called "Supernatural Laws" and the "Mental Principles" represent "building blocks" of this PM concept.

The universal concept of PM concerns not only the professional but also the private life of a person! The initial premise of the universal concept of PM is the mental acceptance of the unquestionable, but in reality overlooked, ignored fact that every person is just a negligible part of the universe! If PM is to be viewed universally, then it is necessary to first know and understand the action of key supernatural laws and respect them with due humility! Following the natural laws of the universe, the universal concept of OM also includes, derived from these supernatural laws, derived mental principles!

3.1 The supernatural laws of the universe

The natural laws of the universe are timeless and cannot be influenced by an individual. Given that each person has received free will from the Creator, he/she can

[2]Usually these are two PM concepts: Either the professional performance concept of PM (the subject of this concept is exclusively the professional life of an individual) or the universal concept of PM, which concerns both the professional and private life of an individual.

only this one: to respect or to ignore these natural laws! But he/she is fully responsible for the consequences of his/her attitude to the supernatural laws!

3.1.1 The law of unconditional love

This supernatural law is undoubtedly the supreme most important law of the universe, which can be labour-defined as follows: "Everything that exists in the universe has been created in the spirit of unconditional love and also in the manifestations of unconditional love."

The term "unconditional love" simply means the desire to love and accept oneself and other living beings without any conditions, including their otherness, weaknesses and shortcomings.

In order to better understand the scope of the unconditional love law, it is effective to present a person's thinking and actions that fully respect this law. A person who unconditionally loves other people:

- does not restrict or manipulate them,
- doesn't hurt them,
- tries to discover their strengths and positive properties and appreciates their strengths and their life achievements,
- respects their beliefs and values and their way of life,
- avoids accusations, draw attention to their shortcomings and weaknesses, as well as their past offenses,
- tries to be a positive example to them by own behaviour and mainly by own acting
- helps them if they wish,
- is able to selflessly give and help them and does not expect any gratitude for their activities,
- treats them openly and honestly,
- is able to forgive them completely.

The ultimate stage in fulfilling the law of unconditional love is, in addition to respect for oneself and others, the formation of respect for all animals, life values, nature and its gifts, and the awareness of the strong desire to love and honour the Highest Intelligence. Love for animals, for nature and life values can be demonstrated by a wise and humbled approach to everything entrusted to people by the Supreme Intelligence into administration.

3.1.2 The law of continuous improvement

This supernatural law of the universe can be labour-defined as follows: “Everything in the universe, in nature and in human life, develops toward a higher quality level, to higher perfection”.

The essence of life is continual development, movement and change, therefore as well as a person should constantly evolve towards higher perfection, in terms of physical, mental, spiritual and social relationship, respectively socially emotional.

The real interpretation of this law for human life modifies the direction of higher perfection from constant progress to progress in the sense of a trend (ie allowing temporary stagnation or short-term decline) as well as changing the view of the quality of improvement in individual dimensions in relation to human age. While in the course of human life, under ideal conditions, it is possible to realize constant qualitative

improvement of mental, spiritual and social emotional dimension, the nature of developing a physical dimension has a parabolic course![3]

3.1.3 The law of tendency to balance

The law of the tendency to balance emphasizes that "everything in the universe, in nature and in human life, is moving towards equilibrium".

This supernatural law can be clarified as follows: If the system is disrupted, the system will cease to function and come into crisis. But there are mechanisms in the universe, in nature, and even in human life, which cause the restoration of balance.

From the above it can be deduced that when an individual does not respect the action of the two previous supernatural laws and, moreover, does not manage his/her ego, he/she is proud and jealous gets into a state of crisis. The way out of a life crisis is not possible without a fundamental change of PM.4

It should be added that the negative consequences of the deviation from the equilibrium may not be reflected immediately, but rather with a time lag, which may be significant![5]

3.1.4 The law of predestined mission

This supernatural law is hardly acceptable for a rational thinking individual. However, a person with deeper life experience must admit that it is not wise to react to it with vigorous rejection.

The law of predestined mission states that "everything in the universe and in nature has its determined" mission of life "and this mission should be respected".

Each person is a part of nature and therefore this law applies to human being! It means that each individual is born to fulfil the original mission of life. Again, however, every individual is given free will by the Creator, so fulfilling the predestined life mission depends on the degree of identification of his/her will of the individual with the will of the Highest Intelligence!

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[3] Hypothetically: The qualitative and quantitative development of the human physical dimension has a growth course from birth to late middle age. There follows a relatively rapid decline in physical condition during aging. However, this is not a qualitatively correct view - Many older people reproduce their physical condition in accordance with their disposable potential (they practice regularly, go on trips, care for their gardens, etc.).

[4]Some relevant examples of undergraduate students: A student who in any way destroys his or her health (by smoking, using drugs, postponing tasks, consuming alcohol, eating poorly) sooner or later becomes ill, often with fatal consequences; A promiscuous student may feel so emotionally arid that he cannot be able to establish a lasting partnership and becomes lonely with a growing tendency to various negative addictions (usually alcohol and drugs); A student with an unclear personal mission is difficult to apply in the labour market and often remains economically dependent on his or her parents without the will to establish their own family.

[5] One relevant example: A university-educated man, a professionally successful and continuing relationship with women, lives a "single" life, does not want to bind, but becomes the father of a child - a boy. It is unacceptable for him to be a father. All he accepts is paying maintenance to his son. He continues his selfish way of life, while his son, due to the absence of fatherly love and upbringing, cannot find his life mission, is mentally unstable and becomes addicted to drugs.

So, it can be expected that for people who believe they have life in their hands, this law will be unacceptable until the unforeseen life crisis hits them! On the contrary, for a true Christian, the law of predestined mission is something self-evident or sacred![6]

Apart from the above-mentioned extremes of perception of the law of predestined mission, every person must admit, especially if he/she has experienced a serious life crisis (for instance: death of a loved one, betrayal of a best friend, serious illness or injury with permanent disability, personal bankruptcy, etc.), that the life crisis he/she has experienced and overcome, which has both strengthened him/her and changed his/her view and direction of his/her next life.

Such a "disabled" individual with increasing age, without necessarily being aware of it, is approaching to his/her predestined mission. So, is it not that the law of predestined mission has universal validity, and its action is the premise of person's preparation for a humanly unimaginable but always hopeful eternal future?!

3.2 The mental principles

The mental principles are claims that are timeless, like supernatural laws of the universe. Their acceptance and consistent respect fundamentally contribute to life success and human satisfaction.

Mental principles are part of every social philosophy and morality, and what is essential are "present" in human conscience, no matter in which territorial, economic and social environments they are! For mental principles, as well as for the supernatural laws of the universe, this statement is indisputable: if they are not accepted in reality, this causes individual and social consequences as well![7]

The mental principles include the principle of:

- integrity,
- honesty,
- tolerance,
- patience,
- rightness,
- courage and bravery,
- from the inside out.

The mental principle of integrity expresses the natural need for harmony of thought, communication of ideas and subsequent actions.

The mental principle of honesty encourages an individual to ethically think and act, and to take an uncompromising responsibility for his or her expression, decisions, and actions.

The mental principle of tolerance expresses the need for reconciliation of an individual with his own physical and mental potential. To tolerate oneself means to respect one's own self, but at the same time it does not mean taking a fatal attitude to the possibilities of self-improvement. Every healthy person can develop his strengths and eliminate his weaknesses. Yet his efforts to improve must take into account his currently

[6] Why, because he professes his faith in God's Trinity and follows Jesus Christ with his/her "crosses" to the eternal life goal.

[7] The author only deals with the issue of mental principles in general. The reasons are: 1/ Mental principles are sophisticatedly explained by Stephen R. Covey - see Covey, R. S. (2016); 2/ There is a widespread awareness of mental principles within the relevant professional community.

available potential, as he limits his possibilities for improvement in both quantitative and qualitative terms.

The mental principle of patience encourages an individual to realize that "everything has its own time". This principle warns him/her of being impetuous in thinking, in expressing his/her opinions, and in acting. He even warns against uncontrolled expression of emotions. A person who honours the mental principle of patience never behaves hastily. It retains a certain amount of time between the stimulus and the response to this stimulus. He/she is also aware that his/her mind is gradually forming and maturing.

The mental principle of rightness "stirs" an individual to know the necessity of rightness access to whatever he thinks or does.

The mental principle of courage and bravery is related to overcoming the fear of an individual from the consequences of promoting something new, nonconformist, unconventional.

The mental principle "from the inside out" emphasizes that the process of individual contribution to solving problems in the sphere of one's own influence must begin with the individual's answer to the question "who am I" and the transformation of his/her own thinking.

4 Conclusion

The graphically represented formation and functioning of the individually modified holistic management system with its general characteristics is the ideal idea of the author's conviction to the sequence, linkages and content of the pillars of this system, which guarantees efficient, effective and responsible performance of the self-manager's mission and then of the modern leader role.

A prerequisite for the desirable performance of the self-manager's mission and the modern self-leader is the above-standard level of the universal personal management. In order for the above-mentioned assumption to be created, a socially mature person (referred to as "person") must, after the self-knowledge process, choose to manage his/her professional and private life, fully respecting supernatural laws and derived mental principles. However, this also shows the key importance of the spiritual dimension for a full-fledged and harmonious human life and at the same time justifies the choice of this contribution to clarify supernatural laws and mental principles.

The author of the paper emphasizes that supernatural laws and to a large extent mental principles are not manageable from a human point of view. In accordance with given free will, person can either fully or partially respect them or ignore them in managing his/her own professional and private life! But it cannot affect the consequences of his/her choice! With a little exaggeration, person can argue that one, with respect for

supernatural laws and mental principles, can expect "fruits of goodness"8, while one who ignores them sooner or later encounters "fruits of evil"[9]!

References

Covey, R. S. (2016) *"7 návyků skutečně efektivních lidí. Zásady osobního rozvoje, které změní váš život"*, Management Press, Praha, Czech Republic.

Vágner, I. (2015) *"Podněty k posunu paradigmatu myšlení a jednání v managementu",* Sting, spol. s r.o., Brno, Czech Republic.

Vágner, I. (2019) *"Osobní management",* Available at: https://is.sting.cz/auth/do/sting/skripta/katedry_skripta/ker/Vagner_Osobni_Management.pdf

[8]"Fruits of goodness" can have many positive forms, for example: mental peace, good health, a balance between professional and family life, trustworthy family and work relationships, a joyful and happy life, a constant desire to develop in all four dimensions of life, be able to love and to be loved, to perceive life crises as opportunities for personal growth, to be and to remain oneself, to be able to respect and appreciate otherness of opinion, to be able to forgive with heart, faith in God.

[9] "Fruits of evil" can have various negative forms, for example: inner restlessness, bad and deteriorating health, tendencies to work holism or, on the contrary, to procrastination, dysfunctional family, self-deception and untrustworthy relationships in privacy and at work, bleak and dissatisfied life, life perception crisis as a result of circumstances caused by others, dependence on property and power, inability to be self, alibistic and opportunistic thinking and acting, unwillingness to forgive, fear of death, contempt for faith in God.

Motivation as an indispensable part of human resource management

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Abstract

Man is complicated human being with unique interests, needs, objectives and dreams that vary from person to person.The main objective of submitted paper is to highlight the significance of motivation and leadership that are the integral parts of firm culture. We had used the primary data (a questionnaire research) and the secondary data (literature review). The theoretical part provides the theoretical knowledge about the motivation, leadership and firm culture. The practical part expresses how motivation, leadership and firm culture work in a reality in the selected company. The fundamental purpose of this article is to combine theory about motivation, leadership and firm culture. The quality of motivation, leadership and firm culture at the selected company is assessed by means of questionnaire. The questionnaire was available in electronic form on the webpage, which partially evaluated the respondents' answers. Furthermore, we also tested the statistical hypotheses through statistical method that examines the dependencies between two characters (two questions of our questionnaire). Last but not least, based on the questionnaire evaluation are proposed the recommendations for improving a certain weaknesses in terms of motivation, leadership and firm culture at selected company.

Keywords: human resource management; motivation; leadership; firm culture.

JEL Classification: M10, M14, M15, O1, O15

Article Classification: Research article

1 Introduction

The way how people behave is not the coincidence. Behavior of people is influenced by many internal or external factors that drive people to move forward. These internal and external factors act as a kind of driving force, or in other words motivators

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and stimulators, that encourage behaviour of people to achieve the set objectives as well as to satisfy the needs and desires. One person is different from the other person simply because they have different needs, interests, desires, values and objectives. This explains why people behave differently. Therefore, it is crucial for manager to be familiar with person's needs, interests, desires, values and objectives, so the manager will chose the right motivational factor that will satisfy the employee. Human behaviour is strongly influenced by motivation. Motivation is one of the key factors for success. Thanks to motivation we are able to achieve the goals that we set. Motivation plays an important role in both personal and business environment. The term motivation is derived from latin word movere and means to move.

Thus motivation incorporates in its name all the internal incentives and motives that lead people to a certain behaviour and action. Behind the human behaviour and action are the incentives and motives (Vetráková and Bočincová, 2013) or (Mura, 2017) as well as (Žuľová, Švec and Madleňák, 2018).

Different authors define motivation in a slightly different ways. One of the oldest definitions is offered by (Robbins and Coulter, 2004) who defines motivation as an attempt to make the effort to obtain the organizational objectives and at the same time to meet the personal needs of the individual. Thus the effort, organizational objectives and personal needs are the essential elements of motivation. These three elements of motivation are interrelatd. For instance, without the effort, achieving the objectives and satisfying the needs will not be possible. Next definition is provided by (Armstrong and Stephens, 2008) who explains the meaning of motivation from manager's point of view. It is nothing more than just putting people into the right direction that is desired by the manager in order to achieve the positive results for the organization. So the employees behave in a certain way that is expected by the manager who motivate them. Managers use motivation to stimulate the performance of their employees. If the employees are motivated in an appropriate manner, then it is also reflected on their performance and results.

There are plenty of motivational factors that organizations implement in order to achieve desirable effects. (Kadlečíková and Kapsdorferová, 2014) presents some of the motivational factors that are listed bellow:

- need for money;
- need for the safety and independency in the future;
- need for social recognition and prestige;
- need to achieve the desired objectives;
- need to be in touch with other people what is especially a case of managers who meet dozens of people daily;
- need for personal fulfillment, self-realization and achievement;
- need for optimal working condition, such as home office, flexible working hours, job enlargement or job enrichment;
- need to conduct a particular activity or performance that leads to please or satisfaction from the work that has been done;
- need for variability and change;
- need for power and influence.

Sources of motivation are involved in the process of motivation and they influence the level of motivation. Sources of motivation are regarded those elements, which create and encourage the motivation itself. On the other hand, according to Malejčík (2010), sources of motivation consist of:

- needs – every person has certain needs which evoke a feeling of lack that the

person is driven to fulfill. They are a precondition for motivation;

- interests- are states of paying attention to something. It is usually linked with curiosity, concern or passion. Interests always act as a motive;
- habits- are fixed manners of behavior rooted in either education of person or person itself. Habits can be positive or negative. Since habit is an automatized and repetitive way of conducting certain activity, a change of habit is challenging and in some cases it is even impossible;
- ideals- moral beliefs that arise primarily under the development of social factors and the creation of human personality;
- values - person faces with many circumstances that are assigned to different levels of significance and value. Human behavior is strongly affected by a scale of values that is formed by individuals during their lives.

We meet with various types of motivation that can be adopted in a business environment. Choosing the right type of motivation depends on various circumstances. For example, when the manager wants to motivate just one employee he chooses not the same type of motivation than when he wants to motivate all employees together at the same time. We are going to analyze those types of motivation that are used in companies in order to ensure that the manager will choose an appropriate type of motivation in a given situation. Čizmadiová (2013) distinguishes two general types of motivation within an organization:

- Financial motivation- is composed of financial remuneration, including fixed wage and variable wage. Financial compensation is a magic tool in the area of motivation because it may, on one hand, motivate the employees, but on the other hand, it may also demotivate them. The experts agree, that neither only fixed wage nor just variable wage is the ideal solution to enhance work motivation. Experience shows that offering only fixed salary can reduce the effort and motivation of the employees since their compensation is fixed regardless of their performance. Offering only variable wages instead of fixed wage usually forces the employees to achieve the desired result. The employees feel the pressure, because they do not have any certainty of earnings. However, the ideal case how to enlarge work motivation is to combine these two wages together. Besides fixed and variable wage, the employees may also be rewarded by time-rate wage (is paid according to the worked hours), piece-rate wage (is based on performance and output, regardless of how long does it take to finish the task), overtime wage (beyond the standard working hours), premium wage (for extraordinary performance usually added as an extra payment to either time-rate wage or piece-rate wage) and commission (as a percentage of total sales).
- Nonfinancial motivation- includes flexible working hours, health care, teambuilding activities, courses and trainings, vacations and many others.

Singla (2010) finds the difference between financial and nonfinancial motivation in three basic areas that are:

- measurement- financial motives are possible to measure directly in terms of money received, while nonfinancial are not;
- satisfaction level- financial motives satisfy lower basic needs such as need for food or clothing, while nonfinancial motives satisfy higher esteem needs, such as status or career advancement;
- sustainability- financial motives are more efficient when they are applied to workers, while nonfinancial motives are more efficient motivator for managers.

Another division of motivation is provided by Armstrong (2007) who divides motivation into:

- Internal motivation- is rooted in the individual needs as well as in the nature of man. The employee is motivated by himself, without any impulse from external environment. Autonomy, responsibility, opportunity to develop the personality are the examples of internal motivational factors;
- External motivation- this type of motivation is affected considerably by external motivational factors. As external motivational factors are understood those tools, that are used by supervisors in order to enhance the motivation of their subordinates. Increase in wages and job advancement belongs to the most common tools that build up the external motivation. Conversely, external motivation may not always be just positive but also negative in the form of criticism, such as punishment.

In relation to the title of this article, we can state that, the traditional theories argue that leader is usually born as leader. However, new approaches admit that some of these characteristics of successful leader can be obtained through training. For example, assertiveness or communicability can be developed by means of training programs that are provided by consulting and training agencies (Adair, 2005) or (Oliviera and Turčínková, 2019). Blanchard and Johnson (2013) share in their book ''The one-minute manager'' techniques to effective leadership method called the one-minute management. These techniques increase the productivity, sales and personal prosperity and at the same time, they benefit the organization and its employees. The essence of the one-minute management is that the manager has to devote one minute of his time every day and look into faces of the people who are managed by the manager, just because people are most important asset for the company. Moreover, regular meeting between the manager and the employees organized once a week should be a must for companies. The one-minute management also recommends that the companies should create a favorable atmosphere at workplace, simply because people who feel good achieve better results.

Different authors define firm culture by their own words. Mitchell (2009) thinks that ''corporate culture is the glue that holds an organization together''. That is why the organizations should pay attention on the concept of firm culture. He also adds that firm culture ''incorporates an organization's values, norms of behavior, policies and procedures''.

General meaning of firm culture is offered by Lukášová (2010) who defines firm culture to be a set of core beliefs, values, attitudes and norms of behavior that are accepted and shared by all the members of a particular firm and that are reflected in their thinking and behavior. Company's values need to be balanced with employees' values. The concept of firm culture is linked with company's business ethics.

Investopedia (2015) claims that '' a company's culture will be reflected in its dress code, business hours, office setup, employee benefits, turnover, hiring decisions, treatment of clients, client satisfaction and every other aspect of operations.'' This indicates that firm culture has its impact not only on the employees and business but also on external entities, such as company's customers. It strongly influence the motivation of employees and the choice of leadership style, therefore these three concepts, namely motivation, leadership and firm culture, are interrelated.

Many companies want to establish strong firm culture. However, Dědina and Odcházel (2007) and (Ubrežiová et al., 2015) explain that strong firm culture does not always result in positive results for the company. The company has to consider both sides of strong firm culture, not only those positive results, but also the negative ones. On one hand, the advantage of strong firm culture is that all the employees share common values,

objectives and visions. Strong firm culture contributes to positive working atmosphere and it gives chance to motivational behavior as well. Furthermore, firm culture directs employees' behavior. But on the other hand, strong firm culture may cause employee's resistance to changes since they are sticked to traditions, rituals and values. To sum it up, creation of strong firm culture is more desirable than creation of weak firm culture.

2 Material and methods

The general aim of this article is to examine the motivation, leadership and firm culture in the selected multinational company. The basic aim of article is at first to get the sufficient level of knowledge about the motivation, leadership and firm culture and then to investigate the current situation in the chosen company in terms of the motivation, leadership and firm culture.

2.1 The methodical procedure of research

Therefore, the set goals need to be divided into two categories, the theoretical partial goals and the practical partial goals in order to meet the general aim that we have already set at the beginning (to examine the motivation, leadership and firm culture in the chosen company). We set the following hypothesis:

- Hypothesis 1: We assume that there is a relationship between the amount of respondent's wage and his/her satisfaction with variable reward system that is dependent on the performance.
- Hypothesis 2: We assume that there is a relationship between respondent's age and his/her perception of the ideal leader's age.

Questionnaire survey provided us primarily sources of information related with motivation, leadership and firm culture at the selected company. The aim of questionnaire was to determine the financial consultants' subjective perception of the level of motivation, leadership and firm culture. The questionnaire was available in electronic form on the webpage www.survio.com, which partially evaluated the respondents' answers. The questionnaire consisted of 19 questions out of which first eight questions were general that said what was the gender, age category, level of education, years working at the company, working position, number of financial consultans led by particular financial consultant, description of job satisfaction and the amount of net montly wage. The next five questions were devoted to motivation, the other five questions evaluated the issues related to the leadership and the last question described strength of the firm culture. We obtained the fulfilled questioners from 107 financial respondents who perform their job in the chosen company.

The questionnaire included three parts:

- Introduction- we expressed the purpose of the questionnaire and we provided also the instruction to the respondents how to fill out the questionnaire;
- Body- that consisted of 19 questions that has been already analyzed;
- Conclusion- we expressed the thanks for filling the questionnaire and respondents' time, effort, willingness and sincere answers.

In our questionnaire we used two basic types of questions, namely:

- Closed-ended questions- with two, three or multiple options (yes/no);
- Open-ended questions- give respondents the opportunity to express their thoughts and opinions (Could you identify any demotivating factors at your company?).

Finally, the quantitative data obtained from the questionnaire survey were processed through a simple percentage statistical method in Excel. The respondents' answers to each question were presented graphically and numerically by means of charts and graphs.

Furthermore, we also tested the statistical hypotheses through statistical method that examines the dependencies between two characters (two questions of our questionnaire). According to Christmann (2012) this statistical method is called chi square (χ^2) test of square contingency that consists of five steps:

1. formulation of the null hypothesis (H0) that assumes independence between examined characters;
2. formulation of the alternative hypothesis (H1) that assumes dependence between examined characters;
3. determination of the level of significance (α= 5%=0,05);
4. calculation of the test statistic and P-value;
5. decision either to accept or to reject the null hypothesis.

For calculation of chi square (χ^2) test of square contingency we used the formula:

$$\chi^2 = \sum_{i=1}^{m}\sum_{j=1}^{n}\frac{(E_{ij} - T_{ij})^2}{T_{ij}} \quad (1)$$

Where:
Eij = the empirical frequency
Tij = the theoretical frequency

- m = number of categories of the first character
- n - number of categories of the second character
- Decision either to accept or to reject the null hypothesis:
- P-value > level of significance α (0,05) then we accept H0 and we reject H1 => there is an independence between examined characters;
- P-value < level of significance α (0,05) then we accept H1 and we reject H0 => there is a dependence between examined characters;
- (Christmann, 2012)

3 Results

This part of the scientific articleis devoted to the evaluation of every single question of the questionnaire. The basic aim of the questionnaire survey is to find the level of motivation, ways of leadership and strength of firm culture in the evaluated company, according to financial consultants' viewpoints. We obtained the completed questionnaire from 107 financial consultants, whose demographic and social information are covered in the range of questions- from the question number 1 to the question number 8. The rest questions are dedicated the issues of motivation, leadership and firm culture. In general, total number of men working at the company exceeds the number of women who are working at this corporation. This is also proved by the fact that our questionnaire was completed by greater amount of men than women. We managed to get the replies to our questionnaire from 107 financial consultants working in the company, out of which absolute expression represented 83 men and 24 women. In terms of relative expression, the questionnaire was compiled by 78% of men and 22% of women. Only people with at

least secondary education are allowed to work. People with basic education are not part of this company. Proportion between respondents with secondary education and respondents with university education is almost balanced, what means that 51% of respondents working with university level of education and 49% of respondents working with secondary level of education. The highest proportion of respondents, 31% have been working in the company in range from 1 to 3 years. 28% of respondents are relatively new financial consultants who have been working less than 1 year. 25% of respondents have been working at this company in the range from 3 to 5 years. 12% of respondents are considered to be stable part of this company who have been working there from 5 to 10 years. 4% of respondents have more than 10years experience and skills with financial work. We can sum up, that there is high fluctuation of new financial consultants working less than 3 year what is basically not a good sign for the company and that is why should pay attention to this problem. Following question was aimed to find respondents‘ level of interest and satisfaction with job. Almost three quarter of respondents (73%) consider their job at this enterprise to be both interesting and this job brings them feeling of satisfaction. We need to realize that interest and satisfaction is not one and the same. This is confirmed by second choice that respondents could select interesting job, but something at this company makes them unsatisfied, for example variable reward system. So 21% of respondents like their job, since they perceive it to be interesting, but this job does not make them satisfied. For 4% of respondents is working in the company not interested and these respondents are not satisfied with their job. Very small number of respondents (2%) are actually thinking about changing job.

Majority of asked respondents are very satisfied with variable remuneration system. This group comprises more than 39% of respondents. Satisfaction with variable remuneration system is expressed by 28% of respondents. On the other hand, some respondents are not satisfied with variable reward system that is dependent on their performance. The company does not offer to financial consultants the fixed wage, what may act as disadvantage for those who have weak performance. The aim of the company is to motivate the financial consultants to work harder so then they can earn also more money. Dissatisfaction with variable remuneration system is expressed by 16% of respondents. However, 27% of respondents claim that variable remuneration system makes them very dissatisfied.

We set the first hypothesis within this question. Our assumption was that there is a correlation between the range of net monthly wage of respondents and their satisfaction with variable remuneration system that is basically dependent on their performance and achieved results. Again, we tested the correlation between these two studied characters by means of chi square (χ^2) test of square contingency. We set two types of hypothesis:

- H0: There is no correlation between respondents’ net monthly wage and their perception of variable reward system;
- H1: There is a correlation between respondents’ net monthly wage and their perception of variable reward system.
- P-value (0,00000835) < level of significance α (0,05) => H0 is rejected and H1 is accepted

We can conclude that there is a correlation between examined characters. What means that satisfaction of financial consultants with variable reward system is affected by the amount of net monthly wage that financial consultants receive in the selected company (Figure 1).

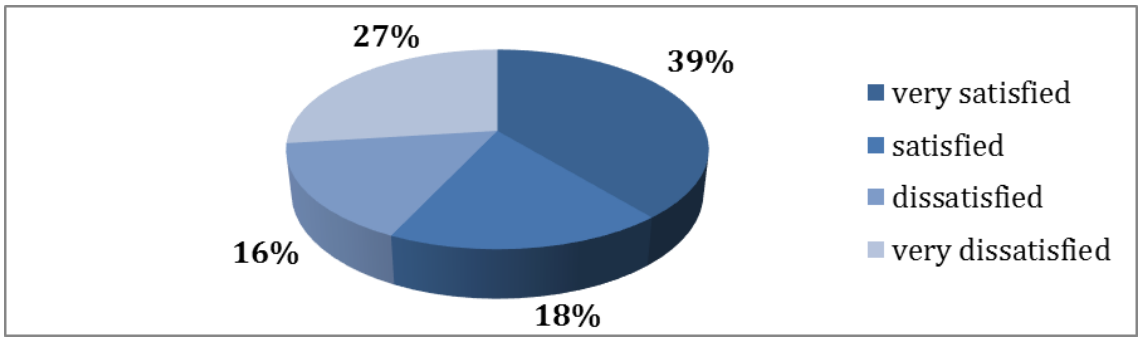

Figure 1 Satisfaction with variable reward system, source: own processing

Majority of respondents are motivated more by means of financial motivation than nonfinancial motivation. Variable wage is the example of financial motivation. 63% of respondents belong to this group. On the other hand, nonfinancial motivation is preferred by 37% of respondents. Flexible working hours, teambuildings and contents are the examples of nonfinancial motivation. The leader in the evaluated company should use that kind of motivation that motivates more the financial consultants in his/her individual organizational structure in order to enhance the performance of team members and to achieve the desired results (Table 1).

Table 1 Satisfaction with motivational factors, source: own processing

	Very important	Important	Unimportant	Very unimportant
Wage	86	21	0	0
Flexible working hours	43	52	12	0
Career growth	80	25	2	0
Competitive work environment	28	41	20	18
Accidental insurance	36	47	18	6
Subsidies for business development	47	48	9	3
Teambuilding	32	67	3	5
Contests	6	64	10	7

The aim of this question was to identify what the different motivational factors mean to the respondents. Depending on the degree of importance, wage and career growth are the most important motivators that motivate them the most. Wage is very important motivator for 86 respondents and career growth is very important motivator for 80 respondents.

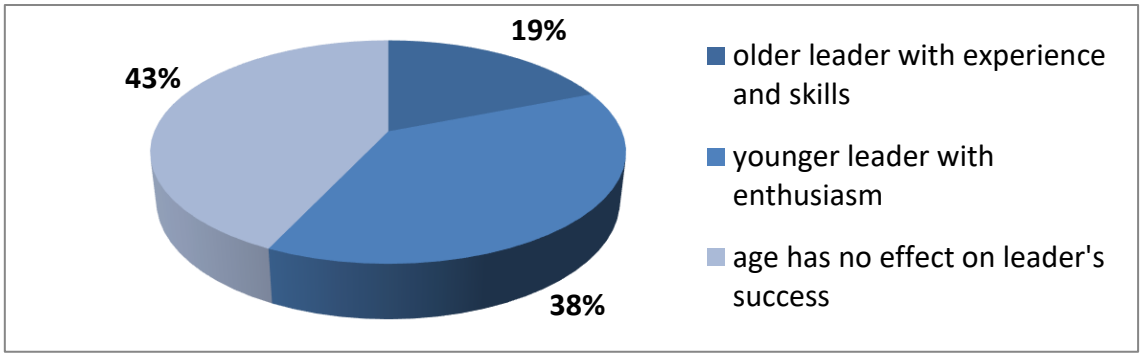

Figure 2 Successful leader in relation to the age, source: own processing

Based on the Figure 2, we can assume that wage plays an irreplaceable role for the respondents, since no one select option unimportant and very unimportant in case of this motivational factor. When we look on respondents' answers from complex point of view, we can conclude that the following motivators, namely wage, flexible working hours, career growth, competitive work environment, accidental insurance, subsidies for business development, teambuilding and contests, are according to the degree of importance rather important than unimportant to the respondents who evaluate every motivational factors separately.

According to 19% of respondents, the successful leader is the older leader, who has more experience and skills than younger leader. 38% of respondents think, that younger leader with enthusiasm is the appropriate leader. The largest group of respondents, specifically 43% of respondents, say, that age does not influence the leader's success and prosperity.

We set the last hypothesis in this question. We assume that there is a positive correlation between the age of respondents and their perception about the age of ideal leader. Thanks to chi square (χ^2) test of square contingency we found out whether there is positive or negative correlation between the studied characters. We constructed the following hypothesis:

- H0: There is no correlation between respondents' age and their perception about the age of ideal leader;
- H1: There is a correlation between respondents' age and their perception about the age of ideal leader.
- P-value (1,00E-08) < level of significance α (0,05) => H0 is rejected and H1 is accepted

We can conclude that there is a positive correlation between studied characters, what basically means that younger financial consultants working in the company think that younger leader with enthusiasm is successful leader. Contrary, the older financial consultants working in the selected company consider older leader with experience and skills to be successful leader. The middle age of financial consultants believe that age has no influence on leader's success. We wanted to analyze respondents' perceptions of the effectiveness of business meetings by this question. Respondents gave us a clear statement to this question, since 93% of asked respondents consider business meeting to be effective leadership tool for solving past, present and future situation. Generally, the financial consultants recapitulate on their business meetings what has happened during previous week and also what they plan to achieve in the coming week. Just a small portion of respondents, specifically 2% of respondents, treat business meetings to be ineffective tool for leading other people. 5% of respondents are between these two opposite groups of respondents, so they express neutral opinion on the question about effectiveness of business meetings. Based on the evaluation of other question, we came to the conclusion that more than half of asked respondents, i.e. 67% respondents combine the practical experience together with the knowledge gained at school in order to lead others efficiently. However, 22% of respondents rely only on practical experience in their leadership and 11% of respondents use only school knowledge in their leadership. Writing objectives on a paper is a key to motivational behavior and success. Financial consultants have a tendency to write the objectives that they want to achieve on a paper, namely 66% of respondents write always their objectives, 18% of respondents write often their objectives and 11% of respondents write just rarely their objectives. On the other hand, 5% of respondents do not write their objectives on a paper.

4 Discussion

We would like to highlight that the importance of motivation and leadership in firm culture of any organization is really vital. Almost every individual's activity is affected by a certain degree of motivation, that leads to achieving the desired result. The company, that wishes to be successful should be familiar with employees' needs, wants, desires and objectives so then, the managers could select exactly those motivational factors and types of mation that result in motivated behavior of the employees. The effort of successful leader should be achieving optimal level of motivation, neither too low nor too high. Only optimal level of motivation can enhance person's productivity and performance. Many companies underestimate the importance of motivation and many managers do not lead their subordinates by use of motivators and stimulators what is big mistake for such companies, because as we have already mentioned there is a positive correlation between optimal level of motivation and employee's productivity what results positively on company's profitability. Every rational leader is aware of the fact that firm's success and prosperity is closely linked with the satisfaction of its employees. Thanks to questionnaire survey we came up with some interesting findings which are as follows:

- the majority of the respondents are very satisfied with the variable remuneration system;
- the majority of the respondents agree with the statement that the " greater level of motivation results in greater productivity and performance";
- wage together with career growth belong to the most important motivators;
- financial motivation is preferred over nonfinancial type of motivation;
- the fact that financial consultants do not have the possibility to get fixed salary, to participate in firm competitions and also the fact that all costs have to be covered by the respondents themselves contribute to the demotivated behavior
- democratic way of leadership is considered to be the optimal leadership style;
- the majority of respondents think that the age does not have affect on the success of a leader;
- respondents perceive business meetings to be an effective leadership tool;
- respondents use in their leadership not only the practical experience but also the acquired knowledge from school;
- respondents have a tendency to record the goals on separate paper;

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References

Adair, J. (2005) "*Jak řídit druhé I sám sebe",* Computer Press, a.s., Brno, Czech Republic.

Armstrong, M. (2007) "*Řízení lidských zdroju",* Grada Publishing, Praha, Czech Republic.

Armstrong, M., Stephens, T. (2008) "*Management and leadership",* Grada Publishing, a.s., Praha, Czech Republic.

Blanchard, K., Johnson, S. (2013) "*Minútový manažér",* Citadella publishing, spol. s.r.o., Bratislava, Czech Republic.

Christmann, E. (2012) "*Beyond the numbers",* Natl Science Teachers Association press, USA.

Čizmadiová, M. (2013) "*Čo motivuje zamestnancov",* Available at: <https://www.podnikajte.sk/manazment-marketing/c/942/category/manazment-a-strategia/article/co-motivuje-zamestnancov.xhtml>.

Dědina, J., Odcházel, J. (2007) "*Management a moderní organizování firmy",* Grada Publishing, a.s., Praha, Czech Republic.

INVESTOPEDIA. (2015) *"Corporate culture",* Available at: http://www.investopedia.com/terms/c/corporate-culture.asp.

Kadlečíková, M., Kapsdorferová, Z. (2014) "*Základy manažmentu",* SPU, Nitra, Slovakia.

Lukášová, R. (2010) "*Organizační kultura a její změna",* Grada Publishing, Praha, Czech Republic.

Malejčík, A. (2010) "*Základy manažmentu",* SPU, Nitra, Slovakia.

Mitchell, Ch. (2009) "*International business ethics",* World Trade Press, California, USA.

Mura, L. (2017) "Current situation in Family Businesses", *Managerial trends in the development of enterprises in globalization era*, pp. 178–185.

Oliviera, P., Turčínková, J. (2019), "Human Capital, Innovation and Internationalization of Micro and Small Enterprises in Rural Territory – a Case Study", *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, Vol. 67, No. 2, pp. 545–563.

Robbins, S., Coulter, M. (2004), "*Management",* Grada Publishing, a.s., Praha, Czech Republic.

Singla, R.K. (2010) "*Business management",* V.K. Enterprises, India.

Ubrežiová, I., Moravčíková, K., Sukovská, M. (2015) "Motivation and leadership as a part of firm culture in the selected slovak company", *Acta Oeconomica universitatis Selye*. Vol. 4, No. 2, pp. 198–206.

Vetráková, M., Bočincová, G. (2013) "*Human resource management",* Matej Bel University, Banská Bystrica, Slovakia.

Žuľová, J., Švec, M., Madleňák, A. (2018), "Personality aspects of the employee and their exploration from the GDPR perspective", *Central European Journal of Labour Law and Personnel Management*, Vol. 1, No. 1, pp. 68–77.

The use of time of business sector employees

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Abstract

Inappropriate allocation of the time of employees can have negative effects on job satisfaction, employee's productivity, fluctuation, and job-induced stress of employees. This paper investigates use of the time of employees in private business sector (including employees of business companies and employees of sole proprietors). This article is based on an original field research conducted for last 7 years in Slovak households. The main purpose of the research is to understand the use of time of households and individuals on paid work, unpaid work and leisure time. One perspective of this research focuses on the time that employees spend in paid work (both main full-time job and part-time job). Long and inflexible working hours are being considered important factor of job dissatisfaction of employees. Another perspective describes gender differences and necessity of utilizing specific management approaches for recognizing and solving work-life conflicts of employees. This paper is one of the initial attempts to draw the attention towards the important role of the use of time of business sector employees. Knowledge of allocation of the time (as scarce source) of employees can serve as fundament for managing work-life conflicts of business sector employees and for setting up appropriate human resource management for sustainable satisfaction of business sector employees.

Keywords: business sector; employees; paid work; unpaid work; use of time; leisure time.

JEL Classification: M21, M12, J22

Article Classification: Research article

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1 Introduction

Time is considered as a limited, scarce resource. Every individual must decide how to allocate time (which activities he/she will pursue and how much time he/she will dedicate to particular activities). There are three main disciplines that focus on time allocation of households and individuals – household economics, sociological researches on work-family balance and institutional approaches towards labour market organisation (Wotschack, 2009). Paper of Bhat and Misra (1999) formulated a model for the allocation of total weekly discretionary time of individuals between in-home and out- of-home locations and between weekdays and the weekend. Their model was based on the empirical analysis using data drawn from a 1985 time-use survey conducted in the Netherlands. Aguiar and Hurst (2007) focused on time allocation of households from the leisure time point of view. Based on the time-use surveys in the USA, in five decades, they prove that leisure for men increased by roughly six to nine hours per week (driven by a decline in market work hours) and for women by roughly four to eight hours per week (driven by a decline in home production work hours).

There are different methods for measuring time allocation of households and individuals. Sociologists prefer self-kept time diaries; anthropologists focus more on observation. However, many researchers consider time diary approach the most accurate. Robinson and Godbey (1997) stated, that administered time-diary study is necessary to accurately measure time spent on various activities. The diary procedure avoids the problems of a time estimation and prevents respondents from purposefully distorting activity estimates. Bittman and Wajcman (2004) argued, that stylized questions produce less accurate results than a full diary. In the study of Bonke (2005), comparison of diary information and questionnaire information about the paid work and unpaid work was included. He confirmed that labour supply studies based on questionnaire information are less accurate than studies based on diary information. Budlender (2010) focused on the relation between the unpaid care work and time use. Study included eight countries (Argentina, Nicaragua, India, Republic of Korea, South Africa, Tanzania, Switzerland, and Japan) and in each country, researchers analysed official time use survey data. In five countries, time diary approach was used. In 3 countries, stylized approach (questions related to specific activities) was used.

One of the methods of diary time collection, is time use survey. Time use survey (further in the text only TUS) is a statistical survey which aims to report data on how people spend their time (In: Zisťovanie o využívaní času). In many countries, official time use surveys are used. Since 1990 to 2013, sixty-nine countries worldwide conducted a time use survey (In: Harmonized European time use surveys, 2008). In fifteen European countries, the harmonized European time use surveys (HETUS) is used from 2000.

There are several studies, that focus on the time allocation (time use, eventually work-life balance) of employees. In his study, Thornthwaite (2004) focuses on the working time preferences of employees, based on the comparison from various precedent researches. He stresses an importance of three key aspects of working time - total working hours, access to part-time work, and flexibility – in finding a balance between the work and family of employees. Robinson and Bostrom (1994) used time diary to measure time that employees spent in their paid work. Major et al. (2002) developed and tested a model of the predictors of work time and the relationships between time, work interference with family, and psychological distress. They confirmed that several work and family characteristics were significantly related to the work time. During last years, researchers stress the difference between the time allocation of male employees and female employees. In their study, Hagqvist et al. (2016) analysed the time use of men and women in Sweden, comparing self-employed and employed individuals. Their results show that

self-employed men and women distribute their time in a more gender-traditional manner than employees. Thriveni and Rama (2012) analysed impact of demographic variables on work-life balance of women employees (they analysed 340 female employees from marketing, insurance, banking, and IT areas).

The age of the employees plays also an important role in distribution of the time. Virkebau and Hazak (2017) found that age of the is one of the factors (besides residential status, and the number of young children in the family) that influence requirement of employees in Estonia for flexible working time. Dahm et al. (2015) analysed time distribution in connection with the work-family conflict of employees. Their research showed that discrepancies between actual and preferred time allocations to work activities negatively relate to work satisfaction, psychological well-being, and physical well-being. They also find that women are more likely than men to report self-discrepant time allocations as work-to-family conflict increases. Spieler et al. (2018) conducted two studies (in the first one, they analysed 298 bank employees; in the second one they analysed 608 workers) focusing on the relationship between the age and work–life balance. They found out that older workers enjoy higher work–life balance than young workers. Results show that older workers reported better work–life balance and stronger boundaries at work than young workers, as well as stronger boundaries at home. Stronger boundaries were related to better work–life balance, and boundary strength mediated the relationship between age and work–life balance.

In this article, we focus on the daily distribution of the time (based on the time diary linking time interval and particular activity) of specific group of individuals – employees in the private sector.

2 Material and methods

The aim of this paper is to analyse use of time of employees in the private sector in Slovakia. To get information about the time use, we conducted an original field research, based on diary time collection in 2017. Research was conducted by multidisciplinary team of researchers form the Faculty of Economics, Matej bel University in Banská Bystrica, Slovakia. Research was part of the VEGA project "Decision-making of Slovak households about time allocation for paid and unpaid work and effect of household strategies on selected areas of the economy". The aim of the research was to collect data on daily time use of individuals and households and to identify opinions, preferences, and attitudes of respondents towards the allocation of the time in paid and unpaid activities.

We draw classification of activities that households and individuals perform during the day from the HETUS 2008 classification (European Communities, 2009). In the HETUS classification, there are ten fundamental groups of activities (they are further divided into sub-groups): personal care, employment, study, household and family care, voluntary work and meeting, social life and entertainment, sports and outdoor activities, hobbies and computing, mass media, travel, and unspecified time use. For our research, we selected thirteen groups of activities from all available groups and sub-groups. We maintained the original fundamental classification of HETUS and we divided group "household and family care" into three sub-groups: housekeeping, childcare and help to an adult household member; and group "personal care" into two sub-groups: sleeping and personal care (more about the methodology of the research in Knapková and Kaščáková, 2018).

Within the survey, we questioned 1767 individuals (members of the households) and 833 households in Slovakia. We divided all acquired data into two separate databases

– database of answers from individuals and database of answers from households. We used statistical weights and we confirmed representativeness of the sample by the number of households' members and by the regions NUTS II (database of households) and by the age and gender (database of individuals).

For this article, we used database of individuals. We exported and analysed data on those individuals, who are employed in private sector (we considered main job as a sector of employment). We used SPSS software, version 19, to analyse data. We used non-parametric Chi-Square test to test representativeness, frequency tables, and non-parametric Spearman´s correlation to analyse data on employees.

In the survey, we questioned 679 respondents who are employed in the private sector (according to the employment contract). To check representativeness and accuracy of the research sample, we used data from Ministry of Finance of Slovak Republic for year 2017 (Revízia výdavkov zamestnanosti a odmeňovania vo verejnej správe, 2017). We tested representativeness of the research sample according to the age groups of respondents and according to the gender.

In the Table 1, there are data on the structure of research sample (according to the age groups), and results of Chi-Square test.

Table 1 Age groups of employees and Chi-square test; source: own processing

Age groups	Frequency	Percent	Test Statistics	
15 – 19	2,0	0,3	Chi-Square	8,153
20 – 24	32,0	4,7	df	4,0
25 – 49	455,0	67,0	Asymp. Sig.	0,086
50 – 64	187,0	27,5		
65 – 79	4,0	0,5		
Total	679,0	100,0		

By the means of Chi-Square test, we confirmed that research sample is representative and adequate according to the age groups ($p = 0,086$). In the Table 2, data on gender structure of employees, as well as results of Chi-Square test are included.

Table 2 Gender of employees and Chi-square test; own elaboration

Gender	Frequency	Percent	Test Statistics	
Male	396,0	58,3	Chi-Square	0,170
Female	283,0	41,7	df	1,0
Total	679,0	100,0	Asymp. Sig.	0,681

We confirmed, that research sample is also representative and adequate according to the gender. In the research, 396 male employees and 283 female employees were included.

3 Results

Employees represent important part of the market agents. They have several specifics comparing to other individuals (not involved on the labour market, employers, or sole proprietors). According to Slovak legislation, maximum weekly working time is 40 hours (8 hours per day). This is the time which employees dedicate for paid work, in standard situation. Their daily schedules depend on working days (usually from Monday till Friday) and free days (usually Saturday and Sunday). In the Figure 1, there are

information about the average daily time (expressed in minutes) that employees spend by various activities during the working day and during the free day.

Working Day (Minutes per Day)													
	Sleeping	Personal Care	Travelling	Paid Work	Study and Self-study	Housekeeping	Children Care	Adults Care	Free time	Cultural and Social Activities	Sport	Usage of Modert Technologies	Voluntary Activities
Mean	451,99	93,38	53,97	517,85	9,44	75,03	27,00	0,95	127,71	12,57	23,36	39,46	0,48
Std. Deviation	74,973	48,103	51,702	115,246	47,476	77,627	59,893	10,061	87,658	38,669	45,651	57,816	8,895
Free Day (Minutes per Day)													
	Sleeping	Personal Care	Travelling	Paid Work	Study and Self-study	Housekeeping	Children Care	Adults Care	Free time	Cultural and Social Activities	Sport	Usage of Modert Technologies	Voluntary Activities
Mean	556,50	100,99	4,93	6,42	7,40	216,68	51,01	4,92	198,38	120,39	101,47	59,09	4,24
Std. Deviation	94,097	55,778	20,533	50,983	32,478	145,682	112,327	26,563	121,555	129,519	110,816	79,003	33,518

Figure 1 Time Use of employees during the working day and free day; source: own processing

Employees spend in average almost 518 minutes per working day in paid work (it is app. 8,5 hours). They also spend significantly much more time by traveling (almost 54 minutes during working day and only 5 minutes in free day). On the other side, they dedicate more time for housekeeping in free day (216 minutes) than in working day (75 minutes). Employees also spend much more time by leisure time activities, cultural and social activities, and sport during the free days.

3.1 Use of time of employees according to gender

One of the important factors that influence distribution of the time of employees, is gender. In the Figure 2, there are data on time use of male employees and female employees, both during the working day and free day.

Working day (minutes per day)														
Gender		Sleeping	Personal Care	Trevelling	Paid Work	Study and Self-study	Housekeeping	Children Care	Adults Care	Free time	Cultural and Social Activities	Sport	Usage of Modert Technolog.	Voluntary Activities
Male	Mean	448,27	91,43	53,38	531,01	8,78	58,03	21,47	1,03	131,48	14,17	25,82	47,40	0,83
	Std. Deviation	72,366	46,128	49,526	114,976	49,408	70,825	50,832	11,187	88,434	41,061	49,658	64,136	11,642
Female	Mean	457,19	96,12	54,78	499,42	10,36	98,81	34,72	0,83	122,45	10,32	19,93	28,37	0,00
	Std. Deviation	78,308	50,695	54,680	113,276	44,702	80,552	70,016	8,248	86,441	34,998	39,194	45,420	0,000
Free day (minutes per day)														
Gender		Sleeping	Personal Care	Trevelling	Paid Work	Study and Self-study	Housekeeping	Children Care	Adults Care	Free time	Cultural and Social Activities	Sport	Usage of Modert Technolog.	Voluntary Activities
Male	Mean	556,37	102,15	4,96	5,22	4,98	196,38	50,42	3,57	206,87	122,52	108,43	66,20	5,83
	Std. Deviation	95,205	55,776	21,406	40,160	22,637	153,924	113,139	21,096	128,668	132,361	117,396	85,554	40,813
Female	Mean	556,68	99,37	4,89	8,09	10,81	245,16	51,83	6,81	186,47	117,40	91,71	49,11	2,00
	Std. Deviation	92,688	55,838	19,278	63,160	42,431	128,205	111,373	32,678	109,930	125,595	100,254	67,663	18,901

Figure 2 Time Use of employees according to gender during the working day and free day; source: own processing

During the working days, men and women spend almost the same time by sleeping, personal care, travelling, study and self-study, adult care, free time activities, cultural and social activities, sport and voluntary activities. Male employees spend in average 32 minutes more in paid work than female employees. It can be linked with the higher proportion of men working for 8 hours and women working for 7,5 hours (which are both standard daily working times in Slovakia). Male employees also spend significantly more time by using modern technologies (47 minutes) than female employees (28 minutes). On the other side, women spend much more time by housekeeping (almost 99 minutes) comparing to men (58 minutes). It is linked with the traditional model of division household chores within the households.

We confirmed similar distribution of the activities (time dedicated for activities) between men and women also during the free day. Of course, paid work decreases to minimum during free day (5 minutes per males and 8 minutes per females); as well as travelling. Both men and women spend more time by sleeping (app. 556 minutes for both genders), and children care (about 50 minutes for both genders). Both genders spend more

time by housekeeping, however women dedicate to these activities significantly more time (245 minutes) than men (196 minutes). On the other side, men spend more time by free time activities, sport and usage of modern technologies.

3.2 Use of time of employees according to age groups

Another factor, that influences time use of employees, is age. We divided employees into 5 age groups. Data on time use of various age groups of employees during the working day and free day are displayed in Figure 3.

Working day (minutes per day)														
Age cathegory		Sleeping	Personal Care	Trevelling	Paid Work	Study and Self-study	Housekeeping	Children Care	Adults Care	Free time	Cultural and Social Activities	Sport	Usage of Modert Technolog.	Voluntary Activities
15-19	Mean	600,00	135,00	20,00	570,00	0,00	0,00	0,00	0,00	0,00	110,00	0,00	5,00	0,00
	Std. Deviation	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
20-24	Mean	443,45	110,15	52,47	518,40	12,97	53,21	5,25	0,00	133,92	17,51	40,55	49,18	0,00
	Std. Deviation	105,313	51,858	28,557	140,175	63,596	67,817	27,498	0,000	106,730	45,032	71,846	60,748	0,000
25-49	Mean	454,04	91,77	56,38	509,63	11,41	74,30	38,42	1,10	113,11	14,80	23,91	44,38	0,09
	Std. Deviation	72,097	48,334	56,685	122,092	52,375	75,292	69,170	11,653	80,229	42,381	44,544	59,178	2,273
50-64	Mean	450,01	94,67	49,52	537,32	4,32	81,49	3,81	0,76	159,90	5,67	19,78	23,55	1,52
	Std. Deviation	72,722	46,846	41,139	90,695	28,574	84,758	18,172	6,143	90,063	24,086	42,627	48,063	16,536
65-79	Mean	300,00	60,00	10,00	510,00	0,00	60,00	0,00	0,00	300,00	0,00	0,00	180,00	0,00
	Std. Deviation	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Free days (minutes per day)														
Age cathegory		Sleeping	Personal Care	Trevelling	Paid Work	Study and Self-study	Housekeeping	Children Care	Adults Care	Free time	Cultural and Social Activities	Sport	Usage of Modert Technolog.	Voluntary Activities
15-19	Mean	600,00	110,00	0,00	0,00	0,00	340,00	0,00	0,00	0,00	300,00	60,00	30,00	0,00
	Std. Deviation	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
20-24	Mean	595,04	115,00	7,77	12,40	22,58	159,29	7,87	0,00	154,88	176,30	97,19	84,04	5,21
	Std. Deviation	95,921	61,502	28,251	79,321	60,562	107,204	31,919	0,000	114,709	139,757	88,536	82,402	34,902
25-49	Mean	557,13	97,54	5,71	7,14	8,85	201,96	71,81	3,67	178,92	130,34	103,30	62,90	3,31
	Std. Deviation	94,481	53,400	22,816	52,412	35,105	132,810	130,123	22,490	113,249	134,265	102,843	77,212	25,747
50-64	Mean	551,75	107,92	2,71	3,82	1,53	255,60	6,10	8,91	253,87	87,43	98,94	45,88	6,44
	Std. Deviation	89,066	59,825	11,277	41,406	12,287	167,696	28,927	36,194	124,953	107,212	132,516	82,139	47,543
65-79	Mean	360,00	45,00	0,00	0,00	0,00	495,00	180,00	0,00	239,00	0,00	60,00	60,00	0,00
	Std. Deviation	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000

Figure 3 Time Use of employees according to age groups during the working day and free day; source: own processing

It is interesting, that during the working day, employees younger than 20 years spend the most time in paid work (570 minutes). On the other side, employees between 25 and 49 years spend 509 minutes in paid work. It could be linked with the fact that employees in this age group usually have children and prefer to (or must) dedicate more time to them. It is confirmed by our results – employees between 25 and 49 years spend the most time by childcare (38 minutes per working day). The most free time during working day have employees older than 50 years.

During the free days, all age groups spend more time by housekeeping, free time, cultural and social activities, and sport. Employees between 25 and 49 dedicate, however, much more time to children care than other age groups (except for employees over 65 – we assume that they are grandparents and during the free days they take care of their grandchildren).

3.3 Correlation analysis

We carried out Spearman correlation to examine patterns of relationships between the age groups, paid work, housekeeping, children care and various activities within the daily time distribution. Figure 4 displays Spearman's correlations. Correlations were tested on the significance level $\alpha = 0,05$.

			Sleeping	Personal Care	Trevelling	Paid Work	Study and Self-study	Housekeeping	Children Care	Adults Care	Free time	Cultural and Social Activities	Sport	Usage of Modert Technolog.	Voluntary Activities
Spearman's rho	Age Group	Correlation Coefficient	-0,066	-0,036	-,096**	,085*	-,147**	,150**	-,156**	,098**	,278**	-,214**	-,099**	-,211**	-0,003
		Sig. (2-tailed)	0,050	0,288	0,004	0,011	0,000	0,000	0,000	0,003	0,000	0,000	0,003	0,000	0,922
	Paid Work	Correlation Coefficient	-,120**	-,135**	-0,013	1,000	-,096**	-,157**	-,118**	-0,018	-,153**	-0,036	-0,064	-,112**	0,005
		Sig. (2-tailed)	0,000	0,000	0,701		0,004	0,000	0,000	0,583	0,000	0,285	0,058	0,001	0,880
	Housekeeping	Correlation Coefficient	-,215**	-,077*	-,107**	-,157**	-,130**	1,000	-0,003	,111**	0,006	-,158**	-,236**	-,228**	-,132**
		Sig. (2-tailed)	0,000	0,022	0,001	0,000	0,000		0,920	0,001	0,848	0,000	0,000	0,000	0,000
	Children Care	Correlation Coefficient	-0,032	-,172**	0,015	-,118**	-0,049	-0,003	1,000	-0,007	-,204**	-,223**	-,102**	-,083*	-0,044
		Sig. (2-tailed)	0,346	0,000	0,648	0,000	0,143	0,920		0,832	0,000	0,000	0,002	0,014	0,191

Figure 4 Correlations; source: own processing

We confirmed both positive and negative correlations. However, most of the correlations are week to moderate. It is influenced by the extend of the research sample and relatively many individual influences on the dependent variables.

We found the strongest positive correlation between the age group and housekeeping, and age group and free time. On the other side, the strongest negative correlation is between age group and study (younger the employee more the time he/she spends by studying), age groups and cultural and social activities, age groups and usage of modern technologies, paid work and free time, children care and free time, and children care and cultural and social activities.

4 Discussion

This paper focuses on the time use of employees in private sector. These persons have specific status because they must dedicate significant part of their time to paid work. Our study offers unique data, based on the original field research on time use of Slovak households and individuals conducted in 2017. Together, 679 employees of private sector were included in our research.

Time and division of the time during the day are crucial for understanding and analysing various phenomena, such as work-life balance, time allocation (through the economic approach of utility), individual well-being and satisfaction. Time, in this case, is a scarce resource and no one can use more than 24 hours per day. We consider necessary to continue with the research of time use linked with the employees. Nowadays, work-life balance and individual well-being are becoming more and more important not only for individuals, but also for companies and institutions. Human resource managers are seeking for various motivators for employees and balancing working time, household chores and free time could be one of them.

Results included in this study can serve as unique source of information for companies (as employers), as well as for marketers and government (to understand which age groups of employees focus most on various daily activities and to prepare specific products or services for them). On the other side, our research has several limitations. We analysed distribution of the time; however, we do not focus on qualitative approach (subjective opinions of employees). Extending our research by qualitative analysis will allow us to understand the work-life balance and well-being of employees.

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References

Aguiar, M., Hurst, E. (2007) "Measuring trends in leisure: the allocation of time over five decades", *The Quarterly Journal of Economics*. Vol. 122, No. 3, pp. 969–1006.

Bittman, M., Wajcman, (2004) "9 The rush hour", In: Folbre, N., Bittman, M., *Family time: The social organization of care*, Routledge, London, UK.

Bonke, J. (2005) "Paid work and unpaid work: Diary information versus questionnaire information." *Social Indicators Research*, Vol. 70, No. 3, pp. 349–368.

Budlender, D. (Ed.). (2010) "*Time use studies and unpaid care work",* Routledge, New York.

Dahm, P. C., Glomb, T. M., Manchester, C. F., Leroy, S. (2015), "Work–family conflict and self-discrepant time allocation at work", *Journal of Applied Psychology*. Vol. 100, No. 3, pp. 767–792.

European Communities (2009) "*Harmonized European time use surveys",* 2008 guidelines

Hagqvist, E., Toivanen, S., Vinberg, S. (2019) "The gender time gap: Time use among self-employed women and men compared to paid employees in Sweden." *Time & Society*. Vol. 28, No. 2, pp. 1–17.

Knapková, M., Kaščáková, A. (2018) "Use of time in single-member households in Slovakia", *E+ M Ekonomie a Management*. Vol. 21, No. 3, pp. 40–57.

Major, V. S., Klein, K. J., Ehrhart, M. G. (2002), "Work time, work interference with family, and psychological distress", *Journal of applied psychology*. Vol. 87, No. 3, pp. 427–436.

Revízia výdavkov zamestnanosti a odmeňovania vo verejnej správe. (2018) Available at: https://www.finance.gov.sk/files/.../priebezna_sprava_zamestnanost_odmenovanie.pdf

Robinson, J., Bostrom, A. (1994), "The Overestimated Workweek-What time diary measures suggest." *Monthly Labor Review*. Vol. 117, No. 11, pp. 11–23, Available at: https://www.bls.gov/opub/mlr/1994/08/art2full.pdf

Robinson, J., Godbey, G. (1997), "*Time for Life: The Surprising Ways Americans Use Their Time",* Pennsylvania State University Press, University Park, PA.

Spieler, I., Scheibe, S., Stamov Roßnagel, C. (2018), "Keeping work and private life apart: Age-related differences in managing the work–nonwork interface", *Journal of Organizational Behavior*. Vol. 39, No. 10, pp. 1233–1251.

Thornthwaite, L. (2004) "Working time and work-family balance: A review of employees' preferences", *Asia Pacific Journal of Human Resources*. Vol. 42, No. 2, pp. 166–184.

Thriveni, K. K., Rama, D. V. (2012) "Impact of demographic variables on work-life balance of women employees (with special reference to Bangalore City)", *International Journal of Advances in Management and Economics*. Vol. 3, No. 6, pp. 226–229. Available at: http://www.managementjournal.info/index.php/IJAME/article/view/248/237

Virkebau, M., Hazak, A. (2017) "What type of research and development employees use flextime?", *The International Journal of Organizational Diversity*. Vol. 17, No. 2, pp. 1–9. Available at: https://www.ttu.ee/public/a/aaro_hazak/D17_60602_Final.pdf

Wotschack, P. (2009) "*Household governance and time allocation: Four studies on the combination of work and care",* Rozenberg Publishers, Amsterdam, Netherlands.

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Reflection of digital media and Internet influence on selected cognitive functions of students in educational process

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Abstract

The contribution deals with the impact of digital media and the Internet on education and educational process and has the character of a theoretical-empirical study. The contribution defines basic theoretical background of the studied topic from several authorial approaches and in the empirical part the results of the quantitative research are presented. The main objective of the contribution is through a theoretical reflection and empirical data to examine the current state and to specify the impact of digital media and information-communication technologies on education with a particular emphasis on the impact of the Internet and new technologies on selected cognitive functions, especially the memory and attention of students in cross-sectional research at all levels of education (primary, secondary and higher education).

Keywords: internet; education; cognitive functions; students; memory; attention; knowledge; research.

JEL Classification: I21, I22, Y10, Z00

Article Classification: Research article

1 Introduction

In addition to the great historical change, the new millennium also brought some other changes. One of the most significant is undoubtedly the mass development of communication, information and media technologies. The Internet is now understood to be an absolute commonplace of our lives. Many people, especially teenagers and young adults, cannot imagine their everyday world without this media. It can therefore be stated that the medium of the Internet is one of the most popular and used media of the present. It offers new forms of entertainment, job opportunities, instant and up-to-date information, Internet communication is constantly accelerating and the perception of time

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and space is being abolished. With new types of media (devices), such as tablets or smartphones, it is similar. Most of them already automatically submit their users the ability to connect online, either via wi-fi or, for example, via data provided by mobile operators, at any time and place, to take advantage of all the benefits of electronic media and the Internet.

We could say that today there are no formal restrictions on communication and other spheres of life that result from slowness or geographical differences. We take it for granted that we are constantly "connected" through digital technologies. It is therefore no coincidence that children and teenagers are referred to as "digital natives". These are people, mostly born after 1990,which grew up with computers, the Internet and other technological advances as a tangible part of their natural environment and living space. They represent a generation that spends day-to-day social networking, whether online with their peers or having fun. They use the Internet, new media and technology more or less since the beginning of their perception of the world. Tablets or other devices are already included in some kindergartens, and it is common to see little pupils with the latest models of smartphones. Games and activities in the nature or on the playground with peers have been replaced by digital games in cyberspace. A very important aspect is the entertainisationof life, which is greatly supported, for example, by the use of the Internet. In this context, N. Vrabec (2010, p. 84) very aptly defined the generation of digital natives as people who spend more and more time in the online world where they make new friendships, do their hobbies, acquire, sort and distribute information, communicate through diverse channels, share ideas, build their identity and participate in the life of a closer or broader community.

We consider it interesting to first clarify in this context certain connections directly related to the educational learning process and its current requirements, but which are not explicitly related to the implementation of the Internet and information and communication technologies in education but rather to the general needs of the organization and functioning of the educational institutions and the overall education process. E. Petlák (2012, p. 18) puts a number of inspiring questions with the reflection of the so-called "better school", for instance: Will it be a priority for a better school to put emphasis not on the quantity and the system of knowledge but on the development of the skills to come to the new knowledge? Will it prefer self-education in pupils' attitudes? Will it put the same emphasis on the cognitive, affective and psychomotor side of an individual?

How can an educational process be therefore defined? The educational (teaching) process is intended to inform (educate), form (tutor) and have an instrumental function. According to M. Bošnáková (2006, p. 45), who refers to the international pedagogical terminology UNESCO IBE Educational Thesaurus 1991, the educational process is a process "*in which a pupil (scholar) and a teacher (educator) enter the communication contact for the purpose of information transfer".* In the educational process, a complex personality is formed by means of performing educational elements, which uses the acquired skills, knowledge and habits as a tool to:

- obtain information from any source of information;
- internal, thought processing of information;
- use in practice at the current time, in the current context and conditions.

In this context, we may again mention the author E. Petlák (1997, p. 40), who specifies what abilities pupils should develop in the educational process:

a) ability to learn (planned, systematic and organized);
b) remember the curriculum (repeat, practice, sort...);
c) to think logically, accurately and thoroughly (analyse, synthesize, deduce...);

d) observe things and phenomena (describe the essence, objectively assess, use observation techniques...);
e) creatively approach facts (actively acquire knowledge, organise work...).

At the same time, the author emphasizes the importance of developing these abilities in contemporary pedagogy and didactics. He says that *"an ideal is no longer the pupil as a "living encyclopaedia", but as a capable and creative person who can use, combine and complement creatively the knowledge he or she has acquired".*

Z. Obdržálek (2000, p. 62) adds that the teaching process can be described as a dialectic, contradictory, complex multi-factorial and conflicting storyline that develops on the basis of causal links while being targeted. It includes the teaching activity of the educator and the pupil's learning activity, i.e. two partial processes, between which a certain tension takes place and whose roots lie in the opposite relationship between the educator's guidance and the scholars' independence. Among other things, S. Kelčíková (2012, p. 11) states that the educational process does not only focus on the knowledge side, but also lists the 5 basic functions and tasks that it performs:

1. education
2. formative (development of cognitive processes)
3. educational
4. propaedeutic (introduces new into science, thinking)
5. developing(versatile development of the scholar, orientation on his or hers possibilities).

The expansion of science and technology supports efforts to modernize the objectives, content and forms of the learning process itself. The maturity, development and width of the application of modern means of information and communication technology are becoming one of the basic criteria for the success of the society. It is therefore clear that education and the educational process are strongly influenced by the state of the development of information and communication technologies (ICT). We agree with the statement of Kozík and Šimon (2016, p. 11) that *"today's society adopts an education strategy that is designed to be supported by information and communication technologies"*. J. Maňák et al. (2008, p. 11), in the context of education, define the basic differences between the present curriculum and the expected changes in the future in the following table.

In recent decades, the massive impact of digital media and technologies can be observed in all areas of human life. Many authors (Carr, Bauerlein, Green, etc.) describe and introduce real changes and transformations in the process of thinking, perception and survival of man that are related to (excessive) use of the Internet. For example, rhizomic thinking related to the network arrangement of information in cyberspace, weakening of logical and abstract thinking, which may be the result of the dominance of images on the Internet, the decline of cognitive processes and functions (memory, attention, imagination, thinking, perception, etc.). However, we must not forget that information and communication technologies in the context of education also influence and innovate the practice – the educational process itself.

Table 1 Basic differences between the curriculum of the present and the future; source: (Maňák, Janík, Švec 2008)

Curriculum of the past and present:	**Curriculum of the future:**
Knowledge, wisdom and learning are value to themselves.	The requirement of active learning, to find self-realization in learning.
The transfer of knowledge from teacher to pupil predominates.	Emphasis is placed on creative work.
Emphasis is placed on the knowledge of subjects; relations between the subjects are not at the forefront.	The interdisciplinary approach is emphasized; relations between the subjects are encouraged.
The small relationship between "schooling" knowledge and the knowledge needed for life.	Acquired knowledge should serve to solve everyday problems; emphasis on competence.
The pupil does not have basic knowledge of economics, law and other areas necessary for life.	The pupil is led to understand the relationships and conditions of life: economics, citizen law...
The prevalence of commercialization of culture; media dominate the market.	Supporting cultural action against manipulation of citizens' awareness.
Ethical as well as aesthetic issues are disappearing from schools.	Ethical education in schools; ethical standards are required of all.

In view of the above, our intention and the main aim of this contribution was to empirically explore the current state and level of knowledge of the young generation most affected by the Internet, digital media and technology, as well as the impact of digital media on cognitive functions, especially memory and attention in the educational process.

2 Material and methods

We consider the issues discussed at the beginning of this contribution to be very topical and interesting. In the empirical study of these contexts we decided to use a quantitative research strategy. The basic tool of quantitative research was a questionnaire of our own construction, which contained several questions of various natures. The methods of analysis, synthesis, comparison, methods of statistical data processing and its testing, as well as generalization of data or their graphical representation were used to evaluate and interpret the results of research. The object of the research were students of elementary, secondary and higher education, a total of 1 786 respondents of both genders. The lower age limit was 13 years, the upper 23 years. Respondents were chosen by deliberate selection according to the features we have previously defined (varied focus of schools, level of education, personal contacts within the pedagogical choir). The selection was made first by addressing the management of selected schools. Primarily, we obtained the respondents officially on the basis of e-mail or personal communication with the directors of primary and secondary schools, to which we clarified the aim and subject of the research and, based on their consent, we distributed the questionnaires in print form through classroom pedagogues. Secondly, we obtained the respondents on the basis of personal contacts with teachers at selected schools who distributed the questionnaires during their classes, or beyond school-time. Primary and secondary school students devoted themselves to the completion of the questionnaire during the hours of media education and classroom hours. 7 elementary schools, 11 secondary schools and 1

university were involved in the research. Thus, the return on questionnaires is 92.7 %, which we consider to be a significant success.
Since the conducted research was exploratory (we examined the users' preferences for using the Internet and digital media), we do not formulate the hypothesis in this case, but the following research question:

- RQ1: What are the results of respondents from the field of general knowledge and from the area of attention and reading comprehension?
- RQ2: Is the memory, attention and concentration of respondents in the learning process affected by digital media and the Internet?

All the print versions of the questionnaires and responses of the respondents were subsequently digitized into electronic form. An electronic questionnaire was created using Google service, based on which we could accurately and thoroughly process the results. Subsequently, we converted the data into numerical form and statistically evaluated through special SPSS software intended for these operations. We have tested, analysed and evaluated the obtained data and then derived certain findings and opinions that we present in the next chapter of the contribution.

3 Results

The first part of the questionnaire was devoted to the demographic data of respondents (gender, age, level of education). The survey was attended by a total of 1 786 respondents, of whom 45.6 % were women and 54.4 % were men. The age range of respondents was 13-23 years; the average age of the survey sample was 16.74 years. In terms of descriptive statistics, the statistical age deviation is 2,532. The survey sample composed of students from different levels of education, with elementary school pupils accounting for 38 % of the total research group, secondary school students representing 44 % and university students representing 18 % of the set. Please find bellow all the relevant data in the following graphical overview.

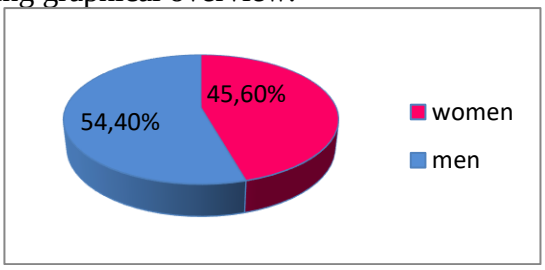

Figure 1 Gender of respondents; source: own processing

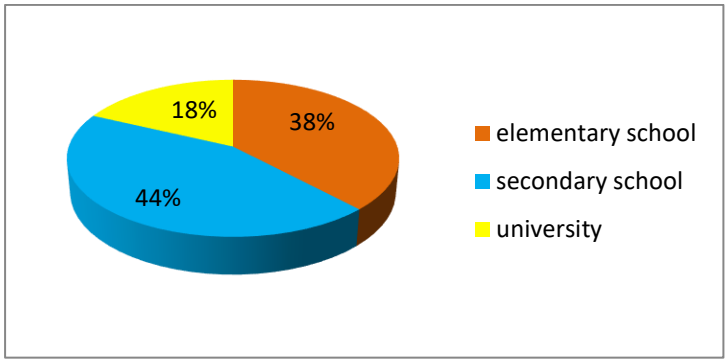

Figure 2 Level of education of respondents; source: own processing

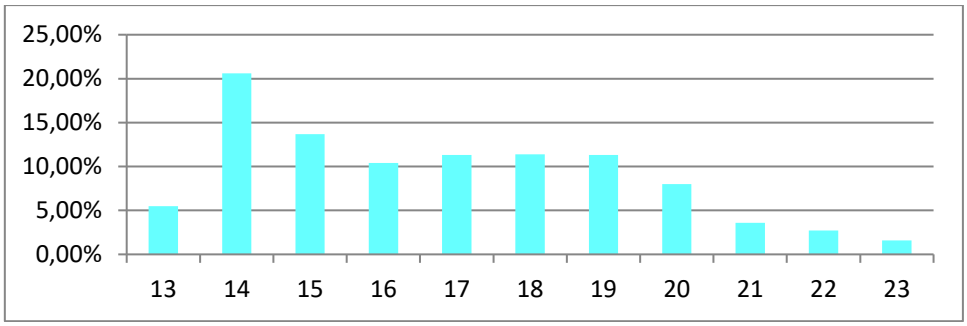

Figure 3 Age of respondents; source: own processing

Reply to research question no. 1 ***What are the results of respondents from the field of general knowledge and from the area of attention and reading comprehension?***will be described below. The questions related to the general knowledge (44-54) were evaluated by giving points for the correct answer (1 question = 1 point). In this context, we want to emphasize that the questions concerned general information and known facts that are taught in the curricula of elementary schools. The maximum score that respondents could get in this section was 11 points – if they answered all the questions correctly. Based on this evaluation method, we therefore determined the knowledge of the respondents in our research sample. The results of the research showed interesting facts. Most respondents (12.5 %) were able to answer 6 or 4 questions correctly. The second best result was a gain of seven points relating to 12.3 % of students. It is similar to the third place with the number of correctly answered questions of 3 and 5 (10.5 % of students). It turned out that less than half of all respondents (48.4 %) knew correctly answer at least half the questions and received at least 6 points. It did not delight us that almost a third of the students received a maximum of three points in the general overview, with 6.6 % of those questioned did not endorse at all – they did not answer correctly either to one of the submitted questions. Also, disappointing was that only 40 out of 1 786 respondents received the maximum score and therefore all the correct answers, representing the least – only 2.2 % of the research sample. It was similar with a 10 point gain, which reached only 4.4 % of students, representing the second lowest score of all. It was the most difficult for students to answer question no. 53, which had a mathematical-logical character and question no. 52, in which they were to rank important historical figures according to the period in which they lived. Particularly problematic was, for example, the question of the third case in the Slovak language, which holiday relates to September 1, the carnival customs, the capital of Australia, or the chemical-physical question about the atomic basic particles. The simplest was for the students to define the author of the play Hamlet, to define the years of the Second World War and the Velvet Revolution. In conclusion, the average number of points received by the respondents is 5.26 points.

In the section of knowledge research we also included question no. 55, which was mainly related to grammar and attentive reading. Respondents should indicate the *options in which sentences are written correctly*. The results did not please us, because it was the worst answered question of all, where almost 79 % of students ticked the wrong answer. This means that students were not able to reveal intentional mistakes and typos in the sentences and were not attentive to answer this question. Questions no. 56, 57 and 58 were included in the category of questions of knowledge because they are related to logical thinking, memory and reading comprehension. In general, it can be said that the most successfully answered was question no. 56 (By which phrase is travel expressed in the sentence?), where the correct answer was ticked by almost 70 % of the respondents. Question no. 57 could be described as a task – respondents were asked to write four verses

of the poem that they remember. For the correct answer, we considered the exact fulfilment of this task and we recognized only the poems that met certain criteria (e.g. decency).

Table 2 Evaluation of general overview knowledge; own processing

Achieved number of points (score)	**N**	**%**
0	118	6,6
1	84	4,7
2	118	6,6
3	188	10,5
4	**224**	**12,5**
5	188	10,5
6	**224**	**12,5**
7	220	12,3
8	164	9,2
9	140	7,8
10	78	4,4
11	40	2,2
Total	1786	100,0

Students most frequently presented the poems of Ľ. ŠtúrMarína, TurčínPoničan or Morho!. However, less than half of the research set responded to this question correctly, with only 44.6 % of the students. Significantly inadequate results relate to question no. 58, in which the respondents, on the basis of understanding a short sequence, had to determine which demonstration statement accrues from it. Only 33.9 % of those questioned answered correctly and were able to understand the text correctly, interpret the meaning and on that basis define the correct answer. Therefore, it can be summarized from the research results that two-thirds of the sample (1 180 students) have difficulty with reading comprehension.

In the following part of the contribution we present results related to research question no. 2***Is the memory, attention and concentration of respondents in the learning process affected by digital media and the Internet?***and we interpret the results of several questionnaire questions to answer it (19, 25, 26, 27, 15).

In question no. 19 we asked respondents *whether they pay attention to other activities while preparing for school*, while respondents could tick multiple answers. Even within this section a significant multitasking was showed, since more than 90% of the research sample stated that they carry out other activities in addition to preparing for school. Nearly 49% of students said that their preparation for school is also accompanied by listening to music or radio. We consider this result interesting because, according to psychologists, there is a theory that music can have positive effects on the process of concentration, if it is properly "dosed".This means that if the preparation for school is interrupted by a short musical background, the brain can "regenerate" during these moments, and after a while, intensify its performance to the learning process. However, it is important to estimate the right amount and time of listening to music to avoid the opposite – the decline of attention and the difficulty to concentrate again on the learning process. A very frequent activity is also online communication, which is carried out by 42.4% of students during home preparation for school.However, based on a number of authorial opinions, we believe that this activity is distracting and reduces student concentration in the study. Approximately the same number of respondents (18.3 %)

share their attention in addition to preparing for school between watching videos and surfing the web. Only 9.6 % of the research sample, which represents only 172 respondents, has shown no other activity and devotes attention only to preparation for school, which we consider to be a very low figure. This fact can also influence the overall level of education and knowledge that we will analyse in other research questions.

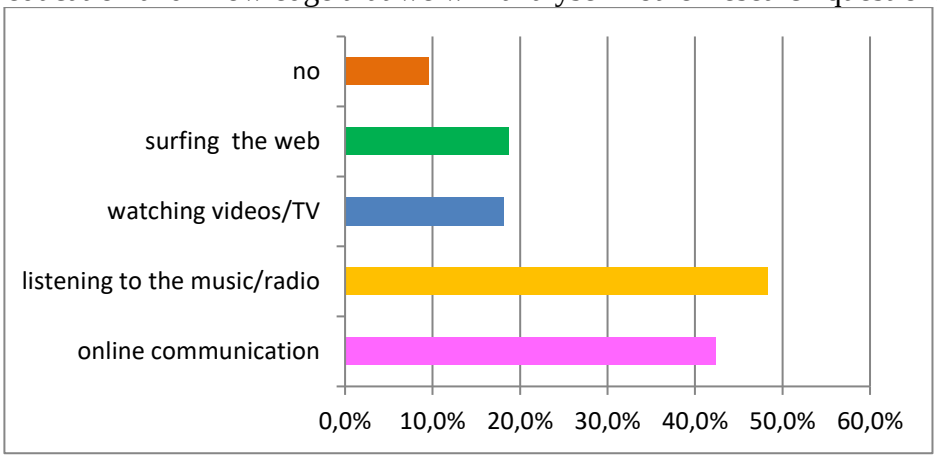

Figure 4 Influence of attention during school preparation; source: own processing

We aimed on the attention of respondents also in question no. 25, which specifically focused on using a smartphone. The model situation was as follows: It is the evening before a challenging test/exam. You still need to learn, but there are still notifications on your phone. In this context, we asked *what the respondents were paying attention to.* Only 22.5% of students do not get distracted by the smartphone during the learning process. As a result, more than 77% of respondents pay attention also to smartphone notifications, varying in intensity. Most respondents (63%) were inclined to answer "sometimes also to the phone", less than 4% even said they would not return to learning and focus their attention only on the smartphone and its notifications.

In view of this question, we were also interested in the correlation to the results of knowledge-based questions in the section of general knowledge– we therefore examined whether the fact that the attention of students in the learning process is influenced by digital media and the Internet also reflects the differences in their knowledge. To test these correlations, we used Fisher statistical significance test, which showed significant differences with regard to attention.

Table 3 Existence of significant differences in relation to q. no. 25 and general overview knowledge; own processing

test	**F**	**significance**
ANOVA (Fisher test)	12,265	0,000

Our assumption that knowledge will decrease proportionally with increasing focus attention on smartphone and its notifications in the learning process has been confirmed. The research results have shown that the best scores on knowledge questions (5.48 pts. on average) were achieved by those students whose attention is not influenced by the smartphone and they are dedicated exclusively to school preparation. On the contrary, the worst impact was on those respondents who said they would completely put aside learning and the smartphone would pull them into the world of digital media and cyberspace, with an average of just 3.64 pts. of 11. Figure 5 illustrates the results of this test very accurately and simply, where the *x*-axis represents the focus of attention in the learning process (numbers 1-4 represent the possibilities of a-d in q. no. 25) and the *y*-axis shows the average number of points from knowledge questions. The curve is rapidly

declining, the more it approaches number 4, which represents the answer "I completely put learning aside; I devote myself to the smartphone only".

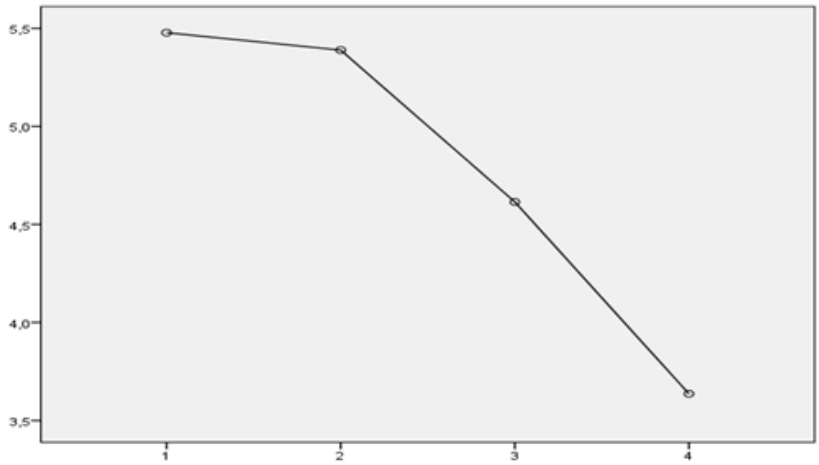

Figure 5 Attention in the learning process and its impact on knowledge; source: own processing

It is also interesting to note that at the same time, none of the students reached the maximum score; 9 were the most correct answers in this category. It is obvious that in general students did not score enough on knowledge questions due to their difficulty, as the best average is 5.48 points. Nevertheless, we can confirm that digital media and the Internet have an impact on the knowledge and education of students in the context of dispersing their attention and concentration. Please find bellow all the relevant data in the following table overview no. 4.

Table 4 Correlation of preference focus attention during school preparation and knowledge overview; own processing

q. no. 25 What do you pay attention to during school preparation? / score in knowledge (points)	**N**	**Arithm. mean**	**Interval for average**		**Min. score**	**Max. score**
			Lower limit	**Upper limit**		
definitely curriculum	402	5,48	5,21	5,74	0	11
sometimes the phone	1126	5,39	5,22	5,56	0	11
especially the phone	192	4,61	4,21	5,02	0	11
phone only	66	3,64	2,94	4,33	0	9
total	1786	5,26	5,13	5,39	0	11

In the above-mentioned model situation, we were also interested in *how much time the respondents spend using the smartphone* in the event that the phone notifications distract and draw attention away from the preparation for the exam (q. no. 26). This question can also be seen as a control one, particularly in the context of question no. 25. The results showed some differences in the number of those who say they are not distracted by smartphone. In question no. 26, only 10% of students ticked the answer "I will not take the phone into my hands until I am finished with my school preparation", while in question no. 25 more than 22% of the respondents said they payattention exclusively to the curriculum. Thus, it can be assumed that the number of respondents who focus their attention only on school preparation is around 15-16%. Nearly 49% of students use smartphones in relation to school preparation only for a short time. However,

it is also interesting to mention the respondents admitting that if they prefer the smartphone, they sometimes forget and lose a lot of time e.g. due to surfing the web or online communication – about a third of the research sample (34.8%) opted for this option. More than 115 respondents (6.6%) have declared that the learning process is disturbed – learning is completely discarded and their attention is devoted exclusively to the smartphone.

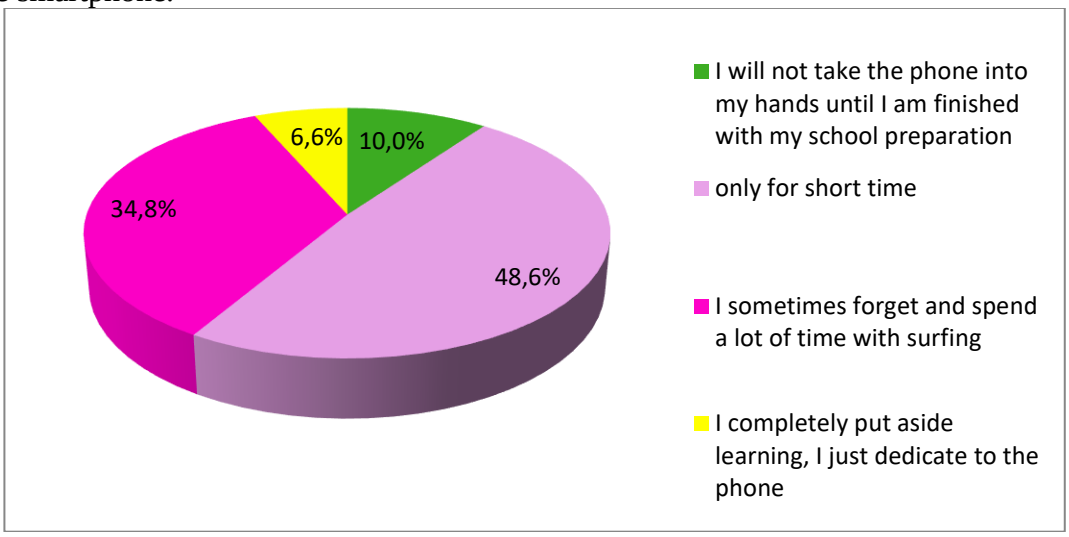

Figure 6 Using of smartphone while preparing for school; source: own processing

In relation to the impact of the Internet and digital media on the memory of respondents, we were also interested in their *attitude to the curriculum, which is not very attractive and interesting for them* (q. no. 15). In the model situation, we have indicated that, although the curriculum is less interesting, they need to remember and learn as much as possible. The research results were extremely interesting, as only 14.7% of students said they are trying to remember and learn everything – that is, also curriculum that is not attractive to them. This attitude can be seen as conscious, because in the future, many lessons that have not been attractive in school times can be helpful, sometimes they may be even necessary.Almost 47 % of respondents said in this context that they would try to overcome and learn such – not very interesting – curriculum. More than 38 % of the respondents showed a negative attitude and said they rely on searching of such topics on the Internet if they needed them by ticking the answer "if I need something, I will Google it". Their attitude reflects not so right approach to acquiring knowledge and education, as they do not build on their own knowledge but rely on internet search engines. However, they are not always able to present the essential – contexts. This is confirmed by the views of several authors exploring the impact of digital media on education – people will know where to look, but they will not always get the information and connections they are looking for.

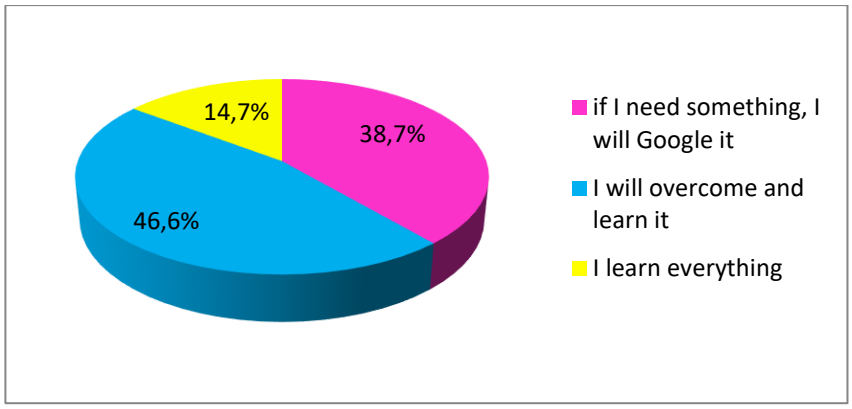

Figure 7 Attitude to less interesting curriculum; source: own elaboration

In relation to this question, we have decided to test whether there is a relationship and differences with respect to the respondents' knowledge. We were detecting whether their attitude also reflects the knowledge of the general overview in some way. For testing, we used Fisher test, which proved to be significant with a value of 0.035, with significant results being data up to 0.05.

Table 5 Fisher test of statistical significance with respect to q. no. 15 and knowledge; own processing

	the total value	**F**	**significance**
between groups in q. no. 15	53,924	3,346	0,035

Table 6 Correlation of preference focus attention during school preparation and knowledge overview; own processing

q. no.15 Attitude towards an uninteresting curriculum / score in knowledge (points)	**N**	**Arithm. mean**	**Interval for average**		**Min. score**	**Max. score**
			Lower limit	**Upper limit**		
if I need anything, I will Google it	692	5,05	4,84	5,26	0	11
I will overcome and learn it	832	5,43	5,24	5,62	0	11
I learn everything	262	5,30	4,92	5,67	0	11
total	1786	5,26	5,13	5,39	0	11

The results were very interesting because they showed that there was a significant relationship in this respect. We found that those students who answered in q. no. 15 they do not learn the curriculum that they do not like and if they need it later they will use Google, have achieved a lower average score (5.05 pts.) on knowledge questions than those who will overcome and will learn such curriculum (5.43 pts.). At the same time, it was shown that although students who said they willlearn everything did not reach the highest average score, however, they reached the highest score within the upper limit of the points earned (5.67 pts.). Figure 8 illustrates the present findings accurately and simply, wherein on the *x*-axis the numbers 1, 2, 3 represent the answers a, b, c in q. no. 15 and the *y*-axis shows the average number of points achieved in the general overview.

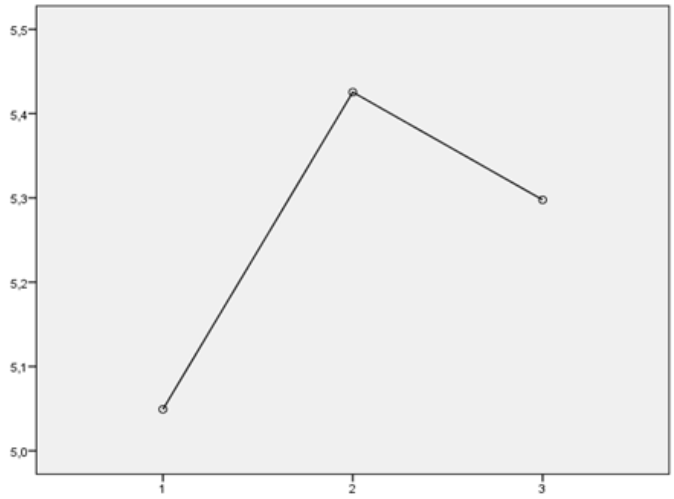

Figure 8 Attitude to learning and its impact on knowledge; source: own processing

In question no. 27 in the context of the digital media's influence on the learning process we were detectingwhether the respondents *think their learning outcomes are influenced by the time spent chatting and having fun on the Internet and to what extent.*Only less than 32% of students said they believe that digital media and the Internet do not affect their study success in any way. Most respondents, almost 47% said that they *sometimes* feel this impact. More than 14% of respondents agree with the fact that spending time on the Internet *often* affects their learning outcomes. Approximately 130 respondents from the research group ticked that they perceive the impact of digital media and the Internet on school results and performance*almost constantly* or even *constantly*.

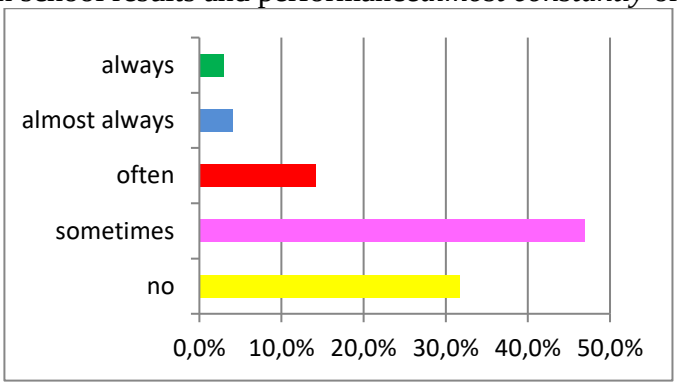

Figure 9 The impact of the Internet on learning outcomes; source: own processing

4 Discussion

In the next section we present a brief summary of the most interesting results of the examined issue:

RQ1: What are the results of respondents from the field of general knowledge and from the area of attention and reading comprehension?

- Most respondents (12.5 %) were able to answer 6 or 4 questions correctly. 7 pts. of a maximum of 11 pts. obtained 12.3 % of students, 10.5 % of respondents correctly answered 3 or 5 questions. Less than half of the respondents (48.4 %) were able to correctly answer at least half of the questions, almost a third of the students received a score of three points in the general overview, with 6.6 % of those questioned did not endorse at all (0 pts). Only 40 out of 1 786 respondents received the maximum score and therefore all the correct answers, representing the least – only 2.2 % of the research sample, only 4.4 % of students gained 10

pts.;
- the most difficult was the mathematical-logical task and the historical context, the author of the play Hamlet and the years of the Second World War were the simplest;
- higher average scores were achieved by those students who also use the Internet for education by 0.62 pts.;
- the worst answered question was focused on attention and grammar (79 % incorrect answers), but it was answered the best by those students who spend the least time on the Internet (if they are online only 1 hour a day, the number of correct answers is almost 40 %, if they are online 4 hours a day, the number of correct answers is only 19.1 %);
- insufficient results were demonstrated also in terms of reading comprehension, where only 33.9 % of the respondents answered correctly. Only 44.6 % of the students responded correctly to the memory task, while it is also true that students who spend least time on the Internet were able to solve it better (about 54 %), but only 39.8 % of students who are online for more than 4 hours a day could answer correctly.

RQ2: Is the memory, attention and concentration of respondents in the learning process affected by digital media and the Internet?
- Yes, because more than 90 % of the research sample reported that they are carrying out other activities in addition to school preparation, almost 49 % listen to music or radio while learning, 42.4 % chat, 18.3 % surf the web and watch videos;
- only 22.5 % respondents will not be distracted by the smartphone during the learning process, others also pay attention to its notifications;
- the respondents who are not influenced by digital media notifications and who are exclusively devoted to school preparation (5.48 pts.) have gained a better knowledge score, while students who succumb to them have received an average of only 3.64 pts. in the knowledge overview => attention and concentration is affected;
- more than 38 % of respondents rely if needed on the search for information on the Internet and if they do not like the curriculum, they do not learn it – but these students received the lowest average score (5.05 pts.) as opposed to those who overcome and learn the curriculum (5.43 pts.) => memory is affected;
- only 31.7% of students do not report the impact of the Internet and digital media on learning outcomes, but most – almost 47 % of respondents said they sometimes or often feel this impact (14.7%).

It can be said that nowadays, the Internet, smartphones, digital media and technologies have become an absolute commonplace of our lives. Especially children and young people are growing up with them more or less from childhood, and they often can control or use them better than their parents. Therefore, the present contribution reflects the current state of knowledge and influence of the Internet and digital media especially on the memory and attention of students of primary, secondary and higher education.
The Internet is becoming an epicentre of change, the extent and depth of which cannot be reduced to technological progress. It ceased to be a victor and became the cause of a fundamental social break. We believe that the Internet and new media is the engine of the new paradigm of human education, thinking and perceptions of the world. It can be

concluded that we consider the subject and research results to be highly up-to-date and remarkable, and it will be interesting to see what developments, changes and forecasts in these contexts and areas can be recorded in the future.

References

Bošnáková, M. (2006) "*Základy pedagogiky"*, Vysoká škola zdravotníctva a soc. Práce sv. Alžbety, Bratislava, Slovakia.

Kelčíková, S. (2012) *"Edukačný proces"*, Available at: https://portal.jfmed.uniba.sk/download.php?fid=447

Kozík, T., Šimon, M. (2016) "*Vzdialené experimenty v edukácii",* Univerzita Konštatína Filozofa v Nitre, Nitra, Slovakia.

Maňák, J., Janík, T., Švec, V. (2008) "*Kurikulum v současné škole"*, Paido, Brno, Czech Republic.

Obdržálek, Z. (2000) "*Didaktika pre študentov učiteľstva základnej školy"*, Univerzita Komenského, Bratislava, Slovakia.

Petlák, E. (2012) "*Inovácie v edukačnom procese",* Dubnický technologický inštitút, Dubnica nad Váhom, Slovakia.

Vrabec, N. (2010) "Digitálni domorodci na Slovensku: komunikácia a nová identita mládeže v on-line prostredí", *Communication today*, Vol. 2010, No. 1., pp. 83–93.

Corporate culture as one of the factors of global management in multinational corporation

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Abstract

Among one of the most used ideas belong presently clearly ”globalization“, with which there are connected not only political, economic and environmental, but also cultural pressures to the business subjects. Process of their management at the national, but mostly at the international level, consists of connection of factors, resulting from globalization, which become necessary assumption of success and competitiveness. Although successful multinational corporations include standardly mentioned aspect to their managerial tools, new rising multinational corporations continue many times in underestimation of importance and power of the factor. Contribution solves mutual interaction of business cultures in the process of corporations' mergers with regard to the organizational structure and identification of problems, rising during the merger. Contribution underlines also influence of global management and process of mutual acceptation of two business cultures and understanding of reasons that lead to the successful merger of corporations from the view of global management.

Keywords: corporate culture; globalization; management; multinational corporation.

JEL Classification: F23, M14, M16.

Article Classification: Research article

1 Introduction

Due to the rapid growth of Technologies, speeding up of the processes in production, as well as in transport, increasing of information dissemination and growth of consumed way of life, the idea of “globalization“ becomes phenomena number one in economy. But globalization is not only single economic idea, but vital process that

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companies are using, but not managing. For example according Kislingová (2005) it means "*process of integration of economic activities that connects production and markets of various countries through business with goods and services, capital and information transfer and it mutually connects nets of ownership and management of multinational corporations*". Business and production companies have many times multinational character, reflecting in creation of big global or multi-national companies with following characteristics:

- Acting in more than one country,
- Ability to use geographical differences between countries,
- Geographical flexibility, ability to move its activities across whole world.

To be able to act in a broad extend, global companies must establish managing and information processes the most effectively, to establish authority and responsibility exactly and to find the most effective model of organization structure that would be dependent on the type of business and management. Not every economy in the world is prepared for the penetration of global corporations; therefore, their influence is negatively influencing national economy. Countries that are separated from the globalization process have only very few protection mechanisms, by which they could face or at least limit not demanded economical amplitudes and crises without presently not demanded strengthening of regulation and business limitation.

Globalization is a process of growth of international connection to all areas (economy, policy, culture, communication, living environment, etc.), observed mostly in last decades. Its extreme interpretation marks globalization also as sophisticated capitalism that wipes away local traditions and regional differences and it creates homogenized world culture. It is immediately connected all of us as individuals, but also social units, as for example families, communities and whole society. Consumption of unified products increases and by this way also pressure to the cultural identity suppression.

In time of globalization countries are mutually financially connected and economically dependent. Economically strong companies try to decrease their costs and to increase their production by developing of their activities in various countries at various continents. There is therefore rising centralization and unification of logistic purchase, sale and financial activities from companies in various countries to one place. Penetration of capital to other countries demands environment knowledge, its economic, cultural, political and technological parameters.

Companies are presently in situation when the change presents necessary everyday task. Such companies that do not accept changes and do not adapt their business model to these changes are moving towards failure. Situations, which influence the way of business operation positively or negatively, are called as "factors of environment." Those are generally distinguished as external (heavy predictable and not influenced by company) and internal that can be influenced and managed by company.

One of the factors of global management of a multi-national company is also company culture, which will be dealt in the contribution. Presently, in time when companies are penetrating to other regions of the world to extend their business activities, the task of culture differences and their mutual influencing, should be one of the leading themes.

2 Present state of problem solving

Economically strong companies in afford to decrease their costs and to increase production, develop their activities in various countries in various continents. There is

therefore rising centralization and unification of logistic purchase, sale and financial activities in companies from various countries to one place. Penetration of capital to other countries demands environment knowledge, its economic, cultural, political and technological parameters.

Pitelis (2000) defined multi-national companies as organizations that own or manage production or services in one or more countries. From this results moral, legal and managing problems of multi-national companies that significantly reflected at the end of 20th Century. Ulrich (1998) defined the need of balance, coordination and control during observing of autonomy in management of global corporations. He defined six principles that are according to him very necessary for successful integration of global and local activities, which are as follows:

- Ability to determine, which activities are key and which are not,
- To achieve consistency, basicity and identity, but also to enable flexibility,
- To achieve identity at a producer of world brands, but also to respect local customs,
- To achieve whole effect (the higher the better), but also to concentrate at the details (the smallest the better),
- To share existing knowledge and to establish the best processes,
- To practice a global point of view, but also to provide local responsibility, "*Think globally, but act locally.*"

From the view of own internationalization, there is very necessary strategy of multi-national business, either from the view of cost decreasing, risk diversification, growth possibilities, global integration or local reaction, etc. Expert literature knows four types of strategies, mainly: international, multi-national, global and transnational (for example Daniels, 2007; Csikósová et al., 2015). Companies that try to minimize their cost, increase effectiveness of production and obtain market advantages over competition, begin to penetrate to other countries to other business markets, to other economies and business traditions by the way of acquisition or mergers.

In expert literature there is different categorization of individual types of merges, while there is no single interpretation. Some authors know "a merger" as any connection of companies, others know also other form of mergers, mainly "consolidation" and "acquisitions". Difference in the ide of companies merges is in the way how to perceive difference of legal adjustment of individual countries. But the most common definition result from the American legislation. Merger of companies means connection of one or more companies, or other business subjects to one business subject with aim to achieve bigger effectiveness and productivity. Connection of two companies is in Slovakian legislative limited by idea "concentration" in accord with Law No 188/1994 about protection of economic competition.

In expert literature there is number of reasons, respectively aspect of how the companies are merging. The motives are different according to the type of the connected companies. According to Slávik (2005) the basic task „Why?" companies make strategic connection, does not have clear answer. Motives of connection are divided to:

- Offensive – it means ambition of the company to expand „voluntarily", to increase its market rate without demanding by competition environment,
- Defensive – resulting from the fact that company is pressed by competition environment to acquisition creation or merger with aim not to finish business activity as object of its competition interest.

Except of mentioned acquisition activities are many times led by personal interests of top managers that see the way in successful acquisition or merger to fame and recognition.

According to Yaakov (2013) research studies show that measure of acquisition failure is around 50%. In researches made before 2013 yet 83% of companies did not fill the goals of mergers. We could assume that managers fill not support mergers or acquisitions, but they will try to find strategies for achievement of market rate, profitability and goals achievement. But reality confirms something else. Trend of mergers and acquisitions during last 20 years is increasing, reasons of mergers failure results from the fact it is easier to purchase the big company, the more heavy is to manage the big company. Majority of failure factors show lack of managerial knowledge to use managerial tools for management that will enable to treat with known problems of mergers. Success of acquisitions and mergers depends greatly on the fact, if companies have skilled, professional and culturally emphatic managers, knowing the languages, which could help companies' integration and manage their management.

According to analysis of 150 mergers, 50% failed and 33% had only marketing contribution. Acquisitions have similar results. Around 50% of acquisitions are over 5 years of existence perceived as not successful, which means they did not achieve determined goals. The main reason of the failure is determined by Lukášová (2010) as management failure, confounding and forgetting the problems, resulting from different cultures.

Perceiving of mutual culture integration is base of successful business. Bad perceiving or underestimation of existence of different cultures led (and can lead) in many cases to business failure. Research and case studies of the companies that changed their culture successfully confirm that chance of success increase by using of following six steps (Schein, 2004):

1. To create sense of change necessity,
2. To change managers and key stakeholders,
3. To model the roles,
4. Trainings, supporting the change,
5. To change system of rewarding,
6. To create new symbols and stories.

Authors that search corporate culture (Deal and Kennedy, 1982; Denison, 1990; Cameron and Quinn, 2006; Lorincová et al., 2016; Kachaňáková, 2014; Antošová, 2010; Lukášová, 2010; Schimmoeller, 2010; Mitrovič et al., 2014, Vetráková and Smerek, 2015, etc.) have the same idea that business culture is specified and its forming must be dealt by sufficient attention from the side of management. Corporate culture is many times product of values of business founder, its history and collective experiences. Therefore, culture is the part of business characteristics, as well as obstacle for changes. Number of companies perceives that their present culture is an obstacle for increasing of organizational productivity and performance, mainly in case there is misbalance between values of the business and environment demands. It is very important during creation of multi-national company due to the acceptance of an effective way of management. Companies by the change of their culture react to the changing conditions of the business environment to be more competitive.

3 Results

Multinational companies, coming to Slovakia are regularly financially strong companies with rich history and skills. Many times they come to revaluate their financial investments, to increase production effectiveness and to decrease the cost. By input to Slovakian business environment, they create new working posts directly in their services and indirectly on the side of their suppliers. By this way they help economic growth and

growth of living standard in Slovakia. By volume of investments and creation of working posts, resp. observing of employment, they influence the region economically. In case of big employers, as for example Volkswagen Slovakia and U. S. Steel Košice, s.r.o., economic and social influence with impact to the economy of whole Slovakia is reaching over the boundaries of the region. Multi-national companies enter to the business environment in Slovakia mostly by two ways:

- Construction of new company on the green field (for example Kia Motors Slovakia, PSA PEUGEOT CITROËN Slovakia, etc.),
- Purchase of the business/merger (for example U. S. Steel Košice, s.r.o., Slovnaft, a. s., Slovenské Elektrárne a. s., etc.).

Realized research had been orientated to the analysis of chosen factors of the internal environment of multi-national companies, acting in Slovakia, mainly: Kia Motors Slovakia, Volkswagen Slovakia, a.s., PSA Peugeot Citroen Slovakia, Slovnaft, a.s. a U.S.Steel Košice, s.r.o., which had been lately compared. Among chosen factors of management belong corporate culture (including history and values), organization structure and its changes, development of employment (including expatriates), change of age structure of employees (especially of managers), internal communication, control mechanisms, job security (injuries), administration of personal changes by modern ICT.

One of the research outputs is identification of advantages and disadvantages of multi-national businesses, acting in Slovakia. From the research following advantages and disadvantages result, presented by Figure 1.

Advantages	**Disadvantages**
- Existing connections to business environment in the region, - Interesting market, clients and consumers, - Processes in new company are clean, bearing not deforming due to the age of the company, - Qualified, skilled personnel, - The owner is from the beginning establishing corporate culture according to its values and ideas, - New equipment with high effectiveness and quality, - Establishment of single information system, - Obtaining of licence during establishment of the business, - The region accepts made business activity, in spite of burdening the living environment.	- Existing corporate culture is not according to idea of a new investor, - Introduction resistance of employees, connected with fear of changes, - Processes in the company are characterized by history, they are less effective, - Over employment in the company, - Lack of qualified working power in the region, - High average age of employees, - High costs for initial training of employees, - Old technology with not demanded impact to the living environment, - Necessary investments for quality providing, - Lack of suppliers in the region, - Possible resistance of the environment in case of ecologic impact to the environment.

Figure 1 Advantages and disadvantages of multi-national companies in Slovakia

From the realized analysis we resulted from influences of the parent company of multi-national company acting in Slovakia. Their impacts had been identified yet in first year after business acquisition with increased emphasize to:

- Job security,
- Establishment of control mechanisms,
- Internal communication and determination of optimal information flows,

- Centralization of managerial activities and change of organization structure,
- Reduction of working posts,
- Optimization of production, maintenance and service processes,
- Permanent pressure to the costs decreasing.
- Establishment of programs for permanent improving and sustainable development.

Any of mentioned areas are significantly contributed to the forming of corporate culture. Analysed companies are gradually changing from the view of organization structure, thinking of employees, determination and perceiving of priorities, management, working habits, etc.

In cooperation with advisory business Deloitte, we also did a research of Global Human Capital Benchmarking 2016 at the bigger sample of multi-national companies, acting in Slovakia. Due to the maintaining anonymity, we do not mention the name of the companies. From the research results and due to the mentioned areas of management, results following:

- The most purchased areas of service Outsourcing:
    - Human sources (wages agenda, personal administration, recruitment and selection of the staff),
    - finances (accounting, taxes),
    - information Technologies (web design, support and help desk, support of applications, ICT development, local support of station administration, operation of special ICT components),
    - legal services,
    - consumers' services (call centrum),
    - marketing and creative services,
    - health care of employees,
    - job security and hygiene (Deloitte, 2016).
- The most centralized areas are:
    - human sources,
    - finances,
    - legal services,
    - information technologies,
    - purchase and material providing (Deloitte 2016).

From the mentioned we can state that services that are in companies most centralized, have potential to be outsourced and purchased. The reason lies in standardized or routine way of activities performing. Centralization of activities and creation of centres of shared services is first steps toward outsourcing. Similarly, through standardization and centralization of financial and accounting processes and integration of various ICT systems to one platform centres of shared services can help to decrease number of employees. The other form of costs decreasing in the company could be transforming of these activities to other country, where there is cheaper working power (so-called offshoring).

4 Discussion

At the mergers there are meeting two or more various corporate cultures. From the view of management and effectiveness of information flows top management enters to mutual interaction from the beginning. At this level of management mutual interaction of cultures cannot be avoided, therefore, there is necessary to obtain the trust of the

management and to obtain key managers, which will know corporate culture, legislation and have contact to external environment. In next period they can help during distribution of rules and changes enforcement. At the lower level of management, there is gradual change of corporate culture and at the beginning the change need not to be perceived. On the contrary, at the big pressure at the beginning of the corporate culture at the level of employees there is a high risk of failure. Proper process presents for example change of motivation system in the company.

Problems with culture need not reflect only during the merger of the companies, but they can be a barrier also during increasing of productivity and performance of the company, mainly in case there is misbalance between values of the company and demands of the environment.

On the contrary, certain advantage for multi-national companies can be building of the business at the green field in other region of the world, when there is assumption to evaluation investment. Such companies can build their culture from the beginning, and they need not to fight with change and resistance of the environment in case of region culture regarding.

Change of corporate culture brings also certain risks, since change of values creates many times sense of threatening. It connects also with accompanied phenomena, as for example high fluctuation, decrease of work productivity, not effective using of working time, problematic relations of people at work place, unfit communication between departments, not effective work meetings, not proper organization structure, excessive number of management levels, various reflection of employee's dissatisfaction, etc. Experiences with change of corporate culture in analysed companies can be overcome by following measurements:

- to build new corporate culture there is necessary to regard elements of existing one,
- there is necessary to regard employees, they need to know the change is very profitable for them,
- change of corporate culture must be supported by change of motivation system, including of various forms of benefits,
- to establish rules for the change process and to support them by internal documentation,
- there is necessary to formulate and build a file of values, at which company will build with aim the employees will be satisfied and accepting the contribution and importance of the changes,
- in case the basic changes in the company are not necessary for increasing of performance, there is proper to realize the changes gradually.

The process of changes in management of multi-national company should be after perceiving of corporate culture and environment, in which company starts to operate.

5 Conclusion

Companies are trying in global competition to achieve still higher performance. By comparing of world brand they improve permanently their processes by the way to not backslidden from the view of effectiveness. Under permanent pressure to decrease their costs and to obtain new markets, they try to find possibilities for investing in other countries, and by this way multi-national companies arise. Success of business in various world localities brings certain risks, connected with acceptance of the business in given country, which depend on perceiving of value of the environment, in which the business

starts. Such values result from the region culture and living standard of the given environment.

Any company is first of all about people, employees that create the values and bear whole corporate culture. Culture can be perceived as a way how people cooperate, how they support achievement of business goals, how the company attract new people and how it maintained qualified employees, as well as how it attracts consumers. Last, but not least is corporate culture, which should help to realize business strategy. Therefore, there is necessary to give attention to corporate culture, mainly during changes in company management. Successful managing of changes demands from the beginning communication with employees, which will be effected by the change and the company needs them also in the future. Not informed or bad informed employees sense threatening and company could lose them. In case of not successful change, there can be situation, when performance and quality will decrease with resulting in loss of clients. Instability of processes, caused by changes, can cause fear also of suppliers. It is up to managers to be prepared for such changes and to manage the changes by the way to decrease their competition.

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References

Antošová, M. (2010) "Human resources management and organizational development as a basis for the knowledge management", *Acta Montanistica Slovaca*. Vol. 15, No. 1, pp. 90–95.

Cameron, K., Quinn, R. (2006) "*Diagnosing and Changing Organizational Culture. Based on the Competing Values Framework",* San Francisco, Jossey-Bass.

Csikósová, A., Mihalčová, B., Antošová, M. (2015) "*International business",* Ostrava, VŠB-TU of Ostrava, Czech Republic.

Daniels, J., Radebaugh, L., Sullivan, D. (2007) "*International Business: Environment and operations",* Prentice Hall.

Deal, T., Kennedy, A. (1982) "*Corporate Cultures: The Rites and Rituals of Corporate Life",* Reading. Addison-Wesley Publishing.

Denison, D. R. (1990) "*Corporate Culture and Organizational Effectiveness",* New York, John Wiley & Sons.

Janošková, M., Bardiovský, G., Ondrík, B. (2016) "Improving the quality of human resources services in the steel company through modern information technologies", *Quality - Access to Success,* Vol. 17, No. 155, pp. 120–124.

Kachaňáková, A., Stachova, K. (2014) "Present state of organisational culture in Slovakia", *Economic Annals-XXI*. Vol. 3-4, No. 1, pp. 35–38.

Kislingerová, E., Nový, I. (2005) "*Chování podniku v globalizujúcim se prostředí",* C. H. Beck, Praha, Czech Republic.

Lorincová, S., Hitka, M. Balážová, Ž. (2016) "Corporate culture in Slovak enterprises as a factor of HRM quality – Case study", *International journal for quality research*, Vol. 10, No. 4, pp. 719–732.

Lukášová, R. (2010) "*Organizační kultura a její změna",* Grada, Praha, Czech Republic.

Mitrovič, S., Grubic-Nesic, L., Milisavljevic, S., Melovic, B., Babinkova, Z. (2014) "Manager's Assessment of Organizational Culture", *E + M Ekonomie a Management*. Vol. 17, No. 3, pp. 35–49.

Pitelis, Ch., Sugden, R. (2000) "*The nature of the transnational firm",*. Routledge.

Schein, E. H. (2004) "*Organizational Culture and Leadership",* Jossey-Bass, San Francisco.

Schimmoller, L. (2010) "Leadership Styles in Competing Organizational Cultures", *Leadership Review*, Vol. 10, No. 3, pp. 125–141.

Slávik, Š. (2005) "*Strategický manažment",* Sprint, Bratislava.

Ubrežiová, I. (2017) "Practical experience of the international business management", In: *7th International Scientific Conference on Managerial Trends in the Development of Enterprises in Globalization Era, 2017*, SUA Nitra, Slovakia.

Vetráková, M., Smerek, L., Seková, M. (2018) "Approaches of multinational companies to the Human Resource Management in their subsidiaries in Slovak Republic", In: *31st International-Business-Information-Management-Association Conference*, Milan, Italy.

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CSR as a part of vocational training of project managers in Slovakia

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Abstract

The paper gives the overview on the research of vocational training of project managers in the spectre of the project management standards in the small, medium and big enterprises in the Slovak Republic. Authors of the paper state why it is so important to involve the Corporate Social Responsibility into the training curriculum for project managers in the companies as a part of building environmental and social responsibility. Study included in the paper consists of quantitative and qualitative research of selected small, medium and big enterprises in the Slovak Republic, focused on questionnaire survey. Data retrieved from the survey have been processed by advanced statistical methods. The method of artificial neural networks (ANN) was used to identify influential variables. Critical analysis is being used to identify specific tools of using CSR in the system of vocational training of project managers within selected subjects. The paper brings empirical evidences how locally based companies have been approaching to vocational training of project managers and how they involve the CSR into the curricula of training. The project manager's role is becoming more and more important and, in addition to their routine activities, employees are also a Project Manager, which is in 41% of the businesses surveyed. 18% of the project managers expressed their self-criticism that project management in their company needs to be improved in view of future needs and one of the most important areas for education is CSR. Complications due to underestimation of the importance of project management and project risk management and CSR could be avoided and minimized if they had better prepared and educated project managers. More than 50% of the businesses surveyed use external forms of education. This paper includes list of recommendations for local firms based on best practices abroad, with aim to increase the vocational training of project managers and CSR effect.

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JEL Classification: M13, M14, O22, H430

Article Classification: Research article

1 Introduction

We live in the world where the global production and population have had significant impact on the environment from the past until today. Modern technologies, processes and lifestyle in the recent years had influenced our lives in fast positive way. Unfortunately, every coin has two sides. The tax for our modern lifestyle is weakened environment we do live in. In the recent years, modern, ecologically oriented subjects are focusing on environment improvement, with aim to develop modern present and preserve the environment at the same time. New strategies and policies are being adopted in more and more modern companies, with goal to provide green and sustainable products to their customers (Chovanová & Szwajca, 2018).

Corporate Social Responsibility (CSR) is currently accepted as a fundamental issue that companies need to address to ensure their sustainable development and their competitive advantages. Successful companies balance economic and social goals by integrating social interests into their strategies (Porter, 2006; Chang & Yeh, 2017). Businesses now integrate corporate social responsibility into their business values by default and integrate them into their processes (School, et al., 2008; Fabuš, 2018). Corporate social responsibility can also be understood as a benefit for the local community and region, as well as represents a new dimension of regional development. It is externally manifested in the creation of higher quality social relations with individuals, social groups, local governments which can contribute to the accumulation of social capital of local communities (Ubrežiová & Mura 2017; Szwajca 2013).

The growing interest in CSR projects among companies is also evident, among other things, from a large number of organizations participating in research that assessed their performance within CSR (Chabowski et al. 2011). Also, the BCG study conducted by employees of globally operating companies found that up to 70% of participating companies have consistently implemented CSR in corporate governance (Reeves at al.,2012). As Caputa (2015) mentioned, the foundation of the relationship, in which the customer becomes an active participant of exchange, is customer's emotional engagement, which finds its reflection in, among others, launching a one-way of two-way information transfer, what could be the way to effective projects CSR.

Project management is undoubtedly one of the main themes in most organizations. Project management serves as a very valuable application platform not only for the business innovation process. Currently, projects are very diverse and can have different goals, needs, and requirements. Projects are often utilized as a means to achieve an organization's strategic plan (PMI, 2018). In fact, project portfolio management is the manifestation of the business's strategy (Cooper et al, 2001). Therefore, project management allows turning today's objectives into something real in the future. Furthermore, they are the meeting point between the present and the future of companies as they implement their strategies through their project portfolio.

To identify competencies and highlight aspects relevant to the development of the project management competencies, various project management institutions have developed guidelines, frameworks or standards. Examples of these institutions include Project Management Institute (PMI), which created the Project Management Competency Development (PMCD) project, the International Project Management Association (IPMA), which has created an individual competence base for project program and portfolio management (ICB). The Project Management Association (APM), developed by the APM Competence Framework (ACF), and the Australian Project Management Institute (AIPM), which has developed Project Management Competency Standards. The role of project managers' competencies together with organizational competencies is therefore essential to improve project performance. Some knowledge, skills, and competencies have proved important for the success of all projects, regardless of project size or complexity. These include participation, documentation, implementation, development, quality assurance process maintenance, critical thinking, project evaluation, communication, leadership and flexibility (Gallagher, Mazur, & Ashkanasy, 2015).

According to the State of the Heart (2016) survey, emotional intelligence becomes the most desirable skill for new project managers. This survey found that managers who use their emotional resources to support "engagement" deliver significant results to their employers - customer loyalty is more likely to be up to 56%, 38% more likely to achieve at least average productivity, and 27% more profitable.

2 Material and methods

Study included in the paper consists of quantitative and qualitative research of selected small, medium and big enterprises in the Slovak Republic, focused on questionnaire survey. Data retrieved from the survey have been processed by advanced statistical methods. The method of artificial neural networks (ANN) was used to identify influential variables. Critical analysis is being used to identify specific tools of using CSR in the system of vocational training of project managers within selected subjects. The paper brings empirical evidences how locally based companies have been approaching to vocational training of project managers and how they involve the CSR into the curricula of training.

Two hundred fifty companies have been interviewed by online questionnaire with eight questions about the CSR practise and project managerial tools in the company. We obtained 159 fulfilled questionnaires. Five questionnaires were excluded for reasons of incomplete answers and errors in completing the questionnaire.

For identifying the profile of questioned companies by turnover (see Table 1) we used five-step range of options. In the group of small companies the most frequent turnover is lower than 2 mil. EUR (69). In the group of middle sized companies the most frequent turnover was from 3 to 10 mil. EUR. We obtained 28 questionnaires from big enterprises and most frequent turnover was more than 201 mil. EUR.

Table 1 The profile of questioned companies by turnower; own processing

	<2 mil.EUR	3-10 mil.EUR	11-50 mil.EUR	51-200 mil.EUR	>201 mil.EUR	Total
Small	69	13	3	0	0	85
Medium	9	16	13	3	0	41
Big	4	2	5	7	10	28
Total	82	31	21	10	10	154

We interviewed the enterprises from throughout Slovakia. The distribution of surveyed enterprises by region (see Table 2) is recorded by regions, based on territorial administrative division of the Slovak Republic. We obtained mostly data from the enterprises based in the region of Bratislava and Banská Bystrica.

Table 2 Distribution of surveyed enterprises by region; own processing

	BA	TT	TN	NR	BB	ZA	PO	KE	Total
small	22	5	6	13	23	8	6	2	85
medium	13	3	5	4	11	3	1	1	41
big	17	2	1	1	4	1	1	1	28
Total	52	10	12	18	38	12	8	4	154

As a result of examining the application of CSR activities in project manager training, we have not addressed the territorial distribution of the companies surveyed, but in the future we are planning to add more dependencies.

Methods: ANN – Artificial Neural Networks

The relationship between the factors of implementing social responsibility and project management tools as answers from survey, both expressed as mean values of the implementation the modern managerial tools in the company, was evaluated through artificial neural networks (ANNs). Principles of ANNs as a method of artificial intelligence are based on an analogy to the supposed workings of the brain that was biologically inspired (Openshaw in Fischer and Nijkamp 1993). Neural networks, also called artificial neural networks, originated from simulating biological neural networks (Fajčíková et all., 2017).

We created 100 neural networks for each evaluated question and answer and all social responsibility factors. For each neural network, the sensitivity of individual social responsibility indicators, the coefficient of sensitivity s_r was determined. The sensitivity of ith input variable was calculated according to the following equations (Fajčíková et al., 2017):

Sensitivity i-th input:

$$\frac{RMS\ without\ ith\ variable}{RMS\ with\ ith\ variable} > 1, where \quad (1)$$

$RMS = \sqrt{\frac{\sum_{i=1}^{n}(y_i - \hat{y}_i)^2}{n}}$ (root mean square error).

According the methodology of Fačíková et all. (2017), for each corporate social responsibility factor (as indicator) we determined the average sensitivity (as median value from 100 calculated networks). We consider those answers as indicators which have the highest values of average sensitivity more than one (s_r > 1) as influential. This is the background of the sensitivity calculations. Why coefficient of sensitivity s_r should be higher than 1 is explained in more detail in Hunter et al. (2000).

3 Results

According to Tharp & Chadhury (2008), project managers can influence their companies toward socially responsible behaviour at the local level in areas such as human rights, employee rights, environmental protection, and supplier relations. Projects that involve partnerships with the local community can create enduring relationships of

respect, goodwill, and mutual benefit. For this to work, however, it is overwhelmingly important to understand the needs of the local community through regular contact and dialogue so that the company becomes an integral part of community life.

3.1 CSR concept in the companies

As part of our research, we were interested in the fact whether, and to what extent, the enterprises we have researched are implementing project management while applying the concept of Corporate Social Responsibility to their day-to-day corporate operations. Figure 1 shows that 34% of companies use CSR almost always or mostly. What we consider to be very important, 29% of the companies surveyed often apply the concept of CSR. However, it is not gratifying that, on the other hand, there is still a large group of companies that do not apply CSR at all or rarely, and this represents 37% of the total. This fact also points out that there is still a large group of companies within the researched companies in the Slovak Republic, which are insufficiently aware of the need to implement CSR in their business activities.

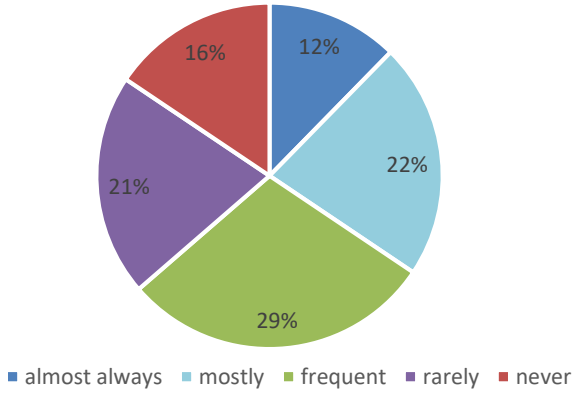

Figure 1 The level of application CSR in the enterprise; source: own processing

From the point of view of applying the CSR concept in the enterprises we study, depending on the turnover of the enterprises, we found the following results: They clearly apply CSR to the business activities of a company with a turnover of less than 2 mil. EUR and closely followed by companies with a turnover of 3 to 10 mil. EUR. On the contrary, Table 3 shows that for companies with a turnover higher than 201 mil. EUR, neither the company replied that CSR was never applied and 56% of companies were applying CSR almost always or at least mostly. Companies with the highest rate of CSR application in business activities can be considered companies with a turnover of 51 to 200 mil. EUR, a total of 60%.

Table 3 Implementation of the CSR by turnover of companies (%); source: own processing

	almost always	mostly	frequent	rarely	never	total
<2 mil.EUR	11	18	31	23	17	100
3-10 mil.EUR	19	19	29	23	10	100
11-50 mil.EUR	19	19	33	24	5	100
51-200 mil.EUR	20	40	20	10	10	100
>201 mil.EUR	34	22	22	22	0	100

Subsequently, we tried to find out how many of the addressed enterprises applying the concept of CSR apply it in the vocational training of their project managers and their project management. We asked this question about those companies that apply the CSR concept at least frequently (see Figure 1). Overall, there were only 66% of companies from the original sample of 154 companies. Figure 2 shows that 71% of companies do not apply CSR to project management (or rarely) and only 17% of companies are actively applying CSR (almost always, mostly). Here we see great potential to improve the situation not only in the application of CSR to project management, but mainly in the implementation of CSR in the vocational training of project managers. We have to say that companies need to realize that the concept of CSR needs to be applied to the realization of their business projects.

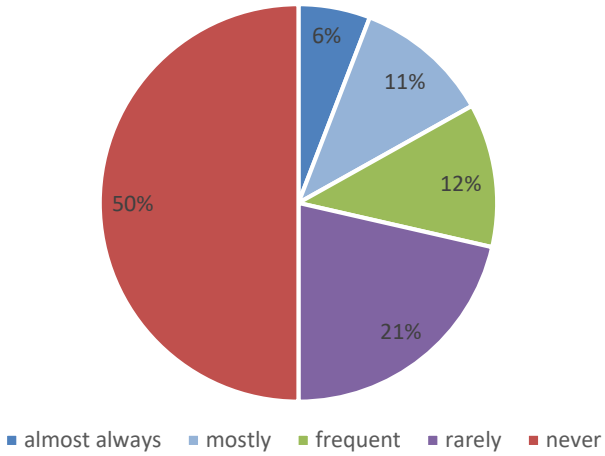

Figure 2 Application of CSR concept into the vocational training of project managers in the company; source: own processing

Regarding to the research, the most significant problem for implementing CSR into the management of the company is monitoring of ecological problems in the region of company. Since more than 50% of surveyed managers consider environmental problems in the region where the company is the most important factor in applying the CSR concept to the company, we can regard this as a direction towards corporate citizenship.

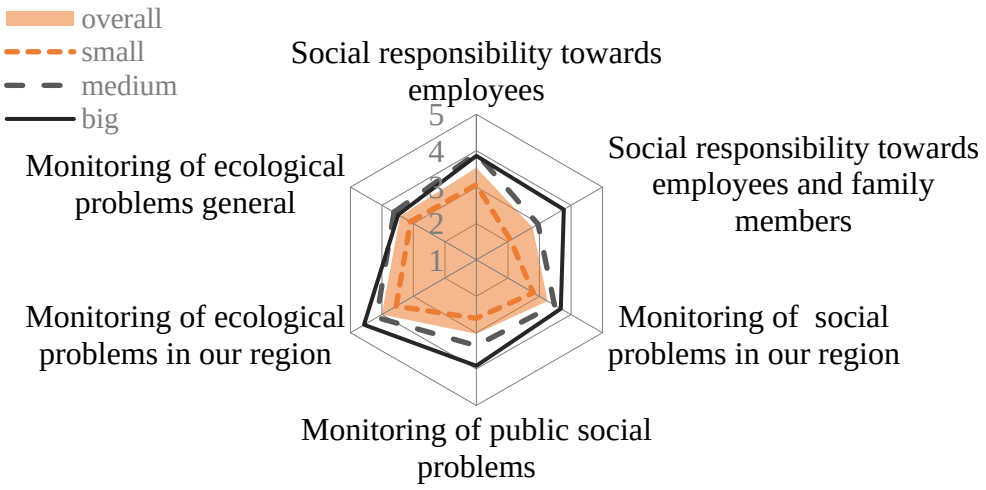

Figure 3 The reasons for implementing CSR in the management of the company; source: own processing

Also the monitoring of social problems in the region of company reached the average score of 3 shows, that those regional problems are important for all three types of companies. Like Melo (2017) suggests, the business interventions need to be understood as a socially constructed process in which each actor exercises a particular agency, going beyond the linear process. In the research on a scale of 1-5, (see Figure 3) environmental problems in the region of company reached a score of 5 and the social responsibility towards employees reached a score of 4 for the big companies. However the results of score for all three types of companies and overall results are very similar, we could say, that the big companies, regarding they yearly turnover give the importance also to corporate social responsibility towards not just employees, but also towards their family members. For small companies, there is not a big difference between the reasons of application the CSR concept in the management of the company. The profit of the company and the legislation determinate the decision for company in case of the CSR and green marketing application (Chovanová & Szwajca, 2018).

3.2 ANN analyses of factors for implementing CSR and project management tools in the vocational training of project managers

It is very difficult to choose the appropriate method to test the sensitivity of the answers to the individual questions asked by the enterprise´s manager. The ANN method is used to test susceptibility in a number of disciplines, primarily in medicine, later in biochemistry and other natural sciences. However, the look at the amount of data collected through the questionnaire survey, the different answer options, the individual dependencies, but first and foremost the sensitivity of the individual responses, that is, how one of the possible responses affects the others that have the most significant sensitivity in each response or least important, we chose an unconventional method in economic and marketing sciences for this testing, namely ANN.

With the ANN method, we tested Question Nr. 5.2 – if the company's CSR concept is applied into the training of its project managers. ANN was used to identify the response with the highest sensitivity in relation to this issue. Table 3 documents the highest sensitivity of answers among (>1) the all answers. Absolutely highest sensitivity for the implementation of CSR concept into the vocational training of project mangers has empathy of project managers (1,003741).

As part of this response, the percentages of equally distributed options that were offered to managers through the empathy cluster were equal. These options related to the project manager's behaviour in the field of empathy, and that the project manager does not notice the emotional reactions of other people in the company, and consequently, with a comparable ratio, the project manager in the company understands how other people feel and the project manager in the company understands the hidden causes of other people's concerns. Of course, there is could be the reason, that the CSR concept works with two important issues, not just in case to customers, but with people general, and they are emotions and relationship.

A very interesting factor, the age of the project manager, who is second in the most sensitive (sensitivity 1, 003181) has a very close connection with the property and manifestations of empathy. The experience of the project manager is manifested with the length of the profession and, of course, with his age. Self-confidence of project manager with sensitivity 1,002832 is undoubtedly closely related to the experience of the project manager and hence his age, therefore the third highest sensitivity of this factor. If the project manager is experienced, with years of experience, he is most likely able to manage multiple projects at once. However, the number of projects that the project manager

manages in one timeframe can significantly affect project results as well as project management. The sensitivity of factor number of parallel projects is 1,002418. Project managers are mostly employees of the companies and the forth highest sensitivity of implementing CRS concept into the vocational training of project managers has the factor CSR towards employees (sensitivity 1,002336). This may mean that project managers perceive the concept of CSR and its implementation in vocational training as an advantage to them, or that this sensitivity may also mean that I understand the implementation of CSR as enhancing their expertise.

The last significant sensitive factor with influence to the tested question has poor staffing of the project with sensitivity 1,002233. We can assume that the poor staffing of the project significantly influences the results, mood in the project team and also the behaviour of individual team members. At this point, the empathy of the project manager is very important, which has been the most sensitive factor in testing CSR implementation for project managers.

Table 3 Implementation of the CSR by turnover of companies (%); source: own processing

	almost always	mostly	frequent	rarely	never	total
<2 mil.EUR	11	18	31	23	17	100
3-10 mil.EUR	19	19	29	23	10	100
11-50 mil.EUR	19	19	33	24	5	100
51-200 mil.EUR	20	40	20	10	10	100
>201 mil.EUR	34	22	22	22	0	100

The lowest sensitivity (see Table 4) was in testing whether a company applies the CSR concept to project managers' training calculated by ANN for the following factors: The last 2 years share (0.997365), new product (0.998311) the project (0.998532). Interestingly, applying CSR to employees experienced one of the highest sensitivities, and vice versa, one of the lowest (0.998734) sensitivities is Social Responsibility towards family members of employees. We assume that this factor does not affect the individual responses of the interviewees. Similarly, the low sensitivity and the impact we have found in the response to project management software (0.998856) and timeliness of project completion (0.998877). We can conclude that the individual findings correspond to general experience, but it is interesting to note that the issue of implementing CSR in project manager training through ANN testing confirms influential and least influential factors.

Table 4 Sensibility of factors, the most sensible; own processing

Factor/Answer	Sensibility
Empathy	1,003741
Age of project manager	1,003181
Self-confidence of PM	1,002832
Number of parallel projects	1,002418
CSR towards employees	1,002336
Poor staffing of the project	1,002233

With the ANN method, we tested Question Nr. 5.2 – if the company's CSR concept is applied into the training of its project managers. ANN was used to identify the response with the highest sensitivity in relation to this issue.

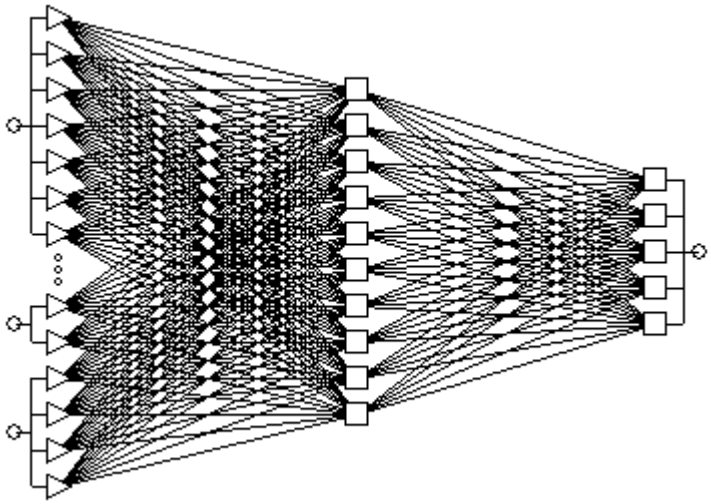

Figure 4 Example of neuron network with 139 inputs neurons and 10 neurons in hidden and 5 neurons in output from 100 counted networks; source: own processing

Example of neuron network (see Figure 4) with 139 inputs neurons and 10 neurons in hidden and 5 neurons in output. The example (it is one from 100 tested neuron networks) shows, that this question has five possible answers.

4 Discussion

According the study of Nielsen (2010) Project managers must become knowledgeable about their corporation´s Corporate Social Responsibility policies so that the goals and objectives of their projects conform to those policies, but they must go further than that. They must determine how well those policies conform to international law and the laws, standards, and the social customs in the country where the project work will be undertaken. Corporate social responsibility practices can lead to sustainable development when there is an empathetic engagement with local stakeholders. Empathy, embedded in an organization culture with care and justice, allows MNEs to be more responsive to local needs and capable of transferring learning from the local to the headquarters and other areas when they want to use corporate social responsibility initiatives to sustain the companies (Lam, 2018; Madzík et all., 2018). We can conclude that a relatively high resistance of empathetic perception of project managers is observed (highest sensitivity even when tested via ANN), when managers over 50 are best within age distribution, even though this difference is not so great , this can be attributed to life and work experience. However, on the other hand, project managers are "noticing" empathic manifestations in others, while having a relatively high ability to understand these empathic expressions, whether, it is about understanding the feelings of others or understanding the causes. The ability, understanding emotions enable individuals to identify what circumstances cause different emotional responses and how more simple emotions blend to cause more complex emotional states. This knowledge is thought to be important in enabling individuals to understand why they may be experiencing particular feelings which is pre- requisite for then considering how these feelings be best managed or controlled (Clarke, 2010).

Within the framework of the individual factors that influence the implementation of CSR in the concept of companies and in the training of project managers, we can recommend that overall empathy will improve if project managers become more aware of the empathic manifestations of others. An enterprise that sets the strategy for any

training program, but in our case, project manager training, should first and foremost understand the importance of the emotions associated with the organization as well as the emotions associated with CSR in the business. This understanding of emotions can lead to positive results in project manager training in the enterprise.

Acknowledgements

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References

Caputa W. (2015) "Social Relations and Environmental Influence as a Determinant of Customer Capital", *Oconomia Copernikana*, Vol. 6, No. 2, pp. 109–128.

Chabowski, B., Mean, J., Gonzalez-Padron, T. (2011) "The structure of sustainability research in marketing, 1958-2008: A basis for future research opportunities", *Journal of the Academy of Marketing Science*, Vol. 39, No. 1, pp. 55–70.

Chang, Y., Yeh, C. (2017) "Corporate social responsibility and customer loyalty in intercity bus services", *Transport Policy.* Vol. 59, pp. 38–45.

Chovanová Supeková, S., Szwajca, D. (2018) "Green marketing as part of corporate social responsibility: IT companies in the Slovak Republic", In: *Zeszyty Naukowe WSB w Poznaniu*. Poznań: Wyższa Szkoła Bankowa w Poznaniu. Wydawnictwo Wyższej Szkoły Bankowej, Poland.

Clarke, N. (2010) "The impact of a training programme designed to target the emotional intelligence abilities of project managers", *International Journal of Project Management.* Vol. 28, No. 5, pp. 461–468.

Cooper, R., Edgett, S., Kleinschmidt, E. (2001) "Portfolio management for new product development: results of an industry practices study", *R&D Management*. Vol. 31, No. 4, pp. 361–380.

Fabus, M. (2018) "Business environment analysis based on the Global Competitiveness Index (GCI) and Doing Business (DB): case study Slovakia", *Journal of Security and Sustainability Issues.* Vol. 7, No. 4, pp. 831–839.

Fajčíková, K., Stehlíková, B., Cvečková, V., Rapant, S. (2017) "Application of artificial neural network in medical geochemistry", *Environmental geochemistry and health*, Vol. 39, No. 6, pp. 1513–1529.

Gallagher, E. C., Mazur, A. K., Ashkanasy, N. M. (2015) "Rallying the troops or beating the horses? How project-related demands can lead to either high-performance or abusive supervision," *Project Management Journal. Vol. 46, No.* 3, pp. 10–24.

Hunter, A., Kennedy, L., Henry, J., Fergusson, I. (2000) "Application of neural networks and sensitivity analysis to improved prediction of trauma survival", *Computer Methods and Programs in Biomedicine*, Vol. 62, No. 1, pp. 11–19.

Lam M.L.L. (2018) "The Role of Empathy in Sustainable Development and Corporate Social Responsibility of Multinational Enterprises in China", In: Çalıyurt K., Said R. (eds) *Sustainability and Social Responsibility of Accountability Reporting Systems. Accounting, Finance, Sustainability, Governance & Fraud: Theory and Application*. Springer, Singapore.

Madzík, P., Budaj, P., Chocholáková, A. (2018) "Practical Experiences with the Application of Corporate Social Responsibility Principles in a Higher Education Environment", *Sustainability.* Vol. 10, No. 6, article nr. 1736.

Markechová, D. Stehlíková, B., Tiprákoá, A. (2011) "*Štatistické metódy a ich aplikácie",* Univerzita Konštantína Filozofa v Nitre, Nitra, Slovakia.

Melo, J. (2017) "Not Everything Is Rosy in the Garden: Challenging Social Aspects in the Relationship between Business and Rural Communities", *The Journal of Corporate Citizenship*, Vol. 68, pp. 56–66.

Nielsen, D. (2010) *"Corporate Social responsibility (CSR) and Project Management",* PMA.

PMI (2018) "Pulse of the Profession 2018: Success in Disruptive Times", Available at: https://www.pmi.org/media/pmi/documents/public/pdf/learning/thought-leadership/pulse/pulse-of-the-profession-2018.pdf

Porter, M. E., Kramer, M. R. (2006) "The link between competitive advantage and corporate social responsibility", *Harvard business review.* Vol. 84, No. 12, pp. 78–92.

Reeves, M., Haanaes, K., Love, C., Levin, S. (2012) "Sustainability as Adaptability", *Journal of Applied Corporate Finance.* Vol. 24, No. 2, pp. 14–22.

State of the Heart (2016) "State of the Heart 2016" available at: http://www.6seconds.org/2016/04/04/state-heart-2016

Stehlíková, B., Tirpáková, A., Poměnková, J., & Markechová, D. (2009) "Metodologie výzkumu a statistická inference", Folia Universitatis Agriculturae et Silviculrurae Mendelelianae Brunensis, Brno, Czech Republic.

Szwajca D. (2013) "Corporate Social Responsibility Versus Marketing – Theoretical and Practical Perspective", *Human Resources Management & Ergonomics.* Vol. 7, No. 1, pp. 100–114.

Tharp, J., Chadhury, P. D. (2008) *"Corporate social responsibility: what it means for the project manager",* In: PMI® Global Congress 2008—North America, Denver, CO. Newtown Square, PA: Project Management Institute.

Ubrežiová I., Mura L. (2017) "Applied Ethics and Corporate Social Responsibility in Entrepreneurship", In: *SGEM 2017: 4th International Multidisciplinary Scientific Conferences on Social Sciences and Arts*, Albena, Bulgaria.

Information support of documentation of working tasks according controlling

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Abstract

Controlling becomes part of the business activities that need to be planned, managed, controlled and evaluated. This tool enables efficient management of work tasks withhin personnel activities. The aim of this paper is to highlight the benefits of controlling and its information support in the personnel process. We used various outputs of the information system for personnel controlling. In this paper we decribe conception of working tasks in the enterprices. The results point to the importance of implementing information support in the area of work tasks and the benefits in terms of saving time, money, resources.

Keywords: controlling; personal management; efficiency; working tasks; report.

JEL Classification: M12, M15, M54

Article Classification: Research article

1 Introduction

The use of controlling is now an essential part of every business and its management philosophy. Controlling becomes part of business activities and processes that need to be planned, managed, controlled, evaluated (Alexandrová, 2009). The controlling also includes personnel activities such as. registration and statistics of work orders in enterprises. The acquisition, processing and use of relevant data for the management of work order records and their evaluation within controlling can be done on the basis of information support. The basic requirement for the work order registration process is to quickly search for processed data by location, workplaces of performance, according to the type of work order - codebook, according to individual time intervals, years, according to the date of execution of the order, according to the activities

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performed within the work order. Creating controlling reports - summary reports for the company management on the records and statistics of work orders, creates space for their effective planning and management. In this paper we want to point out the possibilities of using controlling for working tasks order controlling in personnel activities. The need for collecting, sorting and storing data and information in a knowledge-based society is growing very quickly and therefore it is necessary to implement controlling in companies (Dugas, Mesároš, Ferenc, Čarnický, 2015). Controlling is an effective instrument for managing and optimizing business processes to optimize business costs. The level of management of all processes in eterprises is reflected in the amount of realitzed costs and ulimately in the selling prices of products (Dima, Modrák, 2013). Controlling as a tool of company control subserve specified responsibilities and function like advisory, control and coordination. Controlling is instrument used for various area of industry and very important significante has for wood comapanies in area of calcualation and budgeting (Šatanová, Potkány, 2004). The use of controlling plays an important role ine the area of quality management and risk management in the railway sector for tracking train transport (Nedeliaková, Štefancová, Kuka, 2018). The fundamental use of controlling in chemical enterprises in Slovakia is used to monitor the performance of chemical enterprises and to identify their opportunities in global markets. Values of economic indicators of profitability, liquidity, debt in the form of controlling are indicators that determine the performance of chemical enterprises (Kajanová, 2016). Companies in rail freight transport use controlling. They must drawn up a very good strategy to keep on the transport market in the long term. This requires to prepare high-quality of the strategy plans, their transformation to operational plan, monitoring actual processes and comparison actual processes with the plan. Operational controlling is a very effective instrument how to inform the management about the changes in the businesses environment at the time and finds out impact these changes to basic economic indicators of company (Dolinayová, Ľoch, 2015).

2 Material and methods

In this paper we decribe the concept of work tasking and their application in manufacturing enterprices throug controlling. We will show how to use controlling reports for personnnel acitvities in the enterprices.

Work orders are an essential part of personnel activities in companies, through which employees perform their work and perform processes related to maintenance, repair, assembly, quality control, interconnection, disassembly etc.

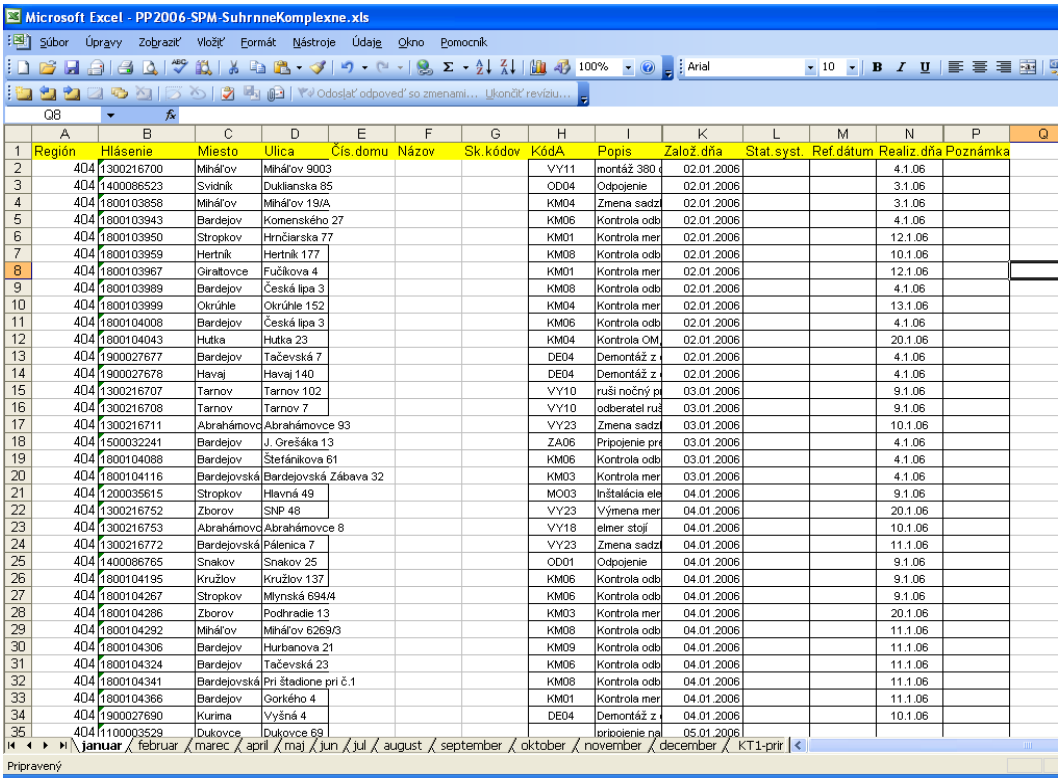
A work order is an accounting document that needs to be compiled according to the requirements of the accounting law number 431/2002.

It must contain all the necessary elements of the accounting document and, at the same time, be an appropriate tool for monitoring and evaluating the activities of individual workers, working place jobs, employees, workplaces (regions). Controlling work orders takes the form of records of work orders by individual jobs, workplaces, individual workers, work positions. Given that it is necessary to accumulate, aggregate and evaluate job order information for the needs of controlling statements - summary reports on work orders and performances based on these job orders, it was necessary to propose a method of collecting them, and evidence records.

3 Results

The evidence of working tasks is very important part of controlling report. The overall data collection philosophy is based on the use of information support and MS EXEL tools (figure 1). This way of recording and collecting data is simple and its

advantage is grouping of data according to certain criteria on the basis of which it is possible to evaluate the efficiency of processes. Collection database of working tasks have to contain requirements of the enterprices. Using of collection database have to prepare for monitoring and evaluationg of working tasks for all working places. On the basis of this data database, it is possible to monitor the performance of work by jobs, according to the type of report, according to the description of the work performed, according to the time of execution of the performance, according to individual months, etc.



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3	404	1400086523	Svidník	Duklianska 85				OD04	Odpojenie	02.01.2006			3.1.06		
4	404	1800103858	Mihaľov	Mihaľov 19/A				KM04	Zmena sadzi	02.01.2006			3.1.06		
5	404	1800103943	Bardejov	Komenského 27				KM06	Kontrola odb	02.01.2006			4.1.06		
6	404	1800103950	Stropkov	Hrnčiarska 77				KM01	Kontrola mer	02.01.2006			12.1.06		
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8	404	1800103967	Giraltovce	Fučíkova 4				KM01	Kontrola mer	02.01.2006			12.1.06		
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12	404	1800104043	Hutka	Hutka 23				KM04	Kontrola OM	02.01.2006			20.1.06		
13	404	1900027677	Bardejov	Tačevská 7				DE04	Demontáž z	02.01.2006			4.1.06		
14	404	1900027678	Havaj	Havaj 140				DE04	Demontáž z	02.01.2006			4.1.06		
15	404	1300216707	Tarnov	Tarnov 102				VY10	ruší nočný p	03.01.2006			9.1.06		
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17	404	1300216711	Abrahámovc	Abrahámovce 93				VY23	Zmena sadzi	03.01.2006			10.1.06		
18	404	1500032241	Bardejov	J. Grešáka 13				ZA06	Pripojenie pr	03.01.2006			4.1.06		
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23	404	1300216753	Abrahámovc	Abrahámovce 8				VY18	elmer stojí	04.01.2006			10.1.06		
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Figure 1 Controoling database of working tasks. source: Module of Controlling

Reports for business management (figure 2) are prepared from a core worksheet database of tasks. Based on this database, it is possible to monitor the performance of work by jobs, regions, by report type, by job description, by performance time, by month, etc. Advantages of partial reports of working tasks are a means of improving work activity and eliminating work-related risks at specific jobs.

In certain specified periods, according to management's requirements, it is possible to interconnect data between individual regions and to prepare a controlling report for the company management, in which mutual synergy can be seen - interconnection of work performance in individual regions at individual workplaces in relation to the time period. These controlling reports enable the management in each month to monitor the efficiency of employees' work performance, the number of performances performed within the monitored workplaces, the downtime in the performance of work activities, and also the time span for certain performances. On the basis of these analyzed data, it is possible to monitor the efficiency of processes as well as the search for their substitution in crisis situations.

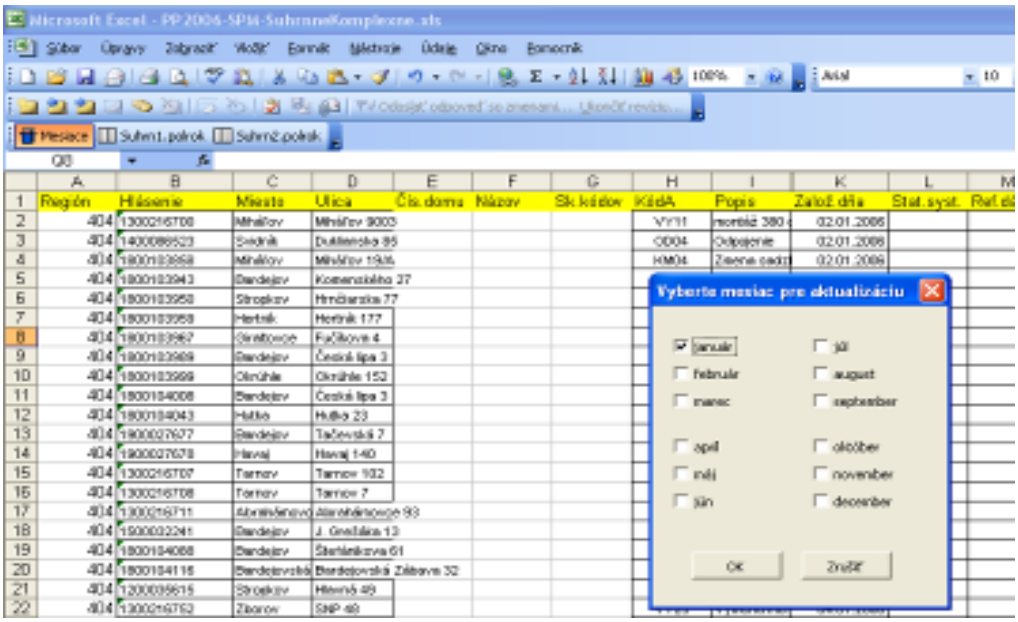

Figure 2 Partial report of working tasks. source: Module of Controlling

In certain specified periods, according to management's requirements, it is possible to interconnect data between individual regions and to prepare a controlling report for the company management, in which mutual synergy can be seen - interconnection of work performance in individual regions at individual workplaces in relation to the time period. These controlling reports enable the management in each month to monitor the efficiency of employees' work performance, the number of performances performed within the monitored workplaces, the downtime in the performance of work activities, and also the time span for certain performances. On the basis of these analyzed data, it is possible to monitor the efficiency of processes as well as the search for their substitution in crisis situations.

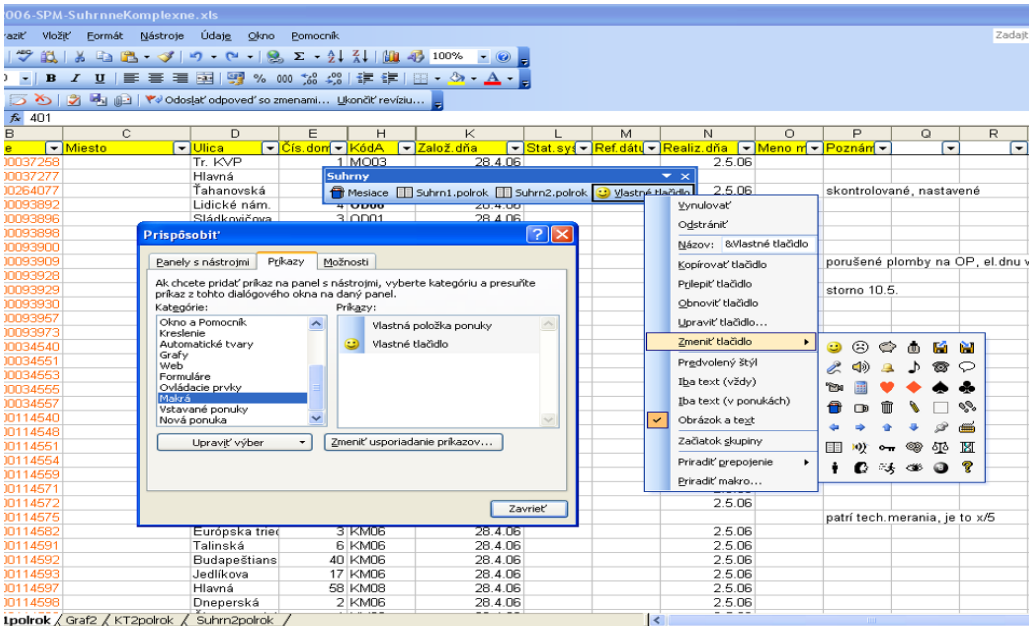

Figure 3 Controlling report of working tasks. source: Module of Controlling

As part of the controlling module for personnel activities, it is possible to prepare summary reports (figure 3) containing selected criteria.Summary Controlling Report contains cumulative data, data determined as basic criteria for preparing a report for the company management. Comprehensive reports are a tool for improving the company's

personnel activities, for financing the company's personnel activities, for reducing the company's costs for individual work orders, for optimizing the work performance of workers and working time.

Another advantage of the controlling database is to prepare a special report (figure 4) to monitor data from different viewpoint.

Pivot tables that are used for fast analysis and data summarization can also be used to prepare the controlling report for inspect - financial audit. The Pivot Table allows to obtain different views of the analyzed data. Based on the prepared PivotTable, graphical views are prepared in the form of PivotCharts, which are an important part of the data analysis assemblies because they are visually impressive and they make it easier for users to view comparisons, schemas, and trends.In such a combination of graphs and tables it is possible to submit aggregate controlling reports for company management, whereby on the basis of such analyzes it is possible to evaluate the efficiency of work performance and to set goals for the planning of maintenance, repair, assembly, etc.

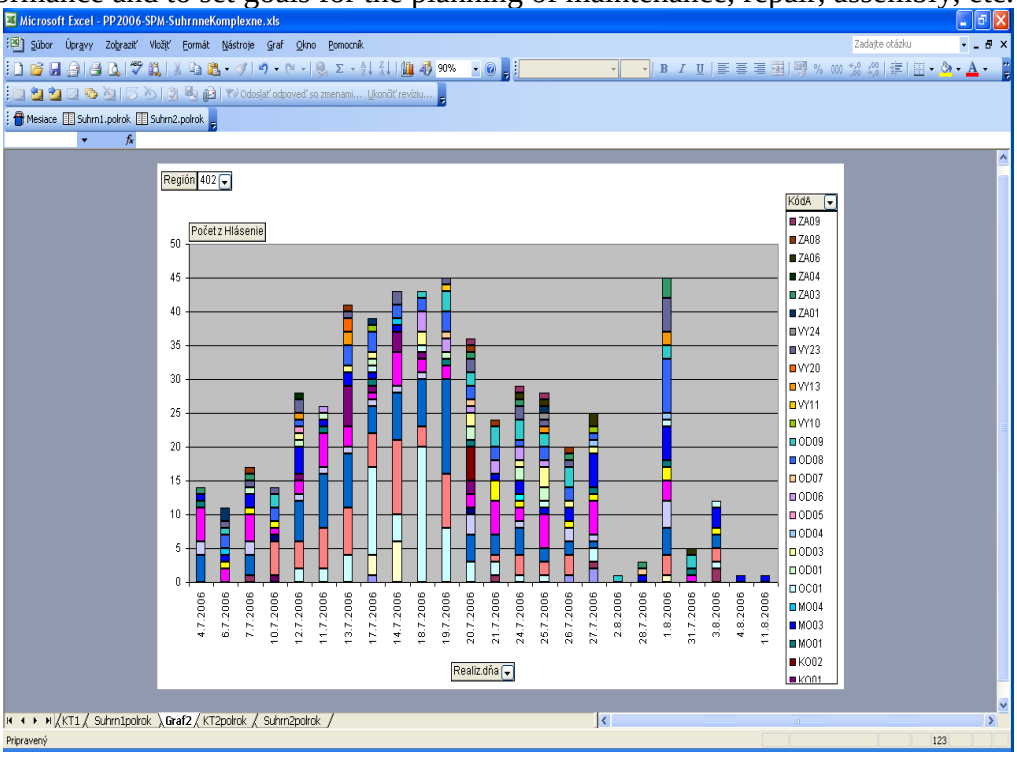

Figure 4 Report of Pivot chart. source: Module of Controlling

4 Discussion

One of the tools of progressive management trends in businesses is controlling, a tool to improve business performance. The need for controlling and its deployment in enterprises is essential because of the increasing differentiation of in-house activities that need to be monitored, evaluated and regularly reviewed.

Controlling is part of a modern management concept and represents a comprehensive system of relevant information that is essential for decision-making and management processes. The use of controlling reports for the needs of planning and managing work orders in practice is justified. On the basis of information support and creation of contingency tables and graphs, we can more effectively monitor work orders according to individual criteria, identify deficiencies in performance for individual regions, and create groundwork for performance evaluation at individual workplaces. Summary reports allow businesses to manage their support processes and ultimately

influence the amount of process costs that are an integral part of each company's financial management. In this paper we point to significante of controlling in personal activities in area of working tasks. Neglected registration of work orders in enterprises where activities are performed on the basis of orders or instructions - especially service activities, repairs and maintenance are high costs. High costs for companies create in terms of failure to meet work performance, high time downtime, non-compliance with customer requirements, frequent occurrences of claims or customer complaints and so on.All these negative aspects will be reflected in the financial indicators of the company, which can also have a negative impact on the formation and creation of profit.Controlling work orders is a convenient tool to quickly and efficiently manage work processes and to influence employee performance.

Akcknowledgements

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References

Alexandrová, G. (2009) "Controlling as instrument for crisis management in the firm" *Business Management and Public Management.* Vol. 4, No. 10, pp. 10–15.

Dima, I., Modrák, V. (2013) "The management of basic production function", In: *Industrial Production Management in flexible manufacturing system.* IGI Global, Hershey.

Dolinayová, A. Ľoch, M. (2015) "Controlling instrument used for monitoring and evaluation processes in the rail freight companies", In: *9th International Scientific Conference on Business Economics and Management (BEM).* Zvolen, Slovakia.

Dugas, J., Mesároš, P., Ferencz, V., Čarnický, Š. (2015) "Using of controlling and its insfluence to direct costs", In: *Business Communication Systems.* Euroscientia, Brusel.

Kajanová, J. (2016) "Globalization and its impact on chemical enterprices performance in Slovakia", In: *16 th International scientific conference on Globalization and its Socio-economic consequences.* Rajecké Teplice, Slovakia.

Nedeliaková, E., Štefancová, V., Kuka, A. (2018) "Innovative methodology for quality and risk management in logistic processes in transport undertakings", In: *Proceedings of international scientific conference Business Logisitics in Modern Management.* Osijek, Croatia.

Šatanová, A., Potkány, M. (2004) "Modern tool of company control", *Economical Journal.* Vol. 52, No. 2, pp. 148–165.

Teplická, K. (2004) "Progressive trends of management in industry firms", *Economy and Management.* Vol. 7, No. 4, pp. 26–31.

The Dynamics of the Change in Composition of University Graduates in the Czech Republic

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Abstract

The beginning of the 21st century is now underway, with signs of great changes in the labor market. These changes can be seen in both the approach of employers and in the success of job seekers. Changes in the national economy's structure are accompanied by changes in the composition of the positions filled and by increasing employer demands on the competencies of a university-qualified workforce. Knowledge of at least one foreign language and excellent computer and IT literacy is commonly required. However, knowledge and skills are becoming key experience requirements as well as the undergraduates' abilities to acquire and use this knowledge effectively. Great emphasis is also placed on time and space flexibility, proactivity, creativity, initiative, teamwork, and self-development. The paper's goal is to present the conclusions of research on the employability of university graduates in the Czech Republic's labor market. A comparative analysis of the labor supply of university graduates in relation to the current labor market's needs was carried out on statistical data from the past ten years for the Czech Republic. The evaluation and conclusions of this analysis demonstrate the existence of structural discrepancies and indicate the need for qualitative and quantitative changes in the composition of graduates' professions and hence the need to reorganize university education. The increasing university graduate failure rate also emerged as a serious problem.

Keywords: labor market; the supply of work; the demand for work; graduate; unemployment of university graduates.

JEL Classification: I23, I25, J21, J24, J42

Article Classification: Research article

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1 Introduction

The dynamically changing structure of the Czech national economy is causing significant transformation in the labor market, and employers' requirements for the knowledge, skills, and abilities of the work force are also changing. Changes in the composition of the jobs that are filled and the increasing tempo of transformation in required knowledge are primarily the result of implementing new technology and new managerial concepts. The importance of transferring knowledge, skills, and abilities is increasing at an astounding rate (Bock et al., 2012; Ritala, et al., 2015). According to the endogenous theory of economic growth, knowledge is projected back into technology and the qualifications of the workforce (Romer, 1990). The creation of knowledge also has a positive external effect. When one company gains a temporary advantage on the market because they have invested into research, development, and their workers' qualifications, their actions result in new or improved products, technology, and production processes. In time, these positive effects spread (spill over) to other companies in very diverse ways and are utilized by other workers. Next, these positive externalities result in increasing returns to scale, which have a fundamental impact on long-term economic growth (Stejskal et al., 2018; Hájek et al., 2018).

The changes taking place on the labor market also significantly influence educational system requirements and the actual trajectory of graduates' transition to the labor market. In this respect, higher education indisputably plays a key role. The labor market's inconsistent pattern of change and its requirements of the Czech tertiary educational system have become the subject of a number of discussions. Nonetheless, the conversation around altering higher education's existing legislative basis, which has been in effect since 2006, has not yet led to any fundamental reform. In the given context, the Higher Education Development Framework for 2020, which ties into the Strategy for Education Policy of the Czech Republic Until 2020 and the Strategic Framework for European Cooperation in Education and Training, has emerged as the key strategic document. These materials by the Ministry of Education, Youth, and Sports (MŠMT) place emphasis on the educational system's professional and hierarchical structure; on educational quality, including the effective combination of knowledge, skills, and competences; on effectively coordinating education with the labor market; and on securing cooperation between universities and employers (MŠMT, 2014). Currently, the starting point for creating a higher education study program is the National Qualification Framework, which has the goal of ensuring the level of quality that qualification provides (Volejníková, 2017). However, this procedural document only targets the results from being taught a specific curriculum, i.e., it defines the knowledge, skills, and competences expected of graduates (Young, 2003).

Tertiary education is indisputably an enormous competitive advantage on the labor market. In advanced societies, education is the most important factor for determining success in professional life. Employers utilize it when selecting workers for specific jobs, and individuals invest in it so as to improve their position in the labor market (Shavit & Miller, 1998; Dubcová, 2018). Even in the Czech Republic (CR), most young people are currently aware of education's importance, and 90% of secondary school graduates apply for higher education. In 2017, there were nearly 300,000 students studying at 64 private and public Czech institutions of higher education. In the vast majority of cases (90.2%), these were students at public tertiary institutions, which have long remained at a total of 26 in the CR. As in other advanced countries, higher education is not only the privilege of the elite in the CR. Whereas roughly 15% of the people born in a given year graduated from higher education at the beginning of this century, this number was over 40% in 2012. Czech tertiary education is thus undergoing steep

massification of higher education, thus confirming Trow's theory of massification. This theory states that many European countries, after passing through the elite and mass phases of higher education's evolution, cross over into a universal (general) phase, where more than half of the appropriate age group go to tertiary education institutions, and at least two fifths of the population hold higher education degrees (Trow, 2005). The number of tertiary students is growing, although many of those who begin higher education do not finish their studies. In addition to approaching class years with low populations, there is a marked decline in the number of graduates as a result of the sharply increasing rate of failure to complete studies. At all levels of tertiary education, the overall rate of failure was 76% in 2017. The following graph (Fig. 1) shows the changes in the number of graduates of Czech higher education according to their degree program for 2007 to 2017.

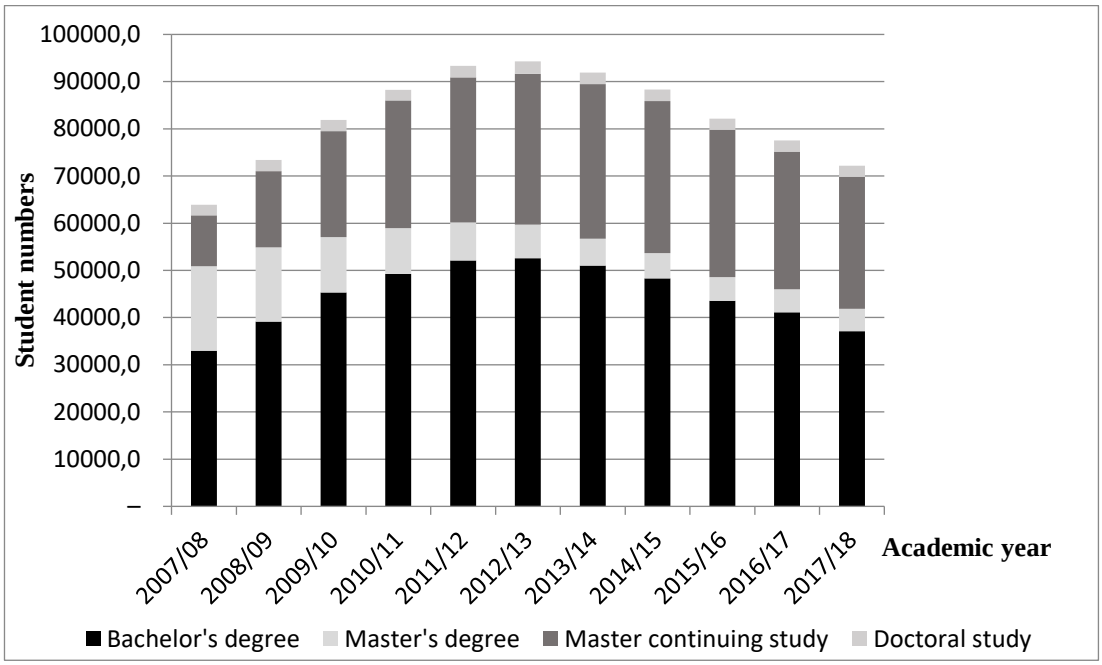

Figure 1 Composition of University Graduates by Degree; source: author's own compilation acc. to (MŠMT 2018).

In the context of the above, the main goal of our research was primarily to conduct comparative analysis of:

- the number of available higher education graduates and the composition of their qualifications;
- the failure rate of higher educational study programs; and
- the employability of the higher education graduates on the labor market and the evolution of unemployment in higher education graduates in the CR.

2 Material and Overall Methods

For the purposes of our research, it was first necessary to clarify terminology of the word "graduate." The Employment Act (Act No. 435/2004 Coll.) does not directly define the term "graduate," though they single out the job seekers who require increased attention when looking for employment, which includes individuals listed in the Unemployment Register for a continuous period longer than five months. According to the Labor Code (Act No. 262/2006 Coll.), a graduate is an employee beginning

employment for work corresponding to their qualifications if their overall professional experience has lasted less than two years since they successfully completed their studies, with maternity leave and parental leave not counted into this period. In the context of this definition and in accordance with the definition according to Zelenka (Zelenka, 2017), the higher education graduate is defined as one who has successfully graduated from school no longer than two years before the date of identification, with the date of completion of studies being the day the last state examinations were undertaken with success.

When processing the comparative analysis's data on the composition of students and graduates of Czech higher education and the rate of failure of studies for students of Czech higher education according to degree program (bachelor's, combined bachelor's/master's, master's, and doctoral programs) and field of education, we used data published by the Czech Statistical Office and data from MŠMT's Development Yearbook of Tertiary Education for the years 2007/2008 through 2017/2018, which contain information on the number of students and higher education graduates for individual academic years.

2.1 Unemployment of higher education graduates

When processing information on tertiary graduates, we relied on the methodology outlined by Zelenka (Zelenka, 2017). Essentially, this methodology has been derived from two sources. The first is data processed by the labor offices (generally twice per year, always on April 30 and Sept. 30). Regarding official experience when compiling data on graduates, labor offices refer to the Labor Code (see above). An unemployed graduate is thus considered to be a registered job-seeker who has graduated from school no more than two years previous to the date of identification. This data thus concern registered unemployed graduates, and as of 2002, has been made publicly available at the integrated portal of the Ministry of Labour and Social Affairs (MPSV) in the file "Graduates by School and Field_MMRR2".

Secondly, data on higher education graduates have been used from MŠMT's SIMS database, Compiled Information from Student Registers. Data for this database have been taken directly from individual tertiary institutions, again always on April 30 and Sept. 30 to correspond with the deadlines for the labor offices' data collection.

Using the data from SIMS and from graduates registered with the unemployment office, the unemployment level for tertiary graduates can be established on the basis of the following relationship:

$$unemployment\ of\ u.g. = \frac{unemployd\ u.g.}{the\ total\ number\ of\ u.g. - continuing\ to\ study} \quad (1)$$

The abbreviation "u. g." used in the equation stands for "university graduate."

The method listed makes it possible to record the actual chance of employment for higher education graduates on the labor market (Zelenka, 2017). We would like to add that it is also possible to acquire data on tertiary graduate unemployment from the data published annually by the National Institute for Education. However, the unemployment level for graduates is calculated here in relationship to the overall number of graduates without taking into consideration whether or not they are continuing in their studies.

Just as elsewhere, when taking our paper's goal into consideration, it is necessary to evaluate results achieved using the acquired statistical data very cautiously, because the statistics are naturally cannot encompass situations linked to, for example, hidden

tertiary graduate unemployment or cases linked to abuse of the qualifications achieved by the graduates when occupying available job positions.

3 Results

3.1. Analysis of the change in the composition of students and graduates of Czech higher educational institutions

During the period under examination, there were fundamental changes in the number and composition of higher education graduates in the CR. The overall number of individuals studying at Czech tertiary institutions decreased by nearly 45,000 during the given period. At the same time, the number of students at Czech institutions of higher education had been increasing up until 2010, when nearly 400,000 individuals were involved in studies; after this point, the number began decreasing annually. Currently, the number has gone down by one quarter. The decline in the number of students mostly concerns bachelor's programs (these students comprise 57.6% of all tertiary education students, with their number having decreased by nearly one third compared to 2007. Master's program students (including combined bachelor's/master's programs, which comprises 35.7% of all tertiary students) is 15.7% less, and doctoral candidates (7.4% of the overall number of tertiary students) have declined by 14.4%. Parallel to this, the number of graduates has been declining since 2013; this number was 72,057 in 2017. At the same time, the greatest decrease in graduates is apparent within bachelor's degree programs, where the number of graduates reacts to a drop in newly enrolled students with an approximate delay of three-years, which corresponds to the length of a bachelor's program. From a long-term perspective, it can be stated that the number of students and graduates at all levels of higher education culminated in 2012, when a total of 94,090 individuals graduated from tertiary education. Beginning at this point, the number of graduates began to decline relatively quickly. According to Zelenka (Zelenka, 2017), the number of graduates will continue to decrease until approximately 2022, when the estimate indicates that around 54,000 people should be graduating from higher education annually, with roughly 33,000 of these entering the labor market.

During this time period, the composition of graduates also changed in relation to their chosen field. While the academic year of 2007/2008 had the greatest number of graduates in the fields of the engineering sciences (15,642 graduates overall), we recorded the highest number of graduates for the academic year of 2017/2018 in the economic sciences (overall 16,504). Over the long term, student interest has been strongest in fields in the group of business, administration, and law (20.2% of all higher education students), of which management and administration has the most students. At the same time, these fields nonetheless registered one of the greatest drops in students; they decreased by nearly one third (-32%). Technical fields from the group of engineering, manufacturing, and construction comprise 16.1% of the students; naturally, even these have encountered a recent decrease in students, which corresponds to the overall decline in tertiary students. In the last 7 years, these have dropped by nearly 17,000 (-26%). The number of students in the Education group is also distinctly decreasing. On the other hand, the field of health and welfare services has seen an increase in students over the period under study, and their percentage of the overall number of students is currently fluctuating around 11.9%. The number of students in the fields of natural science, mathematics, and statistics, which includes 6.3% of students, is also relatively stable; this also applies to the number of students in the fields of information and communication technology (6.7% of students)

and agriculture, forestry, fisheries, and veterinary (4%). Graduates of higher education in the CR are primarily Czech citizens, though a gradual increase in international students can be seen (from 2.5% to 5.3%). Currently, there is a total of 43,800 international students studying at all the levels of tertiary education in the CR. A summary of the data acquired by analyzing the examined time period is contained in the following table (Table 1).

Table 1. The Number of University Students and Graduates by Degree and by Field of Study; source: author's own compilation acc. to (MŠMT 2018).

Academic Year / No. of Students	**2007/2008**	**2017/2018**
Total Number of Students; -by degree:	**343,942**	**299,054**
Bachelor's degree	207,803	172,365
Combined Bachelor's/Master's Degree	51,461	42,461
Doctoral Studies	23,962	22,192
Total Number of Graduates; -by degree:	**63,793**	**72,057**
Bachelor's Degree	32 ,981	37,141
Master's Degree	17 ,903	4, 741
Combined Bachelor's/Master's Degree	10 ,770	27,911
Composition of Graduates by Field of Study:		
Engineering Sciences	15,642	16,230
Agriculture, Forestry, and Veterinary Science	2,656	2,992
Healthcare and Pharmacology	3,837	5,694
Humanities and Social Sciences	8,928	12,019
Economic Sciences	15,358	16,504
Education and Social Sciences	8,965	8,460
Cultural Studies and the Arts	1,485	2,272

3.2 The failure rate for higher education graduates

Above all, the considerable drop in the number of tertiary students and graduates is related to the fact that people born in the 1990s, which were years with low birth rates, have been completing their studies. A second, no less important reason is the increasing rate of failure of higher education students, which is currently a serious problem for most tertiary institutions in the CR. Even though this is a long-term problem, it can be seen that that rate of educational failure has been slowly increasing at a constant rate in the CR, primarily in the first two years of bachelor's programs. The source data showed that currently less than half of the bachelor's programs that have been started are completed successfully. However, at the same time, most of those who leave the programs later re-enroll, either at the same or a different tertiary institution. The rate of failure is relatively low for the later years of degree programs; in combined bachelor's/master's programs, the rate has stabilized at around 64%. In contrast, doctoral studies are completed by only 10% of those who enroll. From the perspective of field of study, the rate of failure is greatest for studies in the fields of agriculture, engineering, and natural sciences with low rates of failure to complete studies seen conversely in prestigious fields such as law, medicine, and psychology. However, even within individual fields, there are large differences between individual schools, faculties, and programs. The following graph (Fig. 2) depicts the percentage of unsuccessful students among the overall number of students who began the given level of higher education in the given year. As is clear from

the graph, the highest percentages were achieved by graduates of doctoral programs, where the percentage of failure in individual years fluctuated around 90%. This was primarily for the fields of health services, medicine, the humanities, and the social sciences. The second highest percentage of failure to complete tertiary studies is shown by master's program students (around 87%); this is followed by bachelor's programs, where a total of 80% of students do not complete their studies at all. The lowest rate of failure to complete studies during this time period fluctuates around 65% and concerns combined bachelor's/master's studies. Concerning professions, this mainly relates to the educational fields of cultural studies, the arts, the humanities, and the social sciences.

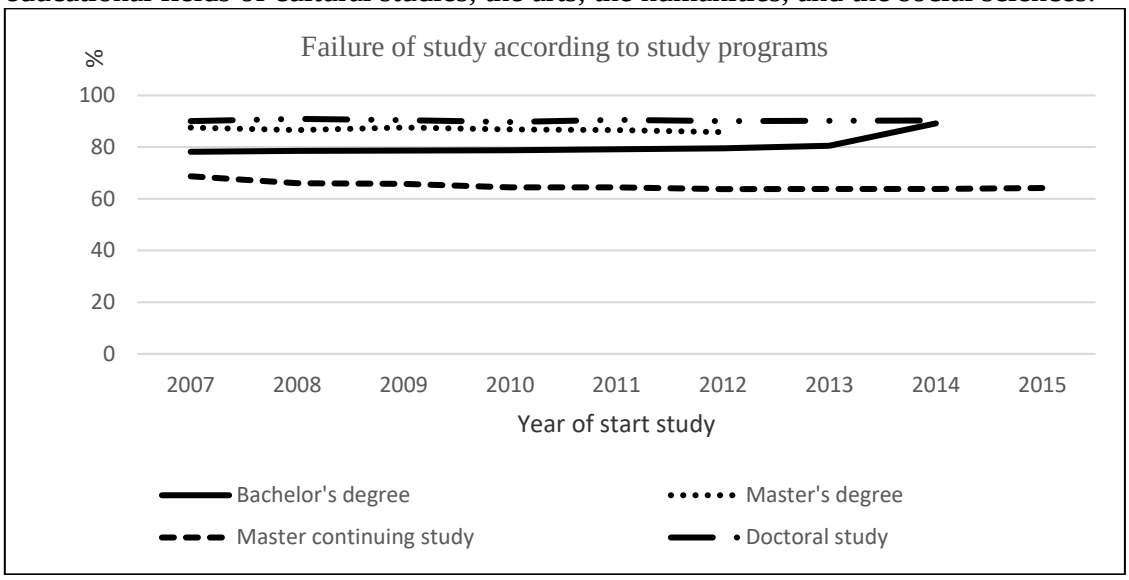

Figure 2 Incompletion of Studies According to Degree Program; source: author's own compilation acc. to (MŠMT 2018).

In the CR, as in many other post-Communist countries, policy aimed at supporting tertiary students in successfully completing their studies largely reflects these countries' persisting conservative approach to the role of higher education. The opinion that education should be the exclusive privilege of the most capable still endures; however, the more demanding work of motivating students has also been distinctly neglected. In fact, not only are the less talented leaving, but also ambitious, capable, and self-confident individuals who criticize the educational system are not completing their education with increasing frequency. These individuals do not see the benefits they expected of higher education and leave to obtain experience, which, especially now, offers them relatively high salaries. Others opt for different academic fields, although they also often leave for abroad.

3.3 The labor market's requirements and tertiary graduates' unemployment rate

The labor market's structure has changed dramatically under the influence of modern technology; at the same time, strong economic growth and the current state of marked low unemployment has fundamentally influenced the balance of power between labor's supply and demand. This has resulted in reinforcing the structural discrepancy between the supply and demand for the labor of tertiary graduates. Problems related to the graduates' levels of preparedness are also constantly increasing. Both the young graduates' actual knowledge as well as the study programs' structure and content are continually lagging ever farther behind the labor market's requirements as seen by employers and companies. Comparative analysis of the data has confirmed the growing social problem of tertiary graduates' employability in the labor market. As this concerns

professions, employer interest in the technical professions and positions in the field of information and communication technology (ICT) dominates across all sectors. Regardless of their size, all companies in the CR are having problems filling ICT positions. The demand is primarily for professions that participate in software development and developers (programmers), as well as engineers, mechanics, testers, and managers for IT workers. An extensive lack of workers is also being seen among craftsmen, who no longer perform difficult manual labor but rather need to be highly qualified professionals such as programmers or developers. There is great interest in CNC operators. In these fields, however, the number of tertiary graduates has been below average over the long term. Moreover, as a result of above-average wages in IT fields, (in 2017, the median was CK 43,081 per month, which is 160% of the median wage for all employees in the CR), there is a new trend to begin work directly after secondary school and put off higher education – or to complete it in a combined form of study. The most alarming aspect of the current situation is in healthcare, where the demand for physicians is many times greater than the number of medical school graduates entering the Czech labor market. On the other hand, the excessive number of graduates in the fields of economics, the humanities, and social sciences is also reflected in the problem of their employment. Moreover, the average level of qualification needed for the work that these graduates will perform in the future has also decreased. Roughly one quarter of them work in places that do not require higher education at all, and another fifth use their education only partially.

The trend for tertiary graduate unemployment levels also underwent dynamic development during this period. Before the CR's entry into the EU, the unemployment level for all tertiary graduates was 8.4%. Afterwards, the indicator's value began a continuous decline. At the end of 2008, the graduate unemployment level began to increase again, primarily as a result of the economic crisis. Between 2010 and 2012, the values fluctuated between 4.0% and 4.6%. In line with the overall economic situation and the positive trend on the Czech labor market, the unemployment level of higher education graduates began to gradually decrease again in 2014, reaching 2.3% in 2017. As demonstrated in the following table (Table 2), we analyzed the unemployment trend for tertiary graduates according to both field of study as well as particular tertiary degree. Over the long term, the lowest unemployment level was seen for graduates in the fields of medicine, pharmacology, health/social work, and law.

Table 2 Unemployment of University Graduates; source: author's own compilation acc. to (Infoabsolvent 2018, MPSV 2018, Zelenka 2017).

	Graduate Unemployment By Degree Program in %				
	Bachelor's Degree	Master's Degree	Doctoral Degree	Total Graduates	Unemployment Rate
2007	4.2	2.6	< 1	2.8	4.97
2017	3.1	2.1	< 1	2.3	4.26
	Graduate Unemployment By Field of Study				
2007	IT and Electrical Engineering, Chemistry and Engineering, Agriculture, Natural Sciences, Social Sciences and the Humanities, Theology, Economics, the Arts				
2017	Agriculture, Natural Sciences, Social Sciences and the Humanities, Theology, Economics, the Arts				

Primarily in recent years, there has also been a low unemployment level for graduates in IT, electrical engineering, and chemical engineering. Conversely, over the

long term, the highest unemployment level was recorded for the fields of agriculture and the arts; there were also above-average unemployment levels for graduates in the natural sciences, humanities, social sciences, and theology. In the humanities, this is primarily concerned graduates in philosophy, cultural anthropology, social ecology, and gender studies.

4 Discussion

Today, it is clear that the future of the Czech labor market will be influenced by new technology, ongoing automation, digitalization, artificial intelligence, and robotics. Accompanying this will also be a transformation of the nature of careers and work methods. Technological advancement makes work easier, although school graduates will need to be able to quickly learn how to work with the latest devices and technology upon entering employment. The focus of human work will gradually shift to control, management, and more creative activities; it can also be assumed that there will be an increasing role for supplementary lifelong education. Therefore, a necessary condition for ensuring the Czech economy's competitiveness is a realistic prediction of the labor market's demands for qualifications. The results of this should be specifications for the requirements of the individual fields in higher education and ensuring their flexible implementation within educational programs – as well as close cooperation between employers and higher education institutions, including individual faculties. Tertiary schools will also need to put greater emphasis on working with information, digital technology, and communication tools; on knowledge of mathematics and IT; and on the abilities to think logically, evaluate processes, make decisions, and seek better, more effective solutions.

The conclusions of our analysis confirm that, over the past ten years, the dynamics of the changing composition of Czech tertiary graduates does not correspond to the dynamic development of the Czech labor market. This is currently true for study programs at all academic levels. The most alarming aspect is the high rate of failure to complete tertiary studies, which somewhat reflects the disproportionate increase in the number of emerging tertiary institutions as well as the number of students that have been admitted in recent years. The existential dependence of institutions of higher education on student numbers and the problem of filling their capacity often lead these institutions to perhaps absurd marketing campaigns; focus is being put on the programs' feasibility rather than emphasizing the higher education's quality. However, higher education's quality is also dependent on the quality and motivation of the individual academic workers. Yet at many Czech tertiary schools, it can be seen that there is a phenomenon of unpropitious choices, which is the result of experts departing on account of higher education's low salaries.

Even though institutions of higher education always undertake more radical changes in their approach to education, students, and ancillary services only very slowly and carefully, they are currently facing a whole range of challenges. To a certain degree, the basic priorities for developing tertiary education in the CR as listed in the Higher Education Development Framework for 2020 do react to the current situation. Implementing the Framework successfully should lead to the goal of the CR's higher education institutions offering a wide spectrum of high-quality study programs in 2020 – ones that will reflect the needs and interests of both a diverse population of students and a modern innovation economy. The conclusions and recommendations of this strategic document can be supported; however, the question remains as to how much of a time lag there will be for it to have an impact on the Czech labor market.

Acknowledgments

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References

Bock, A.J., Opsahl, T., George, G., Gann, D.M. (2012) "The effects of culture and structure on strategic flexibility during business model innovation", *Journal of Management Studies.* Vol. 49, No. 2, pp. 279–305.

Dubcová, G. (2018) "*The Social and Solidarity Economy − One of the Stabilization Ways of Human Capital in Slovak Business",* Verlag Dashöfer, Ljubljana, Slovenia.

Hájek, P., Stejskal, J., Prokop, V. (2018) "Determinants of firms' innovation activities: A case study of German knowledge-intensive industries", In: *Finance & Economics Readings,* Springer, Singapore.

Infoabsolvent (2018) *"Graduate unemployment, by educational field",* Available at: http://www.infoabsolvent.cz/Temata/ClanekAbsolventi/5-1-04/Graduate unemployment/12

MPSV (2018) "Statistical Yearbook 2018", Available at: https://portal.mpsv.cz/sz/stat/stro

MŠMT (2014) *"Higher Education Development Framework",* Available at: http://www.msmt.cz/vzdelavani/vysoke-skolstvi/ramec-rozvoje-vysokeho-skolstvi

MŠMT (2018) *"Development of tertiary education",* Available at: http://www.msmt.cz/vzdelavani/skolstvi-v-cr/statistika-skolstvi/vyvojova-rocenka-skolstvi-2007-08-2017-18

Ritala, P., Olander, H., Michailova, S., Husted, K. (2015) "Knowledge sharing, knowledge leaking and relative innovation performance: An empirical study", *Technovation.* Vol. 35, pp. 22–31.

Romer, P.M. (1990) "Endogenous technological change", *Journal of Political Economy.* Vol. 98, No. 5, pp. 71–102.

Shavit, Y., Muller, W. (ed). (1998) "*From School to Work: A Comparative Study of Educational Qualifications and Occupational Destinations",* Clarendon Press, Oxford, UK.

Stejskal, J., Hajek, P., Hudec, O. (eds). (2018) "*Knowledge Spillovers in Regional Innovation Systems",* Springer Publishing, Cham.

Trow, M.A. (2005) "Reflections on the transition from elite to mass to universal access", In: *International Handbook of Higher Education,* Kluwer Academic Publishers, Norwell, MA.

Volejníková, J. (2017) "The innovation of microeconomics course with a focus on the characteristics of the key descriptors to describe the attainments and skills", In: *The 4th International Multidisciplinary Scientific Conference on Social Sciences and Arts, SGEM 2017 Albena, Bulgaria, Proceedings Book 3,* STEF92 Technology Ltd., Sofia.

Young M. (2003) "National qualifications frameworks as a global phenomenon: A comparative perspective", *Journal of Education and Work.* Vol. 16, No. 3, pp. 223–237.

Zelenka, M. (2017) *"Unemployment of university graduates",* Available at: http://www.strediskovzdelavacipolitiky.info/download/Nezamestnanost%20absolventu%20VS%202002-2017.%20SVP%20PedF%20UK%202018.pdf

Assessment of bossing in secondary school environment of the Slovak Republic in category "Communication area" and "Area of working Life" depending on the length of practice of the respondents

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Abstract

On the theoretical level, the contribution includes the essence of mobbing and bossing. The causes of bossing, its characteristics, methods, consequences for the individual and organization and protection against bossing. On the practical level, the incidence of bossing was evaluated in the environment of secondary education teachers in the Slovak Republic. The aim of the paper was to elaborate logically comprehensive theoretical knowledge from the subject and to find out the real status of bossing in the secondary school environment in the Slovak Republic. Bossing was detected in "Communication area" and "Area of working Life". The following methods were used to achieve the goal: literature study, mathematical-statistical methods, analytical-synthetic method, empirical method (questionnaire technique) and inductive method.

Keywords: communication; work; mobbing; bossing; psychology.

JEL Classification: M12, M50, O15

Article Classification: Research article

1 Introduction

The quality of interpersonal relationships in the organization is an important part of the personnel management and significantly influences the work performance of employees. These relationships are mainly influenced by professional and psychosocial leadership, the quality of communication and the motivation system, the level of self-employment, the level of social care, adequate resolution of conflicts, problems and misunderstandings among employees (Frankovský et al. 2014).

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On the other hand, conflicts, problems, misunderstandings and tensions between employees are perceived as normal (essentially normal) phenomena that are present in almost every work group. These are negative and dangerous if the frequency of their occurrence is high, they have a long-term effect, they concern permanently the same employees, or the problems are not solved. From this point of view in personnel practice of organizations the terms like mobbing or its derivatives, e.g. bossing, staffing, bullying, harassment are more and more frequent. These dangerous phenomena ultimately have a negative impact on both the individual and the organization. The key role of personnel work in an organization is to assess the competences - the professional and psychosocial competencies of the employee to perform a particular job position (Fornés et al. 2011). The issue of mobbing (bossing) is of a specific importance for the pedagogical staff of secondary schools as they educate the younger generation. The generation that, among other things, is very sensitive and truthful to the atmosphere and relationships in the pedagogical organization. In this paper, the emphasis is placed on bossing.

1.1. Mobbing

The term "mobbing" is based on the English word "to mob" and its content is hostile, disgusting and unethical behaviour, carried out systematically and purposefully by one or more persons against another person or group of persons who, due to such behaviour get into a defensive position (Civilidag and Sargin 2013). Psychological terror, therefore, represents inappropriate behaviour in the form of verbal or written taunts, meaning gestures and activities that disrupt the dignity and physical and psychological integrity of a people. It endangers their work performance and significantly contributes to the deterioration of the overall workplace atmosphere (Erturk 2013; Jenčo, 2018). This negative phenomenon has been registered in human behaviour since the 1960s of the 20th century. In the 1990s, the Swedish physician and psychologist H. Leymann started to deal with this phenomenon and he was the pioneer of its identification and description. Gradually, experts from other disciplines, for example, doctors, sociologists, psychologists and managers were paying attention to it as well, since the negative effects of mobbing interfere with the integrity of the whole person.

The term "mobbing" has a lot of synonyms such as psychological terror, psychological abuse, psychological violence (Daňková et al. 2017). The authors compare mobbing to psychological murder, wild hyenas, modern cholera, and plague, and conclude that mental illness at the workplace is reaching epidemic proportions. Whatever the mobbing is, it is a discriminatory expression, undesirable aggression, and a pathological phenomenon (Özyer and Orhan 2012).

1.2 Bossing – a derivate of mobbing

Bossing is a specific form of mobbing where the aggressor is the manager or executive. Attacks are targeted at his subordinates in the form of pressure to enforce their obedience, respect and adaptation, possibly enforcing the "voluntary" resignation of a subordinate from the workplace (Topa and Moriano 2013).

1.2.1 The formation of bossing

Bossing arises under certain specific conditions (causes) that "create" executives due to mistakes they make in their work (they may be caused by their lack of professional competence or insufficient psychosocial competence) (Kavenská et al. 2011). The most

common mistakes of executives in performing their work are: 1. Unclear management policy and absence of management rules. 2. Unclear competencies and chaotic decision-making. 3. Determination of meaningless (unreal) tasks. 4. Only some employees are always overtasked (usually those who are able and willing to work...).5. Forgetting (ignoring) the needs of employees. 6. Constant issuing of new circulars, directives, and constant organizational changes. 7. Subjective, non-transparent and inadequate assessment system. 8. Lack of tolerance, empathy and abilities (unwillingness) to resolve conflicts. 9. The destructive handling with of employees' mistakes and failures. 10. Unfair measure of criticism (Madzík, 2016; Križo, 2018). The most common causes that condition bossing formation include: 1. Insufficient qualification (unwillingness) of managers and executives for leadership (authoritative style of leadership). 2. Low ability of management to solve the conflict (little knowledge, concerns about its solution ...). 3. Permanent pressure to increase performance and reduce costs. 4. Corporate culture with a low level of ethics. 5. Shortcomings in internal company structures. 6. Fear of loss of employment. 7. Hatefulness among employees. 8. Lack of mutual tolerance among employees. 9. Destructive handling with employees' mistakes. 10. Structure of the personality of both the boss and the bossy (Droppa 2013).

According to H. Leymann, a person is considered to be mobbed if at least once a week during 3-6 months one or more activities occur in one of the following five categories (LIPT Questionnaire - Leymann's inventory of psychological terror): "Communication area", "Social Relations area", "Area of Reputation, Respect and Seriousness", "Area of working Life" and "Health area" (Leymann 1990).

1.2.2 Typical characters of bossing

According to professor Leymann the typical signs of bossing include: 1. Aggressive manipulation, hostile and unethical communication. 2. Long-term and continuous attacks targeting a particular individual. 3. Regularity, repeatability, systematism of attacks and their targeting. 4. Threats are indirect and hidden, so it's hard to recognize that something is happening. 5. Refinement, enthusiasm, active and sustained pressure. 6. Despair, indignity, inhumanity. 7. There are persistent signs of hostility and aggression. A key role in eliminating bossing conditions is played by the personality of the executive. He should have the knowledge of psychological terror in the workplace and should have the ability and willingness to avoid the above mentioned mistakes in his work (Yapıcı-Akar et al. 2006).

1.2.3 Methods of bossing

The most commonly used methods by the bossy people include: 1. Method of absurdity: Victims are given difficult tasks that makes no sense. 2. Method of small requirements: The assigned tasks do not correspond to the current qualifications and abilities of the victim. 3. Method of excessive requirements: Victims are allocated jobs that they are unable to handle. 4. Achilles heel method: the victim must principally preferentially handle the tasks that are the most unpleasant. 5. Sustained control method: activities and presence are controlled beyond the normal business environment. 6. Method of surprising decisions concerning the victim - they are being done so that the concerned people do not know about them. 7. Competence clearing method: The current work area of the affected person is systematically more and more limited. 8. Method of isolation: victims are not invited to attend the meetings, retention of important information, space isolation. 9. Method of attack on health: victims are forced to do

harmful work. 10. Method of taunts concerning the mental condition: Victims are said to suffer from mental illnesses and psychiatric disorders (Hrnčiar and Madzík 2015). Bossy people are usually people suffering from complexes, feelings of inferiority, fear of threat of their position, decision and recognition, they are mentally unstable, paranoid. Another cause can be social and corporate pressure on the employee, high demands and expectations of perfect performances. If an employee fails to meet society's expectations adequately, he may feel his own failure and incompetence that he compensates externally with offensive behaviour, giving him a false sense of strength and success (Čarnogurský et al. 2015).

1.2.4 Consequences of bossing for the victim and for the organization

An employee who has become a victim of bossing is behaving similar to stress in several levels: performance level (decrease in working tempo, decreased performance, increased number of mistakes and accidents, absenteeism), psychic level (concentration disturbances, irritability, depression, inferiority, states of fear and anxiety, psychiatric symptoms, suicidal ideas) and psychosomatic level (heart and breathing disorders, headaches, stomach disorders, skin diseases, sleep disorders). The result is psychological and physical exhaustion of the employee, which affects negatively not only work but also personal life. Ignoring such cases can lead to extreme solutions - suicide (Leymann 1990). Psychological terror at work often leads to complete mental and physical exhaustion. Victims of mobbing (bossing) are seriously disturbed mentally and socially. In many cases, the victims see the only way out of taking their lives. According to Swedish research, psychological terror is the cause of 10-20% of all suicides (Leymann 1996).

On the other hand, bossing has negative consequences for the organization on three levels:

- the level of the victim - increasing sickness absence or incapacity for work, decreasing the quality and quantity of the employee's performance by 1/4 to 1/2 of his previous performance,
- the level of bosser - the attacker devotes about 5% of the total productive time to the bossing activities,
- the working environment level - the deterioration of the atmosphere in the group weakens motivation and creativity, work becomes an obligation (Pomffyová et al. 2017).

The negative impact is also reflected in the deterioration of cooperation and communication throughout the working group. The bad working atmosphere lowers motivation and often leads to "inner resignation". Work is an inevitable evil. The economic consequences of bossing can be expressed in the form of a lost workforce, lost working time, higher fluctuation and higher production costs.

1.2.5 Protection against bossing

The problem of bossing and its negative consequences must also be addressed at the level of the whole society. Bossing, in its substance and effect, negatively affects the inner psycho-moral side of its victim (Celik and Peker 2010). This personality component is the holder of significant social and legal characteristics, which the legal order recognizes and protects within the framework of the so-called personality law. Individual personal values can be divided into values of physical nature (life, health, physical integrity) and values of psycho-moral nature (freedom, honour, dignity, inner intimate

sphere). Unauthorized interference with these personal values results in a violation of the basic personality right. According to the Labour Code, labour protection is an inseparable part of labour relations. It is the duty of the employer to ensure the safety and health of employees at work. Discrimination of employees is dealt with by Act no. 365/2004 of the Collection of Laws. It defines (among other things) direct and indirect discrimination, harassment, sexual harassment, and encouragement for discrimination. It also deals with ensuring equality, ways of legal protection, court enforcement, counting non-cash damage. It claims that the employer and the trade union body that has concluded collective agreements are obliged to bring the provisions of the collective agreements into compliance with the Anti-Discrimination Act. This Act also takes over the legal acts of the European Communities and the European Union. An employee may, according to the Complaints Act 9/2010 of the Collection of Laws file a complaint requesting the protection of their rights or legitimately protected interests if they have been broken. The Anti-Discrimination Act provides the possibility to seek legal remedies if it considers that these rights have been violated and the organization has not acted to solve adequate, legal procedures. In the Slovak Republic since 2002, there is the "Public Defender of Rights" institute, where employees can also address the problem of bossing.

2 Material and methods

The main objective of the presented research was to find the perception of the occurrence of bossing as an undesirable phenomenon in the secondary school environment in category "Communication area" and "Area of working Live" depending on the length of practice of the respondents

2.1 Research methodology

For the purposes of the presented research, the original methodology aimed at evaluating of decision-making indicators was used. The questionnaire consisted of 12 items that allow you to judge the occurrence of bossing from different perspectives. The items were evaluated on a 5-point Likert scale where: 1 - I fully agree; 2 - rather agree; 3 - I do not agree or disagree; 4 - rather disagree; 5 - I totally disagree. Unambiguous absence of bossing corresponds to the value of "5" (in terms of the essence of each question). The average values and differences (deviation from value 5) are shown in Table 1 and were calculated according to (1) and (2). The representativeness of selection: According to the source http://www.cvtisr.sk/cvti-sr-vedecka-kniznica/informacie-o-skolstve/statistiky/statisticka-rocenka-publikacia.html?page_id=9580 was in the Slovak Republic September 2017 as a secondary school pedagogical a full-time employee of 20,232 registered teachers. According to this calculation, the recommended minimum sample size is 383 respondents with 5% margin of error and 95% confidence level and assuming uniform distribution of responses. The range of our sample of 393 persons with selective tolerance of 4.2% therefore we considered as adequate. These calculations were performed in the Own elaboration. These calculations were performed in the IBM SPSS STATISTICS statistical program.

$$\emptyset_i = \frac{1}{393}\sum_{i=1}^{393} x_i \qquad (1)$$

where:

∅_i - average value of i-th question;

xi - the value assigned to - by the respondent;
i = 1,2,3 ... 393 (number of respondents).

Differences:

$$\Delta_i = 5 - \emptyset_i; \quad (2)$$

i = 1,2, ... 30.

where:
Δi - the average value of the i-th deviation from the value "5";
i - question number;
Ø_i- average value of i-th question.

The average deviation value in category "Communication area " - Ø_Δc (Table 2) and the average deviation value in category "Area of working Live" - Ø_Δwl (Table 3), for each category of respondents, were calculated according to (3) and (4). Total average deviation value overall average value by the order - Øo (Table 5) for each category of respondents was calculated by (5):

$$\emptyset_{\Delta c} = \frac{1}{6}\sum_{i=1}^{6} \Delta i \quad (3)$$

$$\emptyset_{\Delta wl} = \frac{1}{6}\sum_{i=19}^{24} \Delta i \quad (4)$$

where:
Δi - the average i-deviation value;
i - question number.

$$\emptyset_o = \frac{1}{2}(\emptyset_{\Delta c} + \emptyset_{\Delta wl}) \quad (5)$$

where:
$\emptyset_o$ - the total average value of the deviation is in the category of respondents;
$\emptyset_{\Delta c}$ - average deviation value in the "Communication area" category;
$\emptyset_{\Delta wl}$ - average deviation value in the "Area of working Live" category.

Number and gender: 393 respondents = 62 men (15.8%) and 331 women (84.2%). Practice (years): "up to 5" - 40 (10.2%); "6 to 10" - 108 (27.5%); "11 to 15" - 88 (22.4%); "16 to 20" - 52 (13.2%); "over 20" - 105 (26.7%).

3 Results

Respondents were acquainted with the attributes of bossing (frequency of attacks) and answered the following questions:

- "Communication area" (Questions 1 to 6)

1. The superior does not allow me to comment on my criticism. 2. The supervisor does not call me to attend the operative meetings. 3. My supervisor does not assign a word to me even if I am interested in it. 4. The supervisor does not allow me to access the necessary non-distorted information to fulfil my tasks. 5.The superior stopped communicating with me, respectively he communicates with me minimally. 6. Colleagues are forbidden to communicate with me.

- "Area of working Life" (Questions 19 to 24)

19. The supervisor allocates me jobs that do not match my qualification. 20. The supervisor, if necessary, takes away competencies from me. 21. My supervisor checks my performance, presence at work more closely than of other colleagues. 22. The supervisor does not allow to attend training courses. 23. The superior has repeatedly reminded me of all my mistakes and exaggerates them excessively. 24. Other discriminatory activities are being led by my supervisor.

Note: Questions are not numbered in order.

Table 1 Average values and differences

Question	**Q_ 01**	**Q_ 02**	**Q_ 03**	**Q_ 04**	**Q_ 05**	**Q_ 06**	**Q_ 19**	**Q_ 20**	**Q_ 21**	**Q_ 22**	**Q_ 23**	**Q_ 24**
Average/ $\emptyset_i$	3,96	3,99	4,15	3,94	4,25	4,41	4,24	4,41	4,49	4,51	4,45	4,68
Difference/ Δ_i	1,04	1,01	0,85	1,06	0,75	0,59	0,76	0,59	0,51	0,49	0,55	0,32

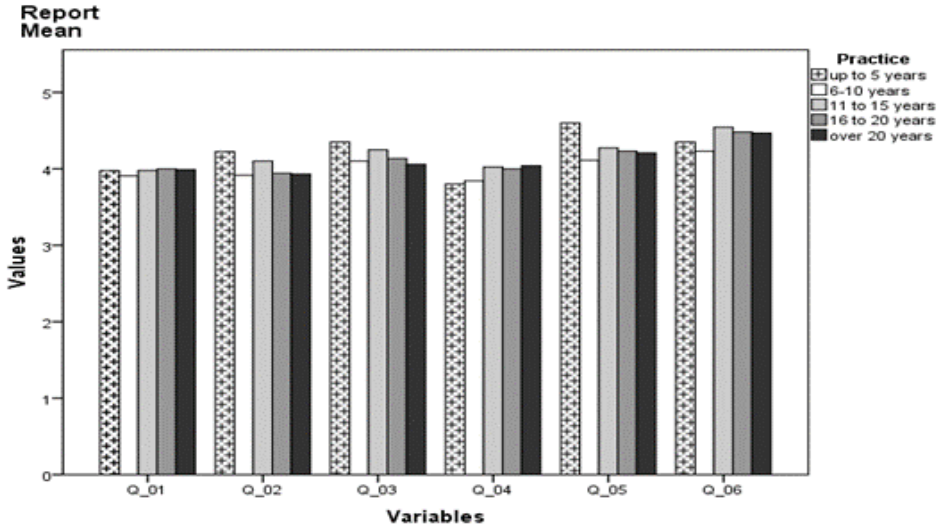

Figure 1 Values in the category "Communication area"; source: own processing

Table 2 Diferentiation of values in the category "Communication area"; source: own processing

Practice (years)	**Δ_{01}**	**Δ_{02}**	**Δ_{03}**	**Δ_{04}**	**Δ_{05}**	**Δ_{06}**	**$\emptyset_{\Delta c}$**	**Average values**	R_c
"up to 5 "	1,025	0,775	0,650	1,200	0,400	0,650	0,783	4,217	**1.**
"6 to 10"	1,093	1,083	0,898	1,157	0,889	0,769	0,982	4,018	**5.**
"11to 15"	1,023	0,898	0,750	0,977	0,727	0,455	0,805	4,195	**2.**
"16 to 20"	1,000	1,058	0,865	1,000	0,769	0,519	0,869	4,131	**3.**
"over 20"	1,010	1,069	0,941	0,960	0,792	0,535	0,885	4,115	**4.**

Comment: Rc - Ranking of respondents' categories according to their bossing assessment

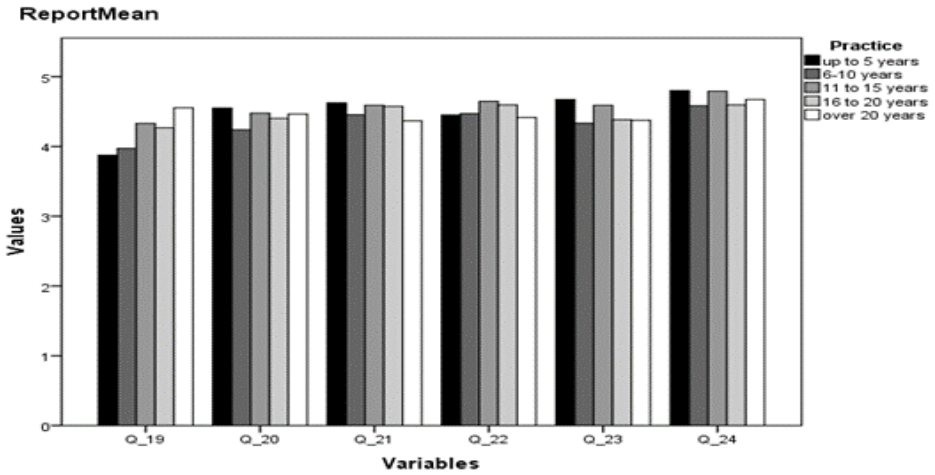

Figure 2 Values in the category "Area of working Life"; source: own processing

Table 3 Differentiation of values in the category "Area of working Life"

Practice (years)	Δ19	Δ20	Δ21	Δ22	Δ23	Δ24	ØΔ wl	Average values	Rwl
"up to 5 "	1,125	0,450	0,375	0,550	0,325	0,200	0,504	4,496	2.
"6 to10"	1,028	0,759	0,546	0,528	0,667	0,417	0,658	4,342	5.
"11 to 15"	0,671	0,523	0,409	0,352	0,409	0,207	0,429	4,571	1.
"16 to 20"	0,731	0,596	0,423	0,404	0,615	0,404	0,529	4,471	4.
"over 20"	0,446	0,535	0,634	0,584	0,624	0,327	0,525	4,475	3.

Comment: Rwl - Ranking of respondents' categories according to their bossing

Table 4 The results of the correlation analysis after participation in the category "Communication area" and "Area of working Life

Pearson Correlation

	Q_01	Q_02	Q_03	Q_04	Q_05	Q_06	Q_19	Q_20	Q_21	Q_22	Q_23	Q_24
Q_01	1	,512**	,495**	,485**	,407**	,370**	,227**	,416**	,346**	,388**	,408**	,283**
Q_02	,512**	1	,456**	,379**	,202**	,222**	,005	,182**	,198**	,129*	,262**	,176**
Q_03	,495**	,456**	1	,515**	,249**	,242**	,116*	,216**	,283**	,256**	,314**	,264**
Q_04	,485**	,379**	,515**	1	,262**	,335**	,207**	,322**	,253**	,314**	,259**	,262**
Q_05	,407**	,202**	,249**	,262**	1	,471**	,244**	,451**	,428**	,339**	,446**	,403**
Q_06	,370**	,222**	,242**	,335**	,471**	1	,128*	,301**	,321**	,305**	,359**	,387**
Q_19	,227**	,005	,116*	,207**	,244**	,128*	1	,487**	,280**	,286**	,313**	,245**
Q_20	,416**	,12**	,216**	,322**	,451**	,301**	,487**	1	,550**	,403**	,547**	,490**
Q_21	,346**	,198**	,283**	,253**	,428**	,321**	,280**	,550**	1	,522**	,684**	,520**
Q_22	,388**	,129*	,256**	,314**	,339**	,305**	,286**	,403**	,522**	1	,477**	,433**
Q_23	,408**	,262**	,314**	,259**	,446**	,359**	,313**	,547**	,684**	,477**	1	,586**
Q_24	,283**	,176**	,264**	,262**	,403**	,387**	,245**	,490**	,520**	,433**	,586**	1

**. Correlation is significant at the 0.01 level (2-tailed)

*. Correlation is significant at the 0.05 level (2-tailed)

(Source: own elaboration)

Table 5 Ranking of respondent categories according to their average values

Practice (years)	**$\emptyset_{\Delta c}$**	**$\emptyset_{\Delta wl}$**	**$\emptyset_o$**	**Average value**	**R**
"up to 5"	0,783	0,504	0,644	4,356	2.
"6 to 10"	0,982	0,658	0,820	4,180	5.
"11 to 15"	0,805	0,429	0,617	4,383	1.
"16 to 20"	0,869	0,529	0,699	4,301	3.
"over 20"	0,885	0,525	0,705	4,295	4.

Comment: R - Ranking of respondents' categories based on their bossing ratings in both categories examine, Øo - the total average value of the deviation is in the category of Respondents

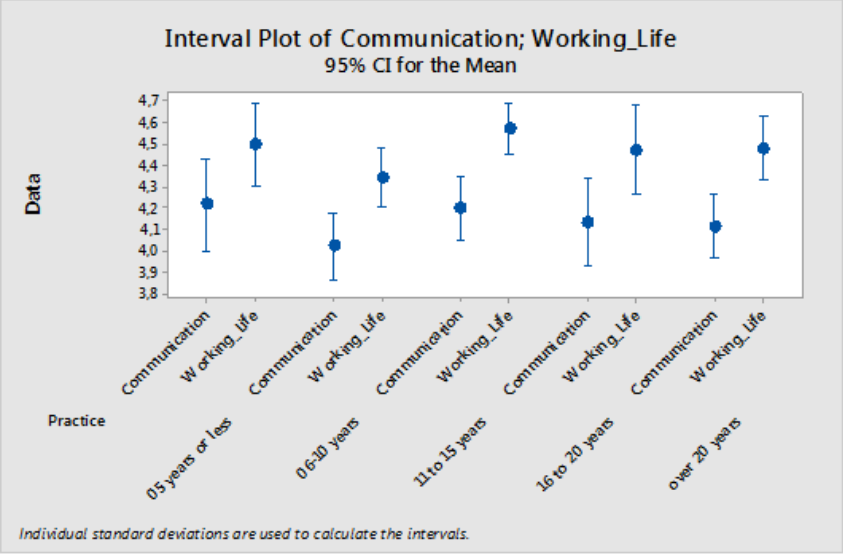

Figure 3 Average values awarded by respondents in the categories in the categories "Communication area" and "Area of working Life"

3.1 Analysis of results

The rating of "5" (unambiguous absence of bossing) was not attributed to any category of respondents in the surveyed "Communication area" and "Area of working

Life" categories. Category "Communication area". In this category, the value of "5" was most closely attributed to the respondents category "up to 5" years with a value of 4.217. Least closely to the value “5” was the "6 to 10" years category with a value of 4.018. The difference in the assigned values between these two categories of respondents is 0.199. Category "Area of working Life". In this category, the value of "5" was most closely attributed to the respondents category "11 to 15" years with a value of 4.571. Least closely to the value “5” was the "6 to 10" years category with a value of 4.342. The difference in the assigned values between these two categories of respondents is 0.229.

Table 4 is symmetrical according to the main diagonal. Each value contained in the table represents the relationship of a pair of variables. Due to the positive values, the value of the second variable changes as well. In the case of one asterisk, the statistical significance is 95%, in the case of two ones, the statistical significance is 99%. The larger the Pearson coefficient, the more intense is the relationship between the two variables. For example, the relationship between Q_02 ("The supervisor does not call me to attend the operative meetings") and Q_21 ("My supervisor checks my performance, presence at work more closely than of other colleagues") has a value of 0,198 but the relationship between Q_05 ("The superior stopped communicating with me, respectively he communicates with me minimally") and Q_23 ("The superior has repeatedly reminded me of all my mistakes and exaggerates them excessively") has a value of 0.446. Thus, the relationship between Q_05 and Q_23 is more intense than the relationship between Q_02 and Q_21. If the stars are not the result, the relationship is not significant.

Table 5 (R) shows the order of the respondent categories for the both categories examined. The respondent category "11 to 15" years was most closely to the value "5", with a value of 4.383. Least closely to the value "5" was the "6 to 10" years category with a value of 4.180. The difference in the assigned values between these categories of respondents is 0.203.

4 Discussion

According to research, in the UK, "up to 5" 3% of employees have become victims of mobbing at work, and up to 78% have witnessed this. Workplace mobbing is becoming a problem in many countries (such as Australia, Austria, Denmark, Sweden, Germany, Spain, Turkey...). In the Czech Republic, a civil association "Work and Relations" was established to help victims of mobbing and bossing. In the future, despite the positive results that have been identified, ie the incidence of bossing has not been confirmed, it is necessary to put an emphasis on prevention. Education in this area should be key. The authors also consider the factor of a certain degree of repression as a significant factor, as the quality of interpersonal relationships at workplaces (not only) has fallen sharply in the last two decades. In many cases, people experience burnout syndrome, protectionism, family life, corruption, unfairness in evaluation, indifference, apathy, intrigue, defamation, envy, and - for these reasons - are subject to immoral practices. A good system of education, prevention, identification of bossing attributes, transparent criteria, practices, and possibly repression could help to solve this - rather complicated - problem.

Based on the results achieved (none of the respondents attributed the value of "5", which is a unambiguous absence of bossing), and on the basis that bossing tends to expand in Europe, it would be appropriate to put periodic training on it.

References

Celik, S., Peker, S. (2010) "Mobbing perceptions of high school teachers", *Procedia-Social Behavioral Sciences,* Vol. 9, pp. 1617–1623.

Civilidag, A., Sargin, N. (2013) "Academics' Mobbing and Job Satisfaction Levels", *The Online Journal of Counseling and Education,* Vol. 2, No. 2, pp. 55–66.

Daňková, A., Čepelová, A., Koreňová, D. (2017) "Process efficiency of local self-government in Slovak Republic", In: *Anna Journal of International Studies*. Vol. 10, No. 2, pp. 309–317.

Droppa, M. (2013) *"Riadenie ľudských zdrojov 2",* Katolícka univerzita v Ružomberku, Ružomberok, Slovakia.

Erturk, A. (2013) "Mobbing Behaviour: Victims and the Affected", *Educational Sciences: Theory and Practice,* Vol. 13, No. 1, pp. 169–173.

Fornés, J., Cardoso, M., Castelló, J.M., Gili, M. (2011) "Psychological harassment in the nursing workplace: An observational study", Archives of Psychiatric Nursing. Vol. 25, No. 3, pp. 185–194.

Frankovský, M., Zibrínová, Ľ., Birknerová, Z., Zbihlejová, L. (2014) "Identification and Specification of Dimensions of Cognitive Distortions. SGEM 2014", In: *Conference on Psychology and Psychiatry, Sociology and Healthcare, Education*.

Hrnčiar, M., Madzík, P. (2017) "A 3D view of issues of quality in higher education", *Total Quality Management & Business Excellence*, Vol. 28, No. 5-6, pp. 633–662.

Jenčo, M. et al. (2018) "Assessing the quality of employees in terms of their resistance", *Quality – Access to Success*. Vol. 19, No. 167, pp. 48–53.

Kavenská, V., Smékalová, E., Šmahaj, J. (2011) "Výzkum v oblasti školní psychologie v České republice", *E-psychologie,* Vol. 5, No. 4, pp. 55–67.

Križo, P. et al. (2018) "Evaluation of the most frequented forms of customer feedback acquisition and analysis", *Communications in Computer and Information Science.* Vol. 877, pp. 562–573.

Leymann, H. (1996) "The Content and Development of Mobbing at Work", *European Journal of Work and Organizational Psychology.* Vol. 5, No. 2, pp. 165–184.

Leymann. H. (1990) "Mobbing and Psychological Terror at Workplaces", *Violence and Victims,* Vol. 5, No. 2, pp. 119–126.

Madzík, P., Chocholáková, A. (2016) "Structured Transfer of Customer's Requirements into Product Quality Attributes - A University Case Study", *Quality – Access to Success,* Vol. 17, No. 154, pp. 38–45.

Özyer, K., Orhan, U. (2012) "Akademisyenlere Uygulanan Psikolojik Tacize Yönelik Ampirik Bir Arastirma/An Ampirical Study of the Mobbing Applied to Academicians", *Ege Akademik Bakis,* Vol. 12, No. 4, pp. 511–520.

Pomffyová, M., Kožárová, M., Krajčík, V. (2017) "Innovative and information perspectives of business management", *Polish Journal of Management Studies*. Vol. 16, No. 2, pp. 221–232.

Topa, G., Moriano, J.A. (2013) "Stress and nurses' horizontal mobbing: Moderating effects of group identity and group support", *Nursing outlook.* Vol. 61, No. 3, pp. 25–31.

Yapıcı-Akar, N., Anafarta, N., Sarvan, F. (2006) "*Causes, Dimensions and Organizational Consequences of Mobbing: An Empirical Study",* Ege Akademik Bakış. Vol. 11, No. 1, pp. 179 –191.

Analysis of learning styles of management students

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Abstract

Actually is necessary to identify our own way of recognition and sorting of information, so-called the cognitive style, which is closely linked with our learning style. The contribution contains theoretical background of many learning styles typologies (e.g. according to brain hemispheres dominance, intelligence, learning motivation, etc.) and research deals with the D. A. Kolb's typology (divergator, assimilator, convergator and accomodator). Aim of the contribution is to analyze learning styles preference of management students at the Pedagogical Faculty of the Catholic University in Poprad, to identify correlation between learning styles preference and future students' professional orientation and to suggest some possibilities for individual learning styles development by the active learning methods. In the research sample composed of 87 students are 2 learning styles dominant (convergator and accomodator) in number of 30 (34,5 %) and between learning styles preference and future professional orientation is a weak positive correlation expressed by the Pearson's correlation coefficient (r =19,44 %). In contribution is used an interrogative method represented by the standardized Kolb's questionnaire, mathematical-statistical methods (descriptive statistics and correlation analysis), case studies (problem tasks) aimed at the active learning methods in subjects microeconomics and macroeconomics and basic idea operations.

Keywords: learning styles; management students; professional orientation; self-cognition; human potential development; teaching of economics.

JEL Classification: A12, A22, I21, J24, M53

Article Classification: Case study

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1 Introduction

Teachers often adress this sentence to students: „You can't learn.“ Teacher should help student learn to learn, to find effective and for individuals understandable learning strategies and to recognize own learning style. Then could students not only better self-accept, but also have more effective time management by learning. With the recognition of learning style is also increasing self-knowledge of students – in our case future managers or economists. Every of us prefers logical or creative thinking, concrete or abstract thinking, team or individual work and other features, which could have impact on our future professional orientation. Mareš (1998) often compares learning styles analysis to well-known personality test MBTI (Myers Briggs Type Indicator): introversion (I) and extroversion (E), sensing (S) and intuition (N), thinking (T) and feeling (F) and judging (J) and perceiving (P).

If we recognize our own features, we could do all tasks effectively, productively and efficient. Learning styles are derived from conginitive styles. Research of both things belongs to the most beneficial innovations of learning and teaching process because of the support of metacongnition and metalearning. Metacongnition and metalearning include also some methods, which increase the learning effectiveness – so-called mnemotechnical tools (e.g. mind maps, memory palace, fast reading and Pareto's rule 80:20 – for learning 80 % of the most important information we need only 20 % of all spent time) (Hlinka, 2013; Meurer et al., 2018, Jenčo, 2018, Križo, 2018a).

1.1 Cognitive and learning styles

Cognitive and learning styles are parts of the metacognitive human potential. The prefix meta- marks higher order phenomenon, superior to the phenomenon, which creates word root, e. g. metacognitive means „recognition about recognition“ and metalearning means „learning about learning“ (Mareš, 1998).

According to Petlák (2012, p. 55) and Turek (2008, p. 83) „cognitive style is a way, which somebody prefers by receiving and processing of information, it's predominantly congenital, it's difficult to change it and it's only little linked with content.“ Learning style „is a summary of procedures, which individual prefers by learning. It's developing from congenital basis, but during the lifetime it's changing and improving...People usually don't realize them, don't analyze them systematic, don't improve them... Change of learning style isn't simple and individuals could change it either alone or with social enviromnent (teachers, classmates, parents, etc.).“

1.2 Basic classifications of learning styles

We could classify learning styles according to many criteria. In literature are mostly mentioned these classifications, but in the analytical part of contribution we would deal with D. A. Kolb's classification.

1. According to brain hemispheres dominance – it's the most simple classification, which comes from researches of the American neuroscientist R. W. Sperry (Nobel price – 1981), who based on surgery of epileptic patients (separation of network of neural connections between hemispheres, so-called corpus callosum) demonstrated, that an individual could use two independent ways of thinking and cognition. To the most important features of the left hemisphere are verbal, logical and convergent thinking, rationality and analysis, in case of the right hemisphere are non-verbal, creative and divergent thinking, intuition and synthesis. Differences between hemispheres we can't

consider as the absolute because of different lateralization levels of individuals. Women have stronger neural connections between hemispheres and men within hemispheres. Very similar features has also classification of learning styles into serialistic (methodical following step by step), holistic (systematic) and flexible (combination of serialistic and holistic learning) (Mareš, 1998; Mikuláštík, 2010; Edwards, 2012; Križo, 2018b).

2. According to motivation and intention, resp. according to learning orientation we differentiate 3 basic approaches to learning: superficial (prevails external motivation), thoughtful (prevails internal motivation and interest in learning content) and strategic (oriented at the best performance) (Mareš, 1998).
3. According to sensory preference (VARK) we divide learning styles into Visual (orientation in pictures, diagrams and graphs), Aural (listening to lectures, loud learning), Read/Write (good memory to read text, transcription of text) and Kinesthetic (manipulation with tools, sense for practical activities) (Mareš, 1998; Petlák, 2012).
4. According to prevailing form of intellligence we differentiate based on the Gardner's theory of multiple intelligence 9 types of learning styles: linguistic (W. Shakespeare, G. G. Byron), logical-mathematical (A. Einstein, M. Curie), space-visual (L. da Vinci, P. Piccasso), kinesthetic (Ch. Chaplin, M. Jordan), musical (W. A. Mozart, L. van Beethoven), interpersonal (M. Gándhí, Mother Teresa), intrapersonal (S. Freud, C. G. Jung), natural (Ch. Darwin, G. Mendel) or existential (Dalajláma, J. P. Sartre) (Mareš, 1998; Urban, 2003; Antonio, 2018).
5. According to mutual connection of abstract and concrete perception abilities and random knowledge separation – it's a parallel of learning styles to earth elements: concrete-sequence (earth – methodical, sense for detail), abstract-sequence (air – sense for theory and ideas), abstract-random (water – dominance of intuition) and concrete-random (fire – experiment and creativity) (Pike, Selby, 1988; Gullach, 2011).
6. According to reality perception (concrete, abstract) and way of the information processing (observation, manipulation), resp. according to D. A. Kolb. Divergator (concrete reflexive, innovator) is characterized by creative thinking, is curious, likes brainstorming and his professional orientation is aimed at humanitarian and art sciences, mentoring and human resources management. Assimilator (abstract reflexive, analyst) prefers ideas, theories and models more than people and his professional orientation is aimed at science and reseach. Convergator (abstract active, practician) is characterized by application ideas to the practice, logical-mathematical thinking and his professional orietation is aimed at natural sciences, finance and accounting. Accomodator (concrete active, dynamic) connects information with their application, he hasn't fear from risk taking and plans realizing, he likes freedom and his professional orientation is aimed at business, services, marketing and innovations (Turek, 2008; Cinová, 2013; Birkner, 2016; Colenci Trevelin, 2018; Meurer et al., 2018).
7. Other classifications, which are little used in pedagogical practice because of the lack of standardized questionnaires and personal individuality– e.g. according to gender differences and according to chronobiological preferences (morning bird, night owl) (Mareš, 1998).

2 Material and methods

Aim of the contribution is to analyze learning styles preference of management students at the Pedagogical Faculty of the Catholic Univestity in Poprad, to identify correlation between learning styles preference and future students' professional orientation and to suggest some possibilities for individual learning styles development

by the active learning methods. We choose the Kolb's typology of learning styles. According to the aim are formulated 2 research questions:

RQ1: How much is the absolute and relative number of learning styles in the research sample?

RQ2: How strong is the correlation between the learning styles preference and students' professional orientation?

For solution of these 2 questions we used standardized questionnaire of D. A. Kolb LSI IIA (Learning Styles Inventory), which was distributed to 87 students (1st and 2nd class of internal bachelor study). Questionnaire contains 12 questions (appendix) with possibilities A–D and respondent should them allocate maximal 4 points (in case of total agreement). Then we could based on the assessment key set final score of each learning style (e.g. divergator = 35, assimilator = 17, convergator = 30 and accomodator = 38).

For RQ2 solution, resp. correlation between learning styles preference and professional orientation were accepted theoretical information and then was to the standardized questionnaire added 13th question, where respondents should allocate to the possilibilities A–D maximal 4 points. To the possibilities are chosen some profession groups, which could students do after graduation (A – human resources manager, employee education specialist, coach/mentor = divergator, B – economics theoretician, economics analyst, economics scientist – PhD student, assistant professor = assimilator, C–accountant, finance manager, tax advisor = convergator, D – marketing manager, PR manager, innovation manager = accomodator). Then was setted a correlation between score for learning styles and score for this question (e.g. divegator = 35 vs. A = 3, assimilator = 17 vs. B = 2, convergator = 30 vs. C = 1, accomodator = 38 vs. D = 4). For correlation quantification is used the Pearson's correlation coefficient.

We suggest for development of each learning style 2 chosen methods of active learning to improve pedagogical process. These suggestions are apllied to chosen problem tasks from subjects Microecnomics and Macroeconomics.

In addition to this standardized questionnaire and additional question about professional orientation respondents answered also to open question about their methods for effective learning and they should it apply to these subjects, too. The most interesting answers are mentioned in contribution.

3 Results

Within the learning styles analysis we set: absolute and relative number of learning styles in research sample (RQ1), correlation between the learning styles preference and future professional orientation (RQ2). Then we suggest in form of case studies (problem tasks) from microecnomics and macroeconomics some active learning methods, which could learning styles support.

3.1 Analysis of learning styles of management students and its correlation with their future professional orientation

We found out in the sample of 87 students according to the Kolb's Learning Styles Inventory, that 30 students (34,5 %) reach the hightest score in learning style convergator. The same result has also accomodator. Convergators and accomodators belong to active learning styles, which are interesting in practice more than in theory and definitions, convergators are more aimed at exact and quantitative sciences and accomodators at

creative areas and marketing. We also could say, that economical-managerial study programms are practically oriented and it's suitable for these students' abilities. The number of assimilators is 14 (16,1 %), that means also relative little interest of students in scientific theories and analyzes. The most rare learning style, which is dominant only by 6 students (6,9 %), is divergator. They are the rarest in all population, characterized by creative thinking and various ideas without limitations. It could by caused by more logical thinking development in pedagogical practice than creative, which is mostly decreasing in adult age (left hemisphere dominance in population). 7 students (8,0 %) reach the same score in two learning styles (convergator + accomodator – 3 students, convergator + assimilator – 2 students, divergator + assimilator – 1 student a the strangest and contradictory combination is divergator + convergator – 1 student) (figure 1).

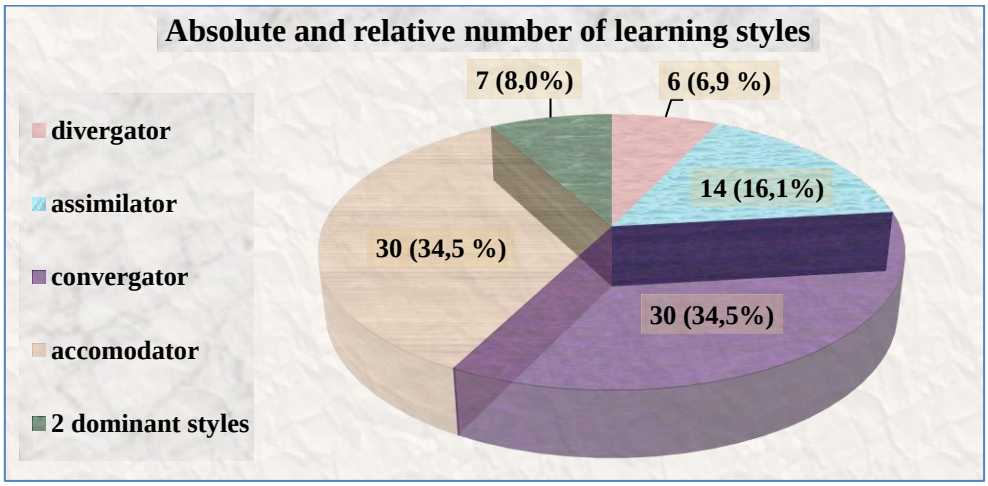

Figure 1 Absolute and relative number of learning styles; source: own processing.

The next step was to express the correlation between learning styles preference score and professional orientation groups score in 13th question, which are analogically assigned to the learnign styles according to the theory (RQ2). The Pearson's correlation coefficient reaches the value r = 0,1944 (19,44 %). We could say, that between investigated variables is weak positive correlation. Professional orientation is determined not only by learning style (e.g. logical vs. creative thinking, concrete vs. abstract thinking, etc.), but also by other factors like e.g. teacher's approach to students at lectures from subjects, which are connected with given professional orientation (interest of lectures, teacher's rhetoric, transparency of evaluation, etc.), financial or non-financial benefits, career growth possibilities a external factors, e.g. labour market situation, expected succession in family business, etc.

3.2 Suggestions for improvement of economics teaching in regard to learning styles

In following sub-chapter are mentioned some suggestions of active learning, which are suitable for Kolb's learning styles. There are some problem tasks from microecomomics and macroeconomics, complemented also by fundamentals of ecnonomical theories and management. By these suggestiones we come from literature about active learning methods (Mikuláštík, 2010; Gullach, 2011; Tomengová, 2012). We recommend rotate following methods during the lecture to be any from learning styles discriminated and to be detected also less preferred learning styles of students.

3.2.1 Suggestions for divergators

For divergators, which are the least prevailed learning style in this research sample (6, resp. 6,9 %), we recommend some creativity development methods, e.g. „Six thinking hats“ (Edward de Bono) or activity „Lotus flower“ (Matsumura Yasuo).

Activity „Six thinking hats“

Aim of this method are 6 various points of view, therefore it's suitable to divide students into 6 groups and every group is represented by one hat. Hats are differentiated by colors and their meaning is following:

1. White hat: We don't express our feelings, we only name available data and facts.
2. Red hat: It's a hat of love and hate, we express and describe our feelings.
3. Yellow hat: It's a hat of beautiful and good things. We express advantages of something.
4. Black hat: It's a hat of ugly and bad things. We express disadvantages and our aim is to avoid mistakes and risk taking.
5. Green hat: It's a hat of provocation, creativity and ideas. These ideas we could also combine.
6. Blue hat: It's a hat of perspective and objectivity, it decides about other hats using. By its using we consider all opinions and summarize information.

Task No.1 is focused on elimination of negative externalities, which belong to the market imperfections.

Company XY has been on the market for 20 years, it's successful and social responsible. Its subject of business activity is chemical processing. By the external environment analysis was detected, that this company has polluted water by chemicals for 2 months. CEO claims, that it's not intentional. In addition, legislative was changed and financial contributions for this company from government will be desreasing. CEO has afraid not only of loss because of lower government contributions, but also because of future increasing environmental costs. He decided to call a meeting and employees should solve this problem by the „Six thinking hats“ method...

Activity„ Lotus flower (Matsumura Yasuo)“

This method comes from Japan. It's relatively unknown and very similar to brainstorming. It's used not only in education, but also in business by suggestions of innovation and promotion. In the middle is located the main problem for solving, around it are located possible solutions expressed by A – H. Then we can also write it to the middle and further develop (figure 2).

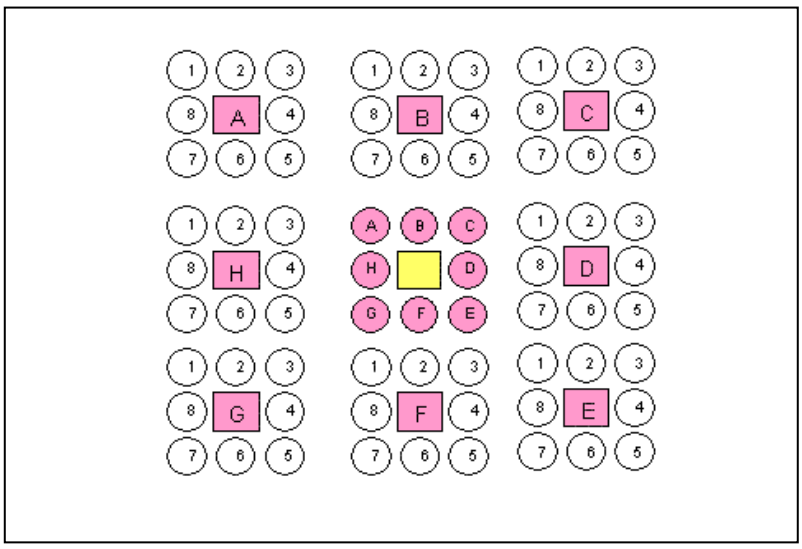

Figure 2 Activity „Lotus flower"; source: Mikuláštík (2010).

Activity No.2 deals with non-price competition and significance of innovations in economics.

Compare 2 competiting hotels according to minimal 3 non-price criteria (e.g. number of rooms, wellness, food...). Then suggest some ideas (e.g. product or promotion innovations) for the worse evaluated hotel. It's not neceessary to suggest ideas according to before setted criteria, you can creative think. By the task solution you should use the „Lotus flower" method and further develop these ideas.

3.2.2 Suggestions for assimilators

Assimilators, in the research sample the second least prevailed learning style (14, resp. 16,1 %), are good at ideas, theories and concepts understanding and therefore in addition to the traditional lecture we recommend activities: „Statements" a „Folder" (Jigsaw).

Activity „Statements"

Every student choose one card, read text and tries to understand an idea. Then he gives card back. Then students individual read text and try to exmplain this idea. The method improves communication skills and tolerance to other opinions.

Task No.3 is connected with statements of well-known economists.

Try to read and understand some statements of well-known economists on cards. Then try to explain it and express your opinion:

„If you give Sahara to the goverment responsibility, in 5 yeras will be there lack of sand."/M. Friedman/

„Individual effort serves to general good."/A. Smith/

„Customer satisfaction provides social sense for all ecnomical activities." /J. A. Schumpeter/

„Farmer and producer can't live without profit no more than employee without wage." /D. Ricardo/

„In long run we are all dead."/J. M. Keynes/

„Problem of socialism is, that money of others will be spent at last."/M. Thatcher/

„The right to the material status equality could be reached only by the totalitarian government." /F. A. Hayek/ etc.

Activity „Folder (Jigsaw)“

This activity belongs to the cooperative learning of news on the lecture. Teacher divides theme into sub-themes and according to their number suggests also number of groups. Every group becomes some sub-theme for individual study and becomes an expert for its. Then should be groups transformated to be in each group an expert for every part. Experts explain their theme to others and answer to some questions.

Task No.4 is connected with the market mechanism and price elasticity.

Divide into 6 groups. Every group should study a sub-theme and would be an expert. After the studying create again groups to be in each group an expert for every part of theme. Sub-themes are following:

1. *Demand and demand factors.*
2. *Demand curve and its construction.*
3. *Supply and supply factors.*
4. *Supply curve and its construction.*
5. *Equilibrium, market shortage and surplus.*
6. *Demand and supply elasticity.*

3.2.3 Suggestions for convergators

Convergators, which same as accomodators are the most prevailed students' group (30, resp. 34,5 %), are characterized by logical, analytical and convergent thinking. Based on these features we recommend to use activities „Domino“ and „Filtering“.

Activity „Domino“

Teacher prepares 16 cards divided into 2 parts. On the left side is the answer and on the right side the question, but answer isn't linked with the question. Students groups with 3-4 members should it put together like by the well-known game “Domino“. The main advantage of the method is logical thinking development and team cooperation.

Task No.5 contains some information from microeconomics, macroeconomics and economical theory (figure 3).

You should play Domino with these cards.

Capital	*Author of the comparative advantage theory*	*Increasing*	*Environmental damage is*
Positive externality	*Relation between inflation and unemployment*	*Active balance of payment*	*Place, where meet seller and buyer*
Physiocratism	*Protects competitive environment*	*Kondratiev's*	*Economical theory of Francois Quesnay*
Equilibrium	*Need of government interventions explains*	*David Ricardo*	*Demand > Supply*
Decreasing	*Advantage for other economical subject*	*Market*	*The best-known work of Karl Marx*
Consumer Price Index	*Long-term business cycles*	*Philips curve*	*Demand curve*
Antimonopoly office	*Other name for market balance*	*Negative externality*	*Supply curve*
Market shortage	*Inflation rate expression*	*John Maynard Keynes*	*Export >import*

Figure 3 Activity „Domino“; source: own elaboration.

Activity „Filtering“

Convergators are good at understanding of main ideas in text. Students should read text and find 5 key words. On chalkboard is the big filter. Then individuals and pairs write these key words to this filer. After filtering they can with 5 key words further work or it can serve them as a mnemotechnical tool.

Task No. 6 is focused on the father of ecnomics Adam Smith.

Try to filter from the text about the invisible market hand 5 key words to further work.

Adam Smith considers own interest (egoism) as the mover of economical development. Every individual, which follows his own interests, tries to increase his welfare, follows also country interest and then is total welfare increased. The invisible market hand allocates limited sources to individuals, which could it effective utilize for own and social benefit. Smith supports trade freedom and recommends government interventions only in following 3 cases: external safety, internal safety and public goods.

3.2.4 Suggestions for accomodators

Accomodators (30, resp. 34,5 %) prefer learning, which they can try practically. From active learning metods we recommned activities „CAF – Consider All Factors“ and „Morphological matrix“.

Activity „ Consider all factors (CAF)“

This activity supports students' thinking about all factors, which could have an impact on final decision. Students work in groups and present factors, which could have positive or negative impact on decision. Every group presents different interests. With this activity is connected also the CAF- Application form (figure 4) for each group.

CAF – decision tool	
Task-theme-problem	
Factor 1	*Pros*
	Cons
	Other
Factor 2	*Pros*
	Cons
	Other
Factor 3	*Pros*
	Cons
	Other
*After discussion and considering all factors **I think**, that:*	

Figure 4 Application form of the activity „CAF“; source: Tomengová, 2012.

Task No.7 deals with non-price competition, task links microecnomics with management and marketing.

The company XY, which is the producer of healthy food, is accused of infection. Before infecting patient eat one of the products. The company belongs to the market leaders in this area. Then experts investigated, that the accusation was false and products don't contain any pathogens. During testing and controlling of quality caused medial scandal demand fall, loss of loyal customers and bioshops in foreign countries (in the Czech Republic, Germany and Austria), where the company wanted to start a business.

Try to suggest some actions for company's image improvement and for increasing of demand with the CAF-Application form. Divide into 5 groups, which could represent each stakeholders: management, employees, customers, suppliers and retailers.

Activity „Morphological matrix"

This activity would be used not only in education, but also by business problems solving (innovative suggestions, promotion, assortment changes). Students are divided into groups with 3 – 4 members and they decide, which variant of problem solving is the most effective according to various criteria. In the end follows discussion about many possible solution ways. This activity increases creative, logical and combinative thinking.

Task No. 8 is connected with producer costs, competition and it's also connected with management and marketing.

*Confectionery production decides, which kind of cake will be baked in the future. According to the market research and inputs are suitable these cake features, based on them we could bake 1296 (3*6*3*4*6) cakes (figure 5):*

Project: New cake				
Flour	***Filling***	***Weight***	***Form***	***Glaze***
coarse	*choco cream*	*20 Dg*	*round*	*choco (dark)*
whole-grain	*nut cream*	*30 Dg*	*rectangle*	*choco (white)*
gluten free	*coconut cream*	*40 Dg*	*triangle*	*sugar*
	marmelade		*square*	*lemon*
	mascarpone			*rum*
	poppy			*coffee*

1. *Which cake variant would be price-effective for customer?*
2. *Which cake variant would be the most innovative and would be for company a competitive advantage?*
3. *Which cake variant would be attractive for new customer segments?*
4. *Which cake variant would bring to business the lowest costs (the highest revenues)?*
5. *Which cake variant would have the lowest energy value?*

Figure 5 Activity "Morphological analysis"; source: own elaboration.

4 Discussion

Aim of the contribution is to analyze learning styles preference of management students at the Pedagogical Faculty of the Catholic Univestity in Poprad (RQ1), to identify correlation between learning styles preference and future students' professional orientation (RQ2) and to suggest some possibilities for individual learning styles development by the active learning methods. Our chosen typology of learning styles is the Kolb's typology, which is represented by the standardized questionnaire Learning Styles Inventory. In the research sample composed of 87 students are dominant 2 learning styles characterized by sense for practice: convergator and accomodator with the same absolute and relative number (30, resp. 34,5 %). Between the learning styles preference and the profession groups preference (added based on features to learning styles in the additional 13th question) is weak positive correlation expressed by Pearson's correlation coefficient with value 19,44 %. We could say, that on professional orientation have impact more factors than only psychological features represented by learning style.

To the contribution benefits belong not only suggestions for development of learning styles by some active learning methods, but also a synergistic effect. The university teachers were informed, how their students perceive and process information by learning and students could mention an e-mail in questionnaire, if they would like to know their dominant learning style. Self-cognition could future manager help to perform tasks more effective, to be more satisfied at work and then to contribute to the business competitiveness increasing.

Our suggestions were applied to subjects microeconomics and macroeconomics (in some cases in connection with economical thinking history, management and marketing) and students also could fill an additional open 14th question, how they try to learn more effective these subjects. The most frequent answers were e.g. loud learning, learning with music, writing of notes, using of graphs, application in pratice, concentration at lectures, searching of information on the Internet and using of colors. To the very interesting answers we could insert e.g. mind maps, listening to speeches of foreign economists on youtube, interest in current economical situation in the EU and worldwide, games like Monopolies or Business Master, reading of books, in which is economics explained on examples from common life, e.g. Spousonomics (P. Szuchman & J. Anderson), etc. The research of mnemotechnical tools and out-of-school economical thinking developement forms could be a subject of our next research, too.

References

Antonio, S. S. (2018) "Conceptualization of the models of learning styles", *Journal of learning styles*, Vol. 11, No. 21, pp. 38–74.

Birkner, M. (2016) "Rešpektovanie učebných štýlov žiakov a ich potenciálu v edukácii", In: *Identifikácia a rozvoj sociálneho a psychického potenciálu: Zborník recenzovaných štúdií z vedeckého seminára,* Bookman, Prešov, Slovakia.

Cinová, E. (2013) "*Špecifické metódy a formy práce so žiakmi zo sociálne znevýhodnneého prostredia",* Metodicko-pedagogické centrum, Bratislava, Slovakia.

Colenci Trevelin, A. T. (2018) "Technological higher education and the impact of learning styles in skills development for entrepreneurial managers of small businesses", *Journal of learning styles.* Vol. 11, No. 22, pp. 27–48.

Edwards, B. (2012) "*Drawing on the right side of the brain",* TarcherPerigee, New York.

Gullach, E. (2011) *"Zbierka metód, techník a aktivít na podporu aktívneho učenia sa",* Metodicko - pedagogické centrum, Bratislava, Slovakia.

Hlinka, M. (2013) *"Poraz školu",* Available at: http://www.ako-sa-naucit-skor.com/poraz-skolu.html

Jenčo, M. et al. (2018) "Assessing the quality of employees in terms of their resistance", *Quality – Access to Success*. Vol. 19, No. 167, pp. 48–53.

Križo, P. et al. (2018a) "Evaluation of the most frequented forms of customer feedback acquisition and analysis", *Communications in Computer and Information Science.* Vol. 877, pp. 562–573.

Križo, P., Čarnogurský, K., Sirotiaková, M. (2018b) "Using the concept of SoLoMo marketing in digital environment to increase brand awareness and communication with customers", *Communications in Computer and Information Science.* Vol. 877, pp. 551–561.

Mareš, J. (1998) "*Styly učení žáků a studentů",* Portál, Prague, Czech Republic.

Meurer, A. M. et al. (2018) "Learning styles and academic performance at the university", *Reice-Revista iberoamericana sobre calidad eficacia y cambio en educacion.* Vol. 16, No. 4, pp. 23–43.

Mikuláštík, M. (2010) *"Tvořivost a inovace v práci manažéra",* Grada Publishing, Prague, Czech Republic.

Petlák, E. (2012) "*Inovácie v edukačnom procese",* Dubnický technologický inštitút, Dubnica nad Váhom, Slovakia.

Pike, G., Selby, D. (1988) "*Global teacher, global learner",* Hodder & Stoughton, London, UK.

Tomengová, A. (2012) "*Aktívne učenie sa žiakov – stratégie a metódy",* Metodicko - pedagogické centrum, Bratislava, Slovakia.

Turek, I. (2008) "*Didaktika",* Iura Edition, Bratislava, Slovakia.

Urban, Z. (2003) *"Čo je inteligencia?",* Available at: http://ihned.cz/c1-21537435-co-je-inteligencia

Vrábliková, M. (2016) *"Učebné štýly žiakov strednej odbornej školy: thesis from additional pedagogical study"*, Žilinská univerzita (DPŠ), Spišská Nová Ves, Slovakia.

Appendix: Kolb's Learning Styles Inventory and additional questions; source: Gullach (2011).

Read every question and assign by each question to variants A-D points from 1 to 4.
4 – total agreement
3 – partial agreement
2 – partial disagreement
1 – total disagreement

1. When I learn:
A. I like intuition and relying to internal feelings 4 2 3 1
B. I like thinking about main ideas 4 3 2 1
C. I like practical activities 4 3 2 1
D. I like observing and listening 4 3 2 1

2. I learn better, when:
A. I listen to lecture and I concentrate to information 4 3 2 1
B. I think logically 4 3 2 1
C. I believe in my feelings and suspicions 4 3 2 1
D. I work at tasks hardly 4 3 2 1

3. During the learning:
A. I like thinking about learning content 4 3 2 1
B. I feel responsibility for the learning result 4 3 2 1
C. I am quiet and closed 4 3 2 1
D. I take all matters seriously and emotional 4 3 2 1

4. I learn better, when:
A. I experience 4 3 2 1
B. I do 4 3 2 1
C. I observe 4 3 2 1
D. I think 4 3 2 1

5. When I learn:
A. I am open to new experiences 4 3 2 1
B. I consider all aspects of problem 4 3 2 1
C. I analyze and specify the parts 4321
D. I try direct on matters 4 3 2 1

6. During the learning I prefer:
A. observing 4 3 2 1
B. activity 4 3 2 1
C. intuition 4 3 2 1
D. logical thinking 4 3 2 1

7. I learn better, when:
A. I can observe 4 3 2 1
B. I can rely on people and relations 4 3 2 1
C. I can come out from theory 4 3 2 1
D. I can it practically try out 4 3 2 1

8. When I learn:
A. I like see my work results 4 3 2 1
B I like theories and general ideas 4 3 2 1
C. I like considering before trying out 4 3 2 1
D. I am internally involved in learning 4 3 2 1

9. I learn better, when:
A. I rely on my observation 4 3 2 1
B. I rely on my feelings 4 3 2 1
C. I can matters try out 4 3 2 1
D. I rely on my assessment and opinions 4 3 2 1

10. During the learning I am a person, which is:
A. closed 4 3 2 1
B. receiving information 4 3 2 1
C. claiming to the responsibility 4 3 2 1
D. theoretising 4 3 2 1

11. When I learn:
A. I like involving in learning 4 3 2 1
B. I like observing matters with distance 4 3 2 1
C. I like assessment and judging 4 3 2 1
D. I like interfering with the things 4 3 2 1

12. I learn better, when:
A. I can analyze ideas, general opinions 4 3 2 1
B. I am sensitive, but not tendentious 4 3 2 1
C. I am careful 4 3 2 1
D. I can do practically 4 3 2 1

Assessment key:
Divergator 1a...., 2c...., 3d...., 4a...., 5a...., 6c...., 7b...., 8d...., 9b...., 10b...., 11a...., 12b....; **Sum**.....
Assimilator 1d...., 2a...., 3c...., 4c...., 5b...., 6a...., 7a...., 8c...., 9a...., 10a...., 11b...., 12c....; **Sum**.....
Convergator 1b...., 2b...., 3a...., 4d...., 5c...., 6d...., 7c...., 8b...., 9d...., 10d...., 11c...., 12a.....; **Sum**.....
Accomodator 1c...., 2d...., 3b...., 4b...., 5d...., 6b...., 7d...., 8a...., 9c...., 10c...., 11d...., 12d....; **Sum**.....

13. Rank these profession groups, which you could do after graduation, according to your individual preference (additional question)
A. human resources manager, employee development specialist, coach/mentor 4 3 2 1
B. economics theoretician, economics analyst, economics scientist (e.g. PhD student, assistant professor) 4 3 2 1
C. accountant, finance manager, tax advisor 4 3 2 1
D. marketing manager, PR manager, innovation manager 4 3 2 1

14. Which ways you increase effectiveness of your learning by? You could apply it to subjects e.g. microeconomics and macroeconomics (additional question)

e-mail (if you would like to be informed about your learning style):

Thanks for questionnaire filling. We believe that awareness about your learning style would have benefit not only for your following in study but also for teachers as a feedback and possibility to improve management of teaching process.

Jana Piteková & Mária Vrábliková.

Customer Service Staff and Their Approach to Claim Solving

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Abstract

Satisfaction and trust of the customers should be very important to companies. There is always a possibility of the claim and companies can prevent it only to a lesser extent. What they can prevent, are unnecessary losses during the complaint procedure. They can prevent loss of customers because of not well mastered complaint procedure by the customer service staff and their inadequate communication skills. Effectively mastered complaint procedure can strengthen the loyalty of the customers. The aim of the article is to present partial results of the research focused on the analysis of the customer service staff communication skills in the complaint procedure. The research was realized in selected telephone companies in Slovakia. Data collected were analysed by the means of statistical methods, based on which it was possible to identify weaknesses of the customer service staff and differences among telephone companies. Based on acquired results it is possible to state that the level of communication skills of the customer service staff is adequate and there are no significant differences among telephone companies.

Keywords: client; customer service staff; communication; skill; assertiveness; active listening.

JEL Classification: O15, M12, J24

Article Classification: Research article

1 Introduction

Delivery of the quality products and services to the market should be automatic (Levický and Lajdová, 2014). Companies constantly need to adapt to changing environment (Stacho et al, 2015). Constantly must looking for opportunities to increase work efficiency, new ways of providing services and communication with customers (Urbaníková, 2017). But even in the best company situation occurs when the customer is not satisfied with the product or service and complains. If the situation occurs, it is

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necessary to solve it in accordance with the valid legislation and minimalize loss and conflict situations with the customer. The approach of the staff and their communication skills are besides the quality of the product or service considered the key factor of the satisfaction of the customers, which is the content of the presented article. It is important to keep the loyalty of the customers for every company, so they are willing to use the services, buy products and propagate the good name of the company. It has a great influence on the long-term perspective of the company.

Human capital development is an essential step towards the success of the business on the market (Lorincova et al, 2018). Professional knowledge and skills are only the basic condition of the success of the customer service staff. They have irreplaceable importance in every job, but they are often not enough to reach the excellent results. One of the decisive factors in sales are communication skills (Poláček, 2016).

The basis of communication consists of the reporting and listening. If we are interested in influencing the others, it is necessary to announce the information in an interesting way for the customer (client). The goal of the communication orientated on the long-term relationship is to acquire the sympathy and trust. Win the others. To make them to the business partners, allies (Moravec, 2016).

It is also necessary to state, that communication can be divided into verbal and non-verbal. Concerning the verbal communication, the customer service agent should master its basic principles, which are shortness, clearness and explicitness. Concerning the non-verbal communication, the customer service agent has to be aware of the fact, that even if he does not speak, he expresses himself by body language. Not only the verbal expression but also non-verbal expression like mimicry, gesticulation and so on, are important by the personal contact. Customer service staff should also keep the appropriate eye contact with the customer, which is the sign of listening, readiness to the discussion, signal of interest. They should try to use shorter sentences, too.

The tone of the voice is also important. The client can hear if the customer service agent believes what he says. If he likes the job, he does. If he respects the customer and what his intentions are. Inexpressive, tired voice reduces convincingness, the vivid, optimistic voice in the opposite is motivating for most of the people. Voice parameters are related to the personality, temperament and current mood (Moravec 2016).

Communication and personality skills of the customer service agent play a very important role in claim handling as well as his skills to listen actively, argue or negotiate with the customer. It is an advantage to be able to act professionally and to know the principles of the assertive behaviour (Maxwill.sk, 2019).

It is necessary for customer care assistants to be able to listen actively. Such a skill helps them to listen to the client´s problems, verify the condition of situations and clarify potential misunderstanding. It helps them to obtain new information, be able to analyse the needs of client better and react on their requirements better, too. Active listening is the core of successful sales interview (Basu, 2011). It is necessary to be able to listen actively at a high level in order to perform an effective and professional communication. It is not possible to avoid listening to a client or ignore their expression when working with clients (Hurst, 1994).

Active listening means, that if the customer service assistant abandons his power – temporarily privilege to talk, claim, know and lecture and begins to listen, what happens is that (Cuddyova, 2016):

- people begin to trust him – if people do not trust him, it is difficult to influence them,
- he gets important information; thanks to that he solves the customer´s problems easier,

- if the customer feels the customer service assistant listens to him, he will be more willing to pay attention to him (if the customer does not feel the customer service agent understands him, he does not tend to invest time and energy into the listening, thanks to which he can understand).

Each customer care assistant should be able to communicate in an assertive way. It means that they should be able to succeed but also to respect the opinions and needs of the others (Wernerová, 2010).

Assertive communication is open, direct communication with the communication partner. It is based on the decency, respect. It does not touch the one´s own rights and the rights of the communication partner either. When using the graded assertiveness, it is necessary to see that it does not grow in agressive form. It is suitable to use it when defending and claim one´s demands (Bakošová, 2017). Every person has the elements of assertive, aggressive and passive behaviour and a certain way of communication. If all three types are in balance and an individual can react adequately, everything is all right. An unwanted situation happens when the aggressive or passive behaviour is dominant (Nagyová et al., 2012). When a person behaves aggressively, he recognizes only his needs and requirements and he is able to do everything in order to fulfil them. This way of behaviour is apparently expressed by anger, hostility, discouragement and it can lead to conflicts, the loss of self-control and so on (Scharlau, 2010). The contrast to the aggressive behaviour is the passive behaviour that has a typical body language (e.g. lowered eyes and so on), apologising phrases, the acceptance of guilt or the use of submissive expressions. Such behaviour follows from the conviction that the needs of others go always first (Lahnerová, 2009).

We can more often experience the aggressive behaviour of the customer when dealing with claim, during which can come to conflicts. The cause of conflict in the business conversation can be (Moravec, 2016):

- a big difference in the expectations of the both sides
- revealing of the lie, dishonesty
- unwillingness to any compromise
- hard critique, which the other side can´t accept
- incoherency and misunderstanding
- irony or other attack on the ego of the other part

The problem can be increased by non-listening, ignorance, interruption, raising the voice, straying from the point, sniffy „tranquillizing“ of the other, downplaying of the problem, transmitting of the responsibility on the others, reproaching of the past faults, using the people who are close to him to support one´s point of view and similar. When dealing with an aggressive client, the customer service staff are recommended (Moravec, 2016):

- to expect such situation can occur,
- keep their emotions under control,
- do not react rash,
- allow to the client to „shout out “,
- do not take the criticism personally,
- to overlook small and irrelevant remarks,
- express understanding, empathy for the situation,
- act assuredly, adequately self-confident,
- listen properly to the client,
- do not step back for being afraid,

- act matter-of-factly,
- do not let oneself discourage and seek way out actively.

In context of complain no real professional who has the things under control let himself provoke by customer´s critical, vicious, ironic remarks. It requires a great self-control of the customer service agent. It appears from the said above, that who wants to control the others, must control himself first (Moravec, 2016).

An essential skill of each customer care assistant is the ability to clearly and comprehensibly present suggestions, ideas, opinions and standpoints, so to present them in an effective way (Thiele, 2010). The presentation skills also closely relate to the ability to persuade others (Korda, 2011). Each customer care assistant should be able "to sell himself". This ability closely relates to empathy, credibility, self-confidence and generally to emotional intelligence (Lojda, 2011).

Customer care assistant has to have control not only over himself but also over the customer´s reactions during the presentation. He should observe customer´s attitude and emotions, for example to decipher the face expression that reveals also small momentaneus emotions. The declination of the body, concentration in the eyes, nodding shows that the customer and the customer care assistant are on the same wave. On the other hand, the raised forearm or index finger may mean, that the customer has something important on his heart. Customer care assistant should be able to react on such non-verbal expressions of the customer (Moravec, 2016).

Negative experience with the claim is a signal „Never again here! "for the customer. The most often reason for the signal is communication of the customer care assistant with the customer claiming. Gruff, annoying customer care assistant does not make the angry claiming customer´s mood better. The claim costs the customer money and time and he is without the product he paid for. It is very bad if all that the surly customer care agent nails down (Prepodnikanie.sk, 2019).

2 Material and methods

The aim of the article is to present partial results of the research focused on the analysis of the customer service staff communication skills in the complaint procedure in selected telephone companies in Slovakia (Orange Slovensko, Slovak Telekom and O2 Slovakia). Specifically we were interested in:

- what are customer service staff´s communication skills in case of claim solving and if there are significant differences among the companies,
- if accepting the claim depends on the telephone company where the claim was solved,
- what was the behaviour of the customer service agent during the communication concerning the claim solution like.

We used questionnaires to acquire the basic details. 318 respondents evaluated the communication skills of the customer service staff in the telephone companies, but 18 questionnaires were rejected for incompleteness. It means, 300 respondents took part in the research. The collected data were analysed by the means of statistical methods in program Statistica. They helped to identify the weaknesses of customer service staff and the differences among individual telephone companies.

We applied a following statement while evaluating all questionnaires: The probability value "p" reports the size of error in case of the rejection of null hypothesis. We can normally reject the null hypothesis only in case of the probability value "p" lower than 0.05 (Markechová et al., 2011).

3 Results and Discussion

As mentioned above, our goal was to find out, **if there are any differences in the communication skills of the customer service staff in case of claim solving concerning the telephone company they work for**.

It is adequate to express an understanding to the customer during technically more difficult conversations like the claims or complaints. Customers sends the information through his emotions, which are very important – anger, sorrow, during such conversation. It is adequate to leave enough space to the client to express himself without disturbing interrupting, that can bring the situation to the boil.

Understanding can be expressed in the following way – "I understand your situation. I understand it is important to you. I am sorry you have such experience. I apologize for the situation. ". Subsequently, it is possible to offer positive solution to the client in the form of the open approach. "Let´s have a look at it. Of course, we find a solution together (Carnegie, 2010). When expressing understanding, the customer service agent gets the time to identify the following steps correctly, the client´s first emotions begin to weaken, and the client starts to be receptive to a constructive solution of situation.

We used Kruskal-Wallis test to evaluate the customer service staff´s communication skills in case of claim solving. We tested the null hypothesis "communication skills of the customer service staff when dealing with claims are not significantly different in individual telephone companies." Results are stated in Table 1.

Table 1 Communication of a customer service agent when dealing with the claim; source: own processing

	Kruskal-Wallis test: H (2, N = 300) = 2.246084 p = .3253		
	Code	Valid N	Sum of Ranks
Slovak Telekom	104	72	11682.00
O2 Slovakia	105	84	11958.00
Orange Slovensko	106	144	21510.00

Based on the reached p-value = 0.3253, which is higher than α=0.05 we cannot reject the null hypothesis. It means, the communication skills of the customer service staff are not very different in individual telephone companies. It can be caused by the consistent training of customer service staff in all telephone companies. The customer service staff try to offer more alternatives of solving the claim. They are also interested in the client´s opinion on the solution of the claim.

They realize they have to aim all their energy at the active listening to the customer with the goal to act effectively, avoid misunderstandings. They know, if they do not active listen to their customers, they will not understand their needs and then the cooperation with them will not work (Webandgo.sk, 2019). Active listening in the business discussion demands a great deal of energy, self-discipline, concentration, but on the other hand enables the other party (Maxwill.sk, 2019):

- understand the real motives behind the spoken words
- signalizes, the customer service assistant is willing to listen and can be trusted
- helps to seek for solutions and solve problems
- it prevents the misunderstanding and wrong interpretation

For more detailed information we compared median (average number of points) in the individual companies. For the transparent overview we created the graph (figure 1) showing the skills of customer service staff in case of claim of which company were better.

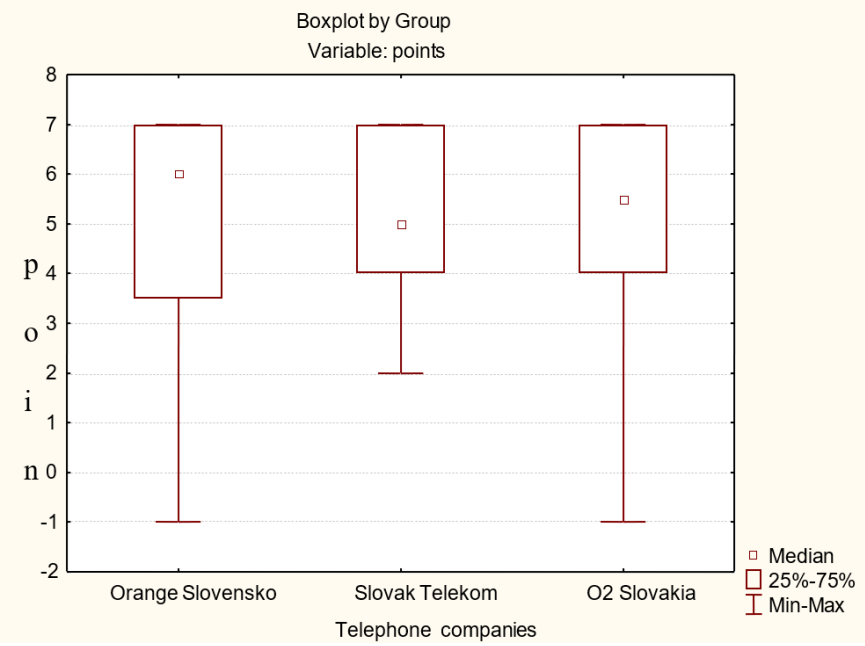

Figure 1 Median graph – Telephone Companies; source: own processing

Even if the results show the level of communication skills of the customer service staff is approximately the same in all three companies, we can say the best evaluation by the respondents acquired the customer service staff of Orange Slovakia and the worst one the customer service staff of the Slovak Telecom Telephone Company (the median is the highest in the telephone company Orange Slovakia and the lowest in the telephone company Slovak Telecom).

We also studied **if accepting the claim depends on the telephone company where the claim was solved.** We tested the null hypothesis "acceptance of the claim does not depend on the telephone company where the claim was dealt with." Results are stated in Table 2.

Table 2 Acceptance of the claim; source: own elaboration

	Chi-square		
Pearson Chi-square	1.977774	df = 2	p = .37199
M-L Chi-square	1.996992	df = 2	p = .36844

We used χ^2 independence test for the evaluation. The p-value calculated is 0.37199, which is higher than α=0.05. That is why we can confirm the null hypothesis. It means acceptance of the claim does not depend on the telephone company the customer service agent works for. The claims are accepted or rejected based on the similar criteria in all the companies. The more detailed results are shown in the table 3.

Table 3 Acceptance of the claim; source: own elaboration

Telephone company	rejected	accepted	total
Slovak Telekom	33	39	72
Column %	26.19 %	22.41 %	
Row %	45.83 %	54.17 %	
Total %	11.00 %	13.00 %	24.00 %
O2 Slovakia	30	54	84
Column %	23.81 %	31.03 %	
Row %	35.71 %	64.29 %	
Total %	10.00 %	18.00 %	28.00 %
Orange Slovensko	63	81	144
Column %	50.00 %	46.55 %	
Row %	43.75 %	56.25 %	
Total %	21.00 %	27.00 %	48.00 %
Totals	126	174	300
Total %	42.00 %	58.00 %	100.00 %

Data in the table show that the percentage of the accepted claims (58%) was higher than the percentage of rejected claims. The highest percentage (46.55%) of the accepted claims was in the Orange Slovakia company and the lowest one (22.41%) in the Slovak Telecom company.

The base of success of every good customer care assistant is suitably chosen communication with the customer. Customers sense especially sensitively communication style of the customer care agent while solving their problem. Right at the beginning of conversation it is important to realize, the customer is angry, that´s why it is not suitable to use arrogant style of communication. Claim solving does not have to be a duel with the customer. A good customer care assistant can work out maximum from the unpleasant situation like claim. Customer care agent should guide the direction of communication. It depends on his attitude and style of communication, if the customer is satisfied at the end or not (Prepodnikanie.sk, 2019).

Key to the protection of the company image and preservation of its good name is the customer care assistant stays calm, settled and concentrated. This way he can come faster to the desired result. This attitude will be especially priced by the customer claiming or commenting something (Webandgo.sk, 2019).

The ideal situation is when a customer care assistant presents as sympathetic, patient and kind. It is also expected that the conversation will progress without any interruptions from the side of the customer care assistant.

As atated above, we also determined **what was the behaviour of the customer service agent during the communication concerning the claim solution like.** For the evaluation, we used Statistica program. The evaluation of the companies is stated in the table 4.

Table 4 Behaviour of the customer service agent during the communication concerning the claim; source: own processing

Telephone company	willingly	pleasantly	nicely	unwillingly	irritated	arrogant	Row totals
Slovak Telekom	42	18	3	6	3	0	72
Column %	28.57 %	22.22 %	8.33 %	28.57 %	33.33 %	0.00 %	
Row %	58.33 %	25.00 %	4.17 %	8.33 %	4.17 %	0.00 %	
Total %	14.00 %	6.00 %	1.00 %	2.00 %	1.00 %	0.00 %	24.00 %
O2 Slovakia	33	21	15	9	3	3	84
Column %	22.45 %	25.93 %	41.67 %	42.86 %	33.33 %	50.00 %	
Row %	39.29 %	25.00 %	17.86 %	10.71 %	3.57 %	3.57 %	
Total %	11.00 %	7.00 %	5.00 %	3.00 %	1.00 %	1.00 %	28.00 %
Orange Slovensko	72	42	18	6	3	3	144
Column %	48.98 %	51.85 %	50.00 %	28.57 %	33.33 %	50.00 %	
Row %	50.00 %	29.17 %	12.50 %	4.17 %	2.08 %	2.08 %	
Total %	24.00 %	14.00 %	6.00 %	2.00 %	1.00 %	1.00 %	48.00 %
Totals	147	81	36	21	9	6	300
Total %	49.00 %	27.00 %	12.00 %	7.00 %	3.00 %	2.00 %	100.00 %

It also follows from the research that all telephone companies emphasize professional and kind behaviour of their employees. Based on the results acquired we can say that the highest percentage of customer service staff behaviour was evaluated as positive, in all the companies. 49% of respondents evaluated the behaviour of the customer service staff as willing, 27% evaluated it as pleasant and 12% evaluated them as nice. The lowest percentage was given to the negative behaviour unwillingly 7%, irritated 3%, arrogant 2%. The best evaluated were the customer service staff of Orange Slovakia – 24% willing, 14% pleasant, 6% nice. Little worse evaluation reached the customer service staff of Slovak Telekom and O2 Slovakia.

Customer service staff have to communicate daily in different situations both verbally and non-verbally, by means of personal discussions, telephone calls, e-mails. It is often said the first impression is decisive and that is why good communication skills are considered the essential condition of success of customer service staff. If the customer service staff are not able to communicate correctly, the probability of their failure increases. Explicitness, briefness, precision, completeness and politeness can be considered the basic requirements of the customer service agent communication with the client. That is why it is important for the customer service agent not only what he says but also how he says it. To communicate successfully, the customer service agent needs to be empathic to other people (clients) and get their trust.

Besides the correct choice of employee for the position of the customer care assistant, the quality and level of communication skills of the customer care staff depend on the investment of the company to the education and supportive training activities.

Enough knowledge and mastery of communication skills can improve service and sales of products on a large scale. Insufficient knowledge of the professional communication and skills brings risks connected with causing distrust, eventually client´s negative experience and in the worst case the failure and loss of client in favour of competition.

It is necessary to realize, that efficient communication is a key to the satisfied customer (Webandgo.sk, 2019). The satisfied customer, who will return to the company for the next purchase with a high probability will be the result of a communication at a professional level (Prepodnikanie.sk, 2019).

References

Bakošová, Z. (2017) "Efektívna komunikácia – súčasť pregraduálnej prípravy budúcich učiteľov", In: *Pedagogická profesia z aspektu vedy, výskumu a praxe. Recenzovaný zborník z medzinárodnej vedeckej konferencie*, Prešov, Slovakia.

Basu, R. (2011) "*Zakázané přesvědčovací techniky*", Grada Publishing, Praha, Czech Republic.

Carnegie, D. (2010) "*Pět nejduležitejších dovedností při jednání s lidmi*", Pavel Dobrovodský – Beta, s.r.o., Praha, Czech Republic.

Cuddyová, A. (2016) "*Umenie vystupovať*", Fortuna Libri, Bratislava, Slovakia.

Hurst, B. (1994) "*Encyklopedie komunikačních technik*", Grada Publishing, Praha, Czech Republic.

Korda, P. (2011) "*Zlatá pravidla obchodního vyjednávaní*", Grada Publishing, Praha, Czech Republic.

Lahnerová, D. (2009) "*Asertivita pro manažery*", Grada Publishing, Praha, Czech Republic.

Levický, M., Lajdová, Z. (2014) "Selected aspects of human resource management in small and medium-sized enterprises in the beekeeping industry", In: *Young Science 2014 proceedings – Croatian Quality Managers Society*, Zagreb, Croatia.

Lojda, J. (2011) "*Manažerské dovednosti*", Grada Publishing, Praha, Czech Republic.

Lorincova, S., Hitka, M., Starchon, P. (2018) "Strategic Instrument for Sustainability of Human Resource Management in Small and Medium-Sized Enterprises Using Management Data", *Sustainability*. Vol. 10, No. 10, article no. 3687.

Markechová, D., Tirpáková, A., Stehlíková, B. (2011) "*Základy štatistiky pre pedagógov*", UKF v Nitre, Nitra, Slovakia.

Moravec, J. (2016) "*Prodávejte a buďte nejlepší!*", Motiv Press, Brno, Czech Republic.

Nagyová, Ľ. et al. (2012) "*Manažérska komunikácia*", SPU v Nitre, Nitra, Slovakia.

Poláček, M. (2016) *"Komunikačné zručnosti ako konkurenčná výhoda predajcov",* Available at: https://spu.fem.uniag.sk/mvd2016/proceedings/sk/articles/polacek.pdf

Scharlau, Ch. (2010) "*Tréning úspěšné komunikace",* Grada Publishing, Praha, Czech Republic.

Stacho, Z., Stachova, K., Hudáková, M. (2015) "Approach of Companies to Customers as Suitable Source of Incentive to Innovate", In: *International scientific conference: Business economics and management (BEM 2015)*, Zvolen, Slovakia.

Thiele, A. (2010) *"Jak na špinavé triky a útoky v komunikaci, úspešná argumentace ve stresu",* Grada Publishing, Praha, Czech Republic.

Urbaníková, M. (2017) "Centers of shared services and their impact on the regions", In: *20th international colloquium on regional sciences*, Kurdějov, Czech Republic.

Wernerová, I. (2010) *"Komunikace pro každého",* Computer Media, Prostějov, Czech Republic.

http://prepodnikanie.sk/ako-nestratit-zakaznika-pri-reklamacii/

https://webandgo.sk/zla-komunikacia-neuspech-v-podnikani

https://www.maxwill.sk/ako-vybavit-reklamaciu-a-nestratit-zakaznika/

https://www.maxwill.sk/pocuvanie-je-kompliment/

Session C

Tourism – history, present time and future

Augmented Reality and its Application in Tourism Marketing

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Abstract

The new millennium brings the boom of modern technologies that offer new potential. Intersectionof so called smart devices, Internet expansion, many mobile applications provide ideal conditions for the development of many areas, especially in tourism. In our contribution, we will describe one of the trend technologies, which strengths can help tourism. Augmented reality enriches the perceived reality with a unique experience. Sightseeing in cities, towns, visits of ruins or natural monuments etc. All these gain a new dimension and added value to today's, modern, human.

Keywords: augmented reality; tourism; marketing.

JEL Classification: M31, M37, O31, Z33

Article Classification: Research article

1 Definition of augmented reality, virtual reality, mixed reality

The concept of augmented reality was defined by Azuma as: *"linking applications combining a real, tangible world and a digital world while interacting in real time and in a three-dimensional environment."* (Bartfield, 2016) Frequent ways in which this technology is used are various technological aids eg. smartphones or handheld computers that are nowadays commonplace in everyday life. Its essence is to improve the real, physical world for digital information about a particular object. As Arnaldy claims: *„this information is most often visual, sometimes audible and very rarely palpable."* (Arnaldy, 2018)The difference is the type of device that provides the overlap of the physical environment with the digital. The primary use of augmented reality technology is to help people in everyday life and provide additional information wherever it is needed. This information may vary based on the used technology. Depending on it, they can provide information about a specific site or an object that can be combined with GPS features. It is the GPS system that has largely enabled the development of virtual and

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augmented reality technologies. At the beginning, it was developed by the military, which used the technologies of augmented reality as well as virtual reality in training to avoid unnecessary loss of life. Later, these technologies became widely publicized.

On the other hand, virtual reality works on a completely different principle. Above all, this technology allows the user to create an action in a pure virtual environment, so that he feels he is in a real environment. It works on technology a display device that, based on the stereoscopic principle, displays a slightly different image for each eye, giving the impression of three-dimensional space. (Švecová, 2017) To make this possible, technology must convince the brain that what it sees is real, even though it is purely digital. This effect has become called immersion in the field of virtual reality (from eng. word *immersion*), which expresses the feeling that an individual has left his physical world and entered the virtual environment. Immigration here expresses the measure to what extent an individual feels like he is in the real world. Various technological aids can help to gain this effect such as VR goggles (eng. VR headset). These, through stereoscopic lenses, create the 3D virtual world effect that an individual can manipulate with. To achieve the effect, the image must be large and of the highest quality so that the perceived environment is as realistic as possible. The glasses are further complemented by various drivers that allow interaction with different virtual objects. Despite the fact, virtual reality and augmented reality share similar technologies, there is a clear distinction between them. The virtual reality is completely substituting it for the fantasy world, while the augmented reality combines the real world with additional information to augment the reality, whether graphi, content, or a combination of both. (Blahút, 2013) The main difference is that virtual reality works exclusively in the digital environment, where augmented reality connects the real environment with digital and enriches it with information.

The third technology mentioned is the so-called mixed reality technology. When we talk about this technology, Milgram and Kishino, they define Mixed Reality as: *"connecting real and virtual worlds."*(Milgram and Kishino, 1994) Despite the fact that this notion is not as well known as the previous two, there are several kinds of hybrid display technology that are capable of mixed reality. Let's mention, for example:

1. Monitor-based displays, also known as WoW displays (from eng. window on the world)
2. Class 1 displays using HMD (from eng. head mounted display)
3. HMD – special glasses that are partially transparent and serves for interacting with a special display

The term *reality continuum* is also associated with the notion of mixed reality. It is a spectrum that covers all the variations between the virtual world and the real world. Thus, it can be a purely virtual environment to purely physical. This spectrum covers all possible variations between real and virtual objects. From the left side, the real world spectrum begins, where nothing is computer generated. On the other side of the spectrum is a virtual world, where everything is digital data. Mixed reality, both as a concept and as a spectrum, seeks to combine the best elements of expanded and virtual reality. When used properly, it is able to connect the virtual world with the real world to create a new environment where virtual objects are embedded in the real world.

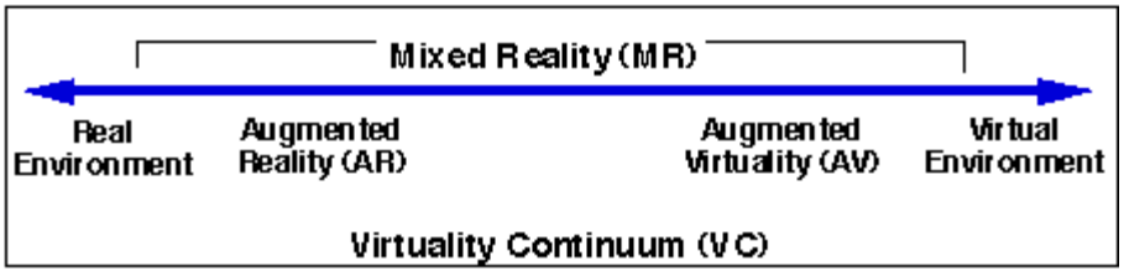

Figure 1 The concept of a virtual continuum by Paul Milgram; source: <http://etclab.mie.utoronto.ca/people/paul_dir/IEICE94/ieice.html>.

2 Marketing mix

We understand the marketing mix as the basic tools that businesses and businesses use to implement marketing strategies. It is composed of four core groups we call 4P: product, price, distribution and promotion. (Kotler and Armstrong, 2012) In order to start a company with a business at all, it must create the desired product. Subsequently, it must decide what price it will ask for the product and how it will be distributed. If they have all of this, there is a time for marketing communication, the way we convince the target group to buy this product. To these tools we could add staff, processes, physical environment, packaging, collaboration and policy. However, we are not talking about these basic marketing mixes.

Depending on how we look at 4P, they may change. From the buyer's point of view, the customer can be characterized as a 4C marketing mix, and it is:

- Value for the customer– customer value;
- Cost of buying and consuming – Cost to customer;
- Availability, convenience – Convinience;
- Mutual communication – Communication.

Also in the case of 4C there are several models, but this is the most famous and most used. But in some cases it also contains components such as distribution channels, or the consumer himself and his right choice and focus. (Matúš and Ďurková, 2012)

Product means all combinations of physical products and services offered by the company in the target market. For achieving the desired sales results of the product, it is necessary to have a suitable product that is most adapted to the target market. This adaptation may relate, for example, to product quality, design or packaging.

Price is the total value that a customer must pay in exchange for a product. It should be adapted to equal consumer value, which means that it should be appropriate to that value.

By place or distribution, we understand the way and activities in which the product is made available to the target market. It provides a spatial view of bringing the product closer to the consumer in order to increase purchasing opportunities. (Kita, 2010) It is not just the store itself (stone shop), but it also includes websites, exhibitions or teleshoping. The better is the product availability, the better are its marketing results.

The last part of the 4P is marketing communication or better said promotion, the way the company communicates the product to the target group. Marketing communication should be oriented towards creating a positive image of the product while communicating it in such a way that it becomes desired and reaches marketing goals. Communication is a key part of the marketing mix. Through its tools, companies communicate not only with the aforementioned customers, but the whole target market as a unit. Communication it takes place among all the communication network operators:

the manufacturer - the distributor, the distributor - the trader, the manufacturer - the trader, the trader - the customer, etc. (Janouch, 2014) In addition, various distribution companies, credit companies, insurance companies can also be included in this network.

The main goals of marketing communication are to inform, persuade and remind customers the products. It also provides a way for the company to maintain good relationships with the entire communications network. Maintaining long-term good relationships is one of the most important goals for society.

2 AR and tourism

The aim of augmented reality is to improve our perception of the world by covering the real world with digital information in such a way that the involved person feels that perceived information is real. Thus, the augmented reality system should: *"provide the user a fully immersive experience."* (Magneat and Papagiannakis,2006) Thus, it will be possible for the user to experience a realistic story that will be spoken through an augmented reality. The most widely used way to apply AR technology to cultural heritage is through a mobile application. In general, such applications provide the same functionality as other AR systems, but mobile applications allow use outside specifically equipped places.

If we are talking about augmented reality and its commercial use in tourism and cultural heritage, then: museums, probably always used to some extend AR, created bridges between objects, ideas and visitors. (Bartfield, 2016) Each exhibition is complemented by various information, whether text, image or video. The only difference is in the used technology. In the previous iterations, visitors had to turn their eyes away from the exposed work toward the display or other medium to obtain additional information. Mobile applications are able to provide all this information to the user in the context of his location without having to look away from the exposed artifact. Also, such an application has hidden marketing potential in it, helping the institutions to seek publicity and attract new audiences.

Recent studies have showen that: "up to 35% museums in Europe has already included VR and AR form presentations to improve their exhibitions." (Angelopoulou et al., 2012) Even though, this way of presenting cultural heritage is still a new one, steady increase in its popularity suggests that museums gradually begin to understand the potential of augmented reality and its effectiveness in creating interest in monuments and creating more engaging ways of presenting monuments. These applications also have the ability to provide an alternative way of navigating museums that do not have enough space to present all the collections, as well as a way to provide navigation information to them. At the same time, some exhibited artifacts are oversized, which often makes it impossible to exhibit them. Such exhibits could be completely replaced by a digital version.

2.1 Presentation of the extinct church of st. Michal in Trnava

A good example of the application of augmented reality is the territory near the basilica of st. Nicholas in Trnava. Two older buildings have been discovered in close proximity, one of which is only presented in the footprint of the current pavement and the other older – karner is still waiting for its presentation. (Kuzmová and Hrnčiarik, 2010) A significant benefit is the nearby fortification of Trnava, which is accessible and so visitors can get a few meters above the terrain and thus open the entire "acropolis" at the basilica of st. Nicholas.

Here, a wide range of interdisciplinary collaboration between scientists from different areas is opened up. Archaeologists, historians, architects, programmers, 3D graphic designers, marketing specialists and others should be involved in the process of creating such an application. This would guarantee not only the aesthetic value, but also the factual aspect of the project. The advantage of such a project is its sustainability in terms of its further leveling in the meaning of whether it is an extension of the number of objects and the possibility of adding new findings over time, or shifting the level of displaying added information depending on the technical progress and capabilities of devices to display the augmented reality.

Trnava as an ancient historical city can boast many sacred objects in the territory of its old core. It is not in vain to be referred to as a small Rome, and yet there are or have been buildings that should be recalled at least as a digital reconstruction. Such objects include the church of st. Michal in Trnava. There is relatively little awareness among the experts about this sacred object, and the public is not as well aware of this monument, which has had an important role in the city's history. The only physical footprint is the aforementioned gournd plan.

For the majority of slovak believers in Trnava has the Church of st. Michal a special place. It took an important place in the formation and struggle for the possibility of spiritual development in the native language, as well as the brief development of the building phases, it is possible to at least approximate reconstruction of the church building structure according to the preserved pictures on the leads of Trnava, (Závadová, 1974) or his intended reconstruction as planned by Michael Himmer. This could bring one of the less known chapters of the history of the royal town of Trnava to the general public and contribute to the attractive presentation of the location for local and foreign visitors of Trnava. Equally important in this case would be the interdisciplinary cooperation of experts in individual partial issues in the creation of the application of the augmented reality aimed at presenting the Church of st. Michal in Trnava. The modularity of this solution makes it possible to extend the area to other interesting buildings in the vicinity of Basilica of st. Nicholas in Trnava in the future.

Figure 2 Present state of the Church of st. Michal; source: author

2.2 Presentation of the extinct lower gate

The non-preserved lower gate, sometimes also called the Bratislava Gate or Lautenberg Gate. To this object we have relatively well accessible archive sources, which can be divided into two groups. The first is the Trnava veduta, on which the lower gate is captured and the second is the drawings and written materials capturing the last building phase of the building. However, more important are the drawings of the focus of the last phase from 1819 by the Viennese architect Anton Grünn, which are located in the Trnava State Archives. These bases can be used to reconstruct a three-dimensional building model with details in the form of windows and the type of roof with the location of the clock in its last building phase. Another valuable resources are archaeological, architectural and historical researches conducted in 2015 by Miroslav Matejko and in 2016-2017 by the Department of Classical Archeology of the Faculty of Arts of Trnava University in Trnava under the leadership of Erik Hrnčiarik.

An international seminar on how to present the lower gate was held in Trnava in 2017. At this stage, several variants were considered from the construction of the gate at its full height, which, however, proved to be an inadequate solution due to the overall change in the views of the Main Street after such a significant construction intervention, to a hint solution in the road body and the walkway. After consultations with the Regional Monuments Board, the city of Trnava, as an investor, decided to present the lower gate by putting it on the floor plan of the walls to a height of one meter and a medieval barbakan to a height of 60 cm. The work on the lower gate presentation was completed in the first half of 2018. Such a presentation is certainly worthwhile, but for the ordinary visitor it is not as attractive as it could be. Therefore, the application of augmented reality is a suitable alternative here to show how the place looked before the main gate was demolished.

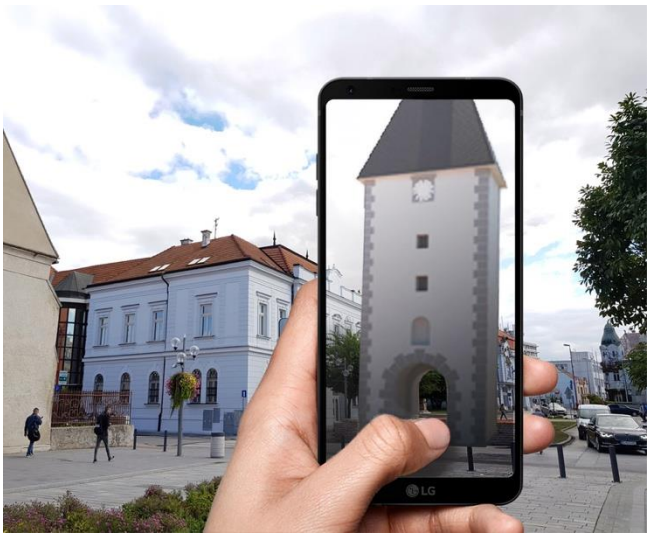

Figure 2 The design of the lower gate in Trnava; source: author collage

3 Results

When we talk about augmented reality and its commercial use in tourism, every exhibition is complemented by various information, whether in text, picture or video form. The only difference is in the technology used. In previous iterations, visitors had to turn their eyes away from the exposed work toward the display or other medium to obtain additional information. Mobile applications are able to provide all this information to the

user in the context of his or her location without having to look away from the exposed artifact. Also, such an application has hidden marketing potential in it, for instance helping the institutions to get the publicity and attract new audiences. The decisive factor is the high penetration of mobile devices, which accounted for 125% in 2017 in the whole Europe. (Graca, 2018) Therefore, we can say that every European, owns a mobile phone. Taking into account some limits, such as the fact that mobile phones are owned also by companies or every person can own one or more phones, we can at least state that at least one family member owns a mobile phone. By this fact, there is ensured the availability of devices that make use of augmented reality. Another benefit is the interactivity of the application, its sustainability in terms of possible adjustments and improved versions based on new knowledge of the practice and development of the technology. Equally important is the creation of digital artifacts, based solely on archaeological and historical research, in non-existent objects, or even in terms of preserving the cultural heritage of digitizing existing artifacts present in applications of augmented or mixed reality.

References

Angelopoulou, A. (2019) "Mobile Augmented Reality for Cultural Heritage", In: *International Conference on Mobile Wireless Middleware, Operating Systems, and Applications*.

Arnaldy, B. (2018) "*Virtual Reality and Augmented Reality: Myths and Realities"*, ISTE Ltd and John Wiley & Sons, Inc, London, UK.

Barfield, W. (2016) "*Fundamentals of Wearable Computers and Augmented Reality"*, CRC Press, Boca Raton, FL.

Graca, M. (2018) "Mobilné zariadenia a ich využitie v kontexte enviromentálneho vzdelávania", In: Bučková, Z., Rusňáková, L., Rybanský, R., Solík, M. (Eds.), *Megatrendy a média 2018, Smolenice, 2018,* Fakulta masmediálnej komunikácie, Trnava. Slovakia.
http://etclab.mie.utoronto.ca/people/paul_dir/IEICE94/ieice.html

Janouch, V. (2014) "*Internetový marketing",* Computer Press, Brno, Czech Republic.

Kita, J. (2010) "*Markteting",* Edícia Ekonomia, Bratislava, Czech Republic.

Kotler, P., Armstrong, G. (2012) "*Principles of Marketing",* Prentice Hall, New Jersey.

Kuzmová, K, Hrnčiarik, E. (2010) "Archeologický výskum románskeho karnenra a exterieru Baziliky sv. Mikuláša v Trnave". In *Pamiatky Trnavy a Trnavského kraja 13,* Krajský pamiatkový úrad Trnava, Slovakia.

Magnenat-Thalmann, N., Papagiannakis, G. (2014) "Virtual Worlds and Augmented Reality in Cultural Heritage Applications", Available at: https://www.researchgate.net/publication/232613064_Virtual_Worlds_and_Augmented_Reality_in_Cultural_Heritage_Applications

Matúš, J., Ďurková, K. (2012) "*Moderný Marketing",* Univerzita sv. Cyrila a Metoda, Trnava, Slovakia.

Milgram, P., Kishino, F. (1994) "*A taxonomy of mixed reality visual displays",* Available at:

Švecová, M. (2017) "Newsgames, virtuálna realita a umelá inteligencia ako nové formy tvorby mediálnych obsahov", In: Jurišová, V., Klementis, M., Radošinská, J. (Eds.), *Marketing identity 2017: Onlinové pravidlá, Smolenice, 2017,* Fakulta masmediálnej komunikácie, Univerzita sv. Cyrila a Metoda, Trnava. Slovakia.

Závadová, K. (1974) "*Verný a pravý obraz Slovenských miest a hradov ako ich znázornili rytci a ilustrátori v XVI. XVII. a XVIII. Storočí"*, Tatran, Bratislava, Slovakia.

Increasing Development of all Different Industries in the World Brought also Changes into the Management of Tourism Industry in the Czech Republic (Theoretical Study)

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Abstract

The study was intended to analyze families with children as a market segment in tourism industry. Family as a market segment profile is examined from sociological and marketing point of view and is analyzed its position in the tourism market. A total of one hundred eleven families with children were addressed, out of them one hundred were willing to respond designed questionnaire and revealed their individual needs. Findings show preferences and needs of families. The main aim of this study is an analysis of the individual needs of families with children in order to identify them as a hospitality market segment profile.

Keywords: analysis; family; hospitality; management; tourism; service.

JEL Classification: Z1, Z3, M3

Article Classification: Technical paper

1 Introduction

Increasing development of all different industries in the world brought also changes into the tourism industry. Under the influence of globalization and increasing competition, supply of tourism market shall adapt their products and services by the requirements of potential customers and monitor the trends in demand. One of the target groups are families with children. In the term of tourism target group of families with

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children is quite challenging. With the improvement of living standards, each family desires to have a quality time with their family. It is an important opportunity to get the whole family together to enjoy their family leisure experience. For example, more and more families have plans to go travelling as their family leisure activities. Parents are willing to make plans for the whole family to have some memorable and valuable family experience together. This trend will help tourism and the hotel industry for opportunities to develop their business. Nevertheless, the tourism and hotel industry does not realize the importance of this kind of family leisure activity for every family member. If the hotel or tourism agency can provide their best service to make the family satisfied, then future trip planning and using the agency for their vacation needs time and time again. So the hotel and travel agency will have a big group of loyal customers. On the other hand, if the family members have bad experiences during their travel, the family may not continue this family leisure activity. This fact ensues from imperfect knowledge of the actual demand. It is a base element of success in any business. The tourism product is so completed and many entities are involved, that is almost impossible to know the demand into the smallest detail. The character of today's families from the psychological and marketing point of view with influence of children is outlined. The point of view of families represents the base for this research. In order to determine their needs and expectations, carefully designed questionnaire was used. From the outcome of the questionnaire, suggestions whether and how to support this hospitality market segment profile, were deduced. The following research objectives were formulated in order to answer the research questions and thus achieve the aim of this theoretical study:

- To identify the nature of tourism industry in general, its typology and characteristics
- To conduct literature review, identifying the buying behaviour and psychological factors of families with children
- To identify services and the classification of services in tourism in the Czech Republic
- To identify the importance of family and social functions of family
- To conduct a questionnaire identifying family´s point of view
- To analyze the data and interpret findings including ascertaining the specific areas of tourism where there is a need for improvement
- To draw conclusion and make recommendations.

Since the main aim of this study is to conduct an analysis of needs of families in tourism industry, it is mainly management and employees of the tourism industry establishments. Findings of this study may generate advantages in terms of opinions on their performance. Consequently, families may benefit as well, since the increase in performance would have a positive effect on the product and services provided and thus the value guest obtains for the same price would be augmented. Subsequently, this study may be useful for individuals interested in the field or for those intending to undertake study with similar research focus. Other most basic forms of tourism are: tourism with adventure themes, tourism with professional motives and tourism with religious orientation. In addition to the basic forms we distinguish between the specific forms of tourism which are oriented on for example seniors, families with children or agro-tourism. According to Gijsbers & Gonzalez Gutierrez de Leon (2018), types of tourism mainly reflect the phenomenal progress of tourism and how its implementation depending on geographical, economic, social and other conditions, as well as its effects (Alfer'ev, 2018). Than Smit & Van Oers (2019) argues, that types of tourism vary according to the following aspects:

- According to the place of realization is distinguished between domestic tourism and international tourism. Domestic tourism means that the participant stays within the country. He is not going beyond the borders of his own country. International tourism is divided into the outbound (passive) tourism, where the inhabitants of a given country travelling to another country (outside) and inbound (active) tourism, which includes participants in foreign arrivals to the country.
- There is an organized and unorganized tourism. The difference between them depends on how the travelling is secured and organized.
- In the case of organized tourism, pre-designed and organized by tourist travel programs for tourists / travellers according to then wishes and budget, are involved.
- Unorganized tourism suggest that the tourist themselves, without the participation and / or mediation of tourist companies organize then trip.
- The number of participants, there are two distinct groups: individual and group tourism. Individual tourism represents a situation where the participant is travelling alone or with his family. On the other hand, group tourism means travelling within a particular group.
- According to the method of financing is defined by the division of who finances the cost of participation in tourism. When it comes to commercial tourism, participants finance everything themselves. On the other hand, social tourism is paid by some organizations or institutions.
- Different accommodation establishments (hotels, motels, boarding houses, hostels, boatels etc.), camps or cottage settlements and tourism held outside public facilities (cottages, caravans).
- According to the types of transport used: car, motorcycle, bicycle, bus, coach, rail, sea, air, etc.

2 Social functions of family

As already been mentioned, the most important task of the family in terms of tourism is the socialization of children. Parents transmit to their children basic values, behaviours, and teach children to be members of the collective. At the same time they show them ways of consumer behaviour. This behaviour is characterized by an individual, who obtains products. According to Martelaer at all (2018) the process which brings children the skills, knowledge, attitudes and experience required for the role of the customer shopping is called socialization. Children receive standard shopping behaviour by observing their parents, grandparents, siblings, and even friends. This process continues into the adulthood and in fact may persist throughout life. Partner may change their consumption behaviour under the influence of the other partner (or vice versa), adults may be influenced by new friends, colleagues at work etc. In terms of tourism, it is important that the consumer takes-over standard provides the foundations for the consumption of the same or similar products in the future. If there is a travel agency focusing for ex. on this market segment (families with children), it brings them future customers. It is quite likely, that children, who travelled with their parents on a vacation to their favourite place, will return to these locations with their children when they become parents. Families with children hide a constant great potential of stable and regular customers. In addition, the parents, especially with young children, recommend frequently the destinations to their relatives and friends (of course only when they satisfied them). “Every individual goes through different developmental stages in his life.

Family is also a dynamic entity that changes over its existence. Family development is arranged in different stages, between which there are transitions. This internal development structure of the family is relatively autonomous. This is not following the calendar, or biological time (Mishra at all, 2019). Malmberg & Andersson (2019) consider the most important is the transition to parenthood, because in the lives of parents expecting a child comes, a big chase that cannot be returned. Parents change the order of values, their habits with the coming of parenthood. Their life starts to follow the child and it´s needs. Nonaka, Shimada & Sakai (2018) organized family stages of individuals into nine phases of individuals. (See Table 1) This model could be described as traditional. In addition to the traditional model, there is an alternative family life cycle, which is initiated by the high divorce rate. Recently, the family life cycle loses its stereotypes, because it is highly individualized. This trend affects the overall individualization of society. Family does not work as a community, but becomes a group of individuals. The researchers found a shift in the nature of the family "cohesion ". According to Bertilsdotter Rosqvist (2019) while the concept of the family meant doing things together, today it means to be in the same household, and each person is doing their own thing. (Bertilsdotter Rosqvist, 2019). Despite (or perhaps because of it) remains family is valued as one of the highest values of our society. This fact was evidenced by the research project of the institute of Sociology. An & Western (2019), claims that recently, "social and cultural cohesion in a differentiated society ", the results of which says that for 77.2% sees the family at the top of the hierarchy of values. With the increasing dynamics of the lifestyle and deficiency of time spent together with the family, become these moments very important for families themselves. Family vacation can become not only a pleasant relax, but also a bonding element family. The family represents not only a social group and part of society, but also major customers and consumers in marketing sphere. Although families are sometimes referred as households, not all households are families. For example, household might include individuals who are not related by blood, marriage or adoption, such as unmarried couples, family friends or housemates, inform L'Esperance (2018). Decision making process of a customer varies according to characteristics of a purchase. It may be significant (apartment, car, vacation, etc.), ordinary (food) or impulsive purchase. Knowledge of the principles upon which the family makes decisions about travelling (form of buying decision) is a presumption for success of tourism marketing. Although the decision within a family is into some degree individual, there are common features that can help characterize the process of family decision-making.

2.1 Consumer buying behaviour and psychological factors

The following chapter examines the family from the consumer behaviour, psychological and marketing point of view. The study of consumer behaviour focuses on how individuals make decisions to spend their available resources (time, money, effort) on consumption-related items (Chan, 2019). The field of consumer behaviour covers a lot of ground. According to Attreya (2018), consumer behaviour is a study of the processes involved when individuals or groups select, purchase, use, or dispose of products, services, ideas, or experiences to satisfy needs and desires. Travel motivation reflects one's needs and wants and can be viewed as a critical variable in relation to their purchase decisions. Maslow hierarchy theory help us to understand the different needs that motivate travellers and in other hand it will be enhancing service provider's knowledge about what kinds of experiences travellers seek, especially for certain groups of people. In the case of tourism industry we might consider travelling as a satisfaction

of rest and relaxation need (physiological need). Social needs might be expressed as a desire for moments spent together with family, children, spouse or meeting new people. The needs of ego could satisfy luxury vacation. Self-realization may occur by organizing a vacation or selecting a destination. The need is usually an impulse that causes motivation. Motivation is an internal process that makes a person move toward a goal. Motivational factors change over time in response to changes in the circumstances of individual's personal life. According to Muhdi & Boutellier (2019) there are two classifications of motivational factors. The first divide tourist motivations into two categories: motivations that lead a person to choose to travel and motivations that lead a person to choose a particular holiday in a certain destination, at a certain period of time. The second classification is more complex and is accepted and used by many specialists. The motivational factors are:

- Psychological (relaxation, clime, health, sport activities)
- Emotional (nostalgia, esthetics, escape)
- Culture (gastronomy, sightseeing)
- Status (exclusivity, fashion)
- Personal (visits to relatives and friends, new friends)
- Personal development (raising the level of knowledge, learning new skill).

All behaviour is goal-oriented. Goals are the sought-after results of motivated behaviour. According to Böckler (2018) "there are two types of goals: generic goals and product-specific goals. A generic goal is a general category of goal that may fulfil a certain need. A product-specific goal is a specifically branded or labelled product that the individual sees as a way to fulfil a need" (Böckler (2018), Clear understanding of customers with respect to who they are, what they need, what they prefer and what they buy is the key element to successful marketing strategy in tourism industry. Decision making is process of concluding or making a judgement about some issue or matter making a choice between two or more alternatives. In the study of consumer buying behaviour the family is considered a crucial decision making unit as the interaction and influence between family members are likely to be greater and more significant than those within the other smaller groups. According to Tsoi (2014) "Influence has been defined as something that is inferred when one person acts in such a way as to change the behaviour of another in some intended manner" (Tsoi, 2014). Thus influence involves actions by family members that make a difference during the decision making process. The decision making process follows a number of stages:

- Problem recognition
- Search for information
- Evaluation of alternatives
- Final choice

The problem recognition may mean the recognition of a need. This may represent visiting relatives, need of a rest and relax or need for a vacation. In the second step search for information means search for information's, which may satisfy the need. In the case of vacation, it can be for example, searching for information about different destinations, touristic activities or types of transport. As a source can be consider travel agents, internet, advertisements, etc. When a sufficient amount of information is collected then the step of evaluating alternatives follows. Which means: deciding between multiple variants, resulting in the section of most advantageous. The final choice and post-purchase evaluation mean: (in the case of tourism) consumption and assessing whether it brought the expected utility (satisfaction). The family remains the predominant social group in

which people choose to spend their free time, particularly their vacations. The issue of decision-making of families about travelling was examined in various studies. However, it is very difficult to derive definite conclusion, since they usually came to different ones. According to Balint (2018), "Tourism researchers have viewed family decision-making operationally as being one of these three types; husband-dominant, wife-dominant, or a joint decision between husband and wife" (Balint, 2018). Each member's influence varied by type of the product, decision making stage and family/household characteristics. Problem of recognition, information search, and the final destination decision are usually share by husband and wife. Furthermore, other studies defined that specific decisions such as travel routes and commercial lodging are also made by couple. Other decisions are either husband-dominant or wife-dominant (Yao, 2018). On the other hand, the author Way (2018), inform that, number of studies examined the question of family decision-making from the perspective of the family life cycle and its role. According to results, decision making matters more men in families without children, while is a joint decision is usually in families with children. In families with high income spouses decide rather together. Recent studies then confirmed the prevailing tendency of joint-decision making, but greater responsibility for individual decisions are attributed to women. Women also perform more affecting task (See Table 3), (Schall & Gibbons, 2018).

3 Material and methods

This chapter will introduce methods and procedures that have been used in order to achieve stated aim of this study. It includes study design, study population and sample size, time scope, instrumentation of the data collection, data source, response rate, data presentation and data analysis. The structure of the methodology section is designed according to the structure proposed by Wood (2015). In order to identify aspects in needs of families with children in hospitality industry, this study is based on the customer's views and perceptions. The research was approached as a case study since it is focused on a single unit. Quantitative research was performed by written questioning. Structured questionnaire was used. All questions from questionnaire were decided in advance. They were asked as they are written, in the same sequence, using the same style for all interviews. Sometimes questions and answers were explained more in depth so respondent could provide most adequate answer. Regarding the population, one hundred twenty-one people were addressed, out of them twenty-one were displaced from overall evaluation. The reason for that was respondents did not corresponded to given parameters. Since the unit of the analysis are families with children, the questionnaire was limited on the families which would like to respond. One hundred twenty-one people were addressed, out of them 100 were willing to respond to designed questions. The population was selected randomly, mainly on the streets, in parks and close to kindergartens and schools. Usually they were adult accompanied by one child or more children.

Interviews were conducted during 1 month period, more specifically from the beginning of March 2018 to beginning April 2018, in Prague, Liberec and Jablonec nad Nisou. Obtained data were analyzed continuously. In order not to inconvenience respondents, the limit of 10 minutes per interview was attempted to keep. Almost equal numbers of respondents were addressed in each city. The instrument in assessing family's perceptions and needs was a questionnaire, conducted as a face to face interview. The questionnaire was anonymous and guests were assured that their answers will be used only for the purpose of the bachelor thesis. In order to achieve stated objectives and answer research questions, the questionnaire was divided into 3 subsequent parts. Those three parts were: introductory text, 15 questions and closing text. Main aim of the whole

work, the importance of answers and their practical usage were introduced in the introductory text. Further, the respondent was assured of complete anonymity. As a source of information, mainly primary sources were used. Primary data were collected in the form of questionnaire, interviews with parents of children. Secondary information was gathered from publications, websites and journals. One hundred twenty-one people were approached and 100 responded to designed questions in a given period. Consequently, the overall response rate is the 82, 64 %. Such high response rate was achieved by the convenience of face to face method. According to the journal Tourism Management (Wood, 2015) minimal response rate of 30 is necessary in order to obtain representative sample. This condition was thus fulfilled. In order to process the data and obtain necessary information, descriptive, statistical as well as content analysis were performed. Thus numerical as well as, the content analysis, were generated. Paper form of questionnaires was transformed into electronically version for simply work with data. The data were analyzed by using the internet page www.survio.com. For clear presentation, data obtained from questionnaires were transformed into tables and figures expressed in percentage form. The Office software was used for these purposes. No other software or additional tools have been taken advantage of.

3.1 Results and Findings

The basis for the analysis of the needs of families with children in tourism was quantitative research, which was conducted by written surveys. Interviews were conducted during 1 month period, more specifically from the beginning of March 2018 to beginning of April 2018, in Prague, Liberec and Jablonec nad Nisou. The questionnaire was broadening in paper form. Randomly selected persons accompanied with children were approached to complete the questionnaire on the street, in public parks, or close to preschools. The electronic version of the questionnaire was created by server survio.com. The questionnaire consisted three parts: an introduction text, the questions and the final text. In the introduction text of the questionnaire was introduced to target the purposes of the thesis. The questionnaire contained 15 questions. In the questionnaire were used closed questions. If the respondent answered the question closed, it meant that he had the choice of certain options. First, the questionnaire contained questions concerning the number of his/her children, social or marital status. This was followed by questions addressing the main issue of research. It means for example mode of transportation, type of accommodation or boarding, duration of vacation and other questions (See Figure 1).

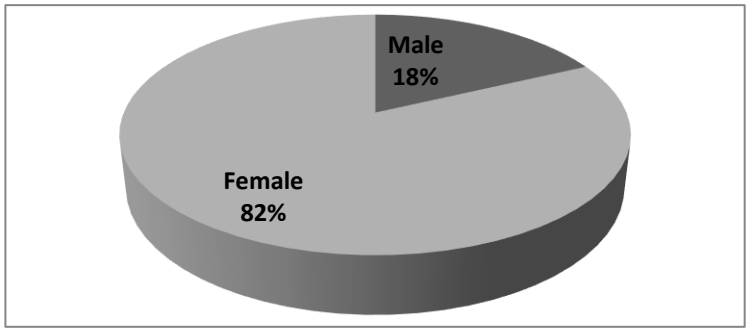

Figure 1 Gender of respondents; source: own processing

General data were not a key goal of the research, but they are essential for the overall evaluation, therefore they are listed at the beginning of this subchapter. This pie chart is a graphical representation, showing the gender of respondents. The questionnaire undertook in total 100 parents of children, out of them 82 were females and 18 males.

The Graph 1 shows that these 82 females represent 82% of the total number of respondents, while 18 males equal to 18% of all participants (See Figure 2).

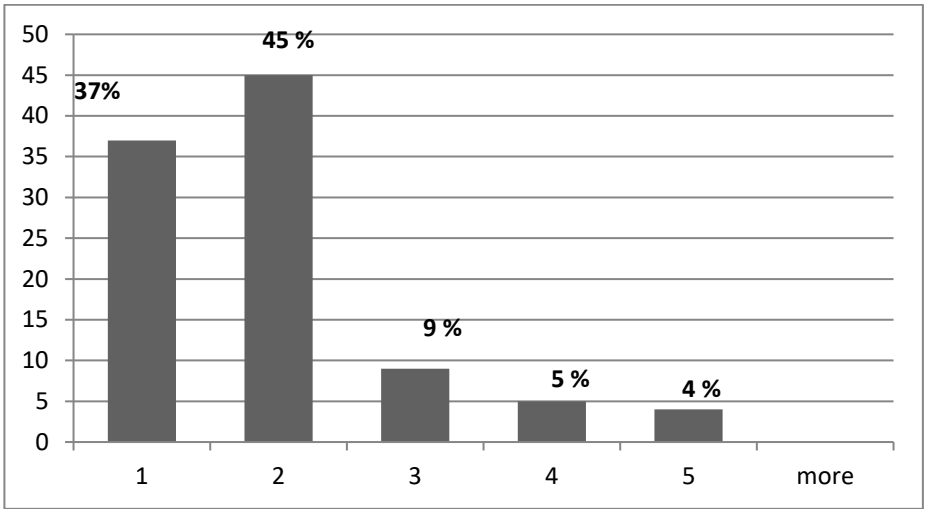

Figure 2 Number of children in a family household; source: own processing

Figure 2 shows than 45% of all respondents have at least 2 children. This result confirms the typical Czech family model. Also 37 % of the respondents with at least 2 children are married. 9% represents parents of three children, 5% represents a group of parents of 4 and 4% are parents of 5 children. None of the participants responded that has more than 6 children (See Figure 3).

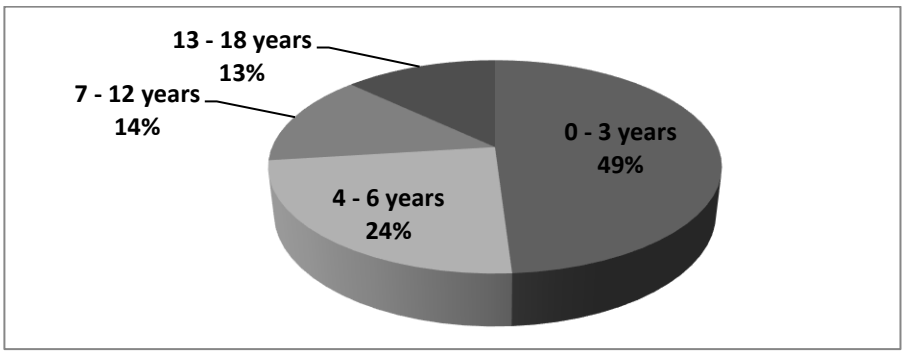

Figure 3 Age of the youngest child in a family; source: own processing

Figure 3, situated above shows that 49% of all respondents (N = 100) were parents with youngest child aged 0-3 years. They were most participated in the survey, followed by parents of children age group from 4 to 6, who represent 24%. 14% of parents belong to the age group of children between 7 and 12 years. Lastly, 13% of respondents were parents of children age group from 13 to 18 years. More than half of the respondents, at least with one child, up to 3 years age, represent mothers in a household. This current situation indicates that mothers are usually on maternity leave for the period of three years and then they come back to the employment (See Figure 4).

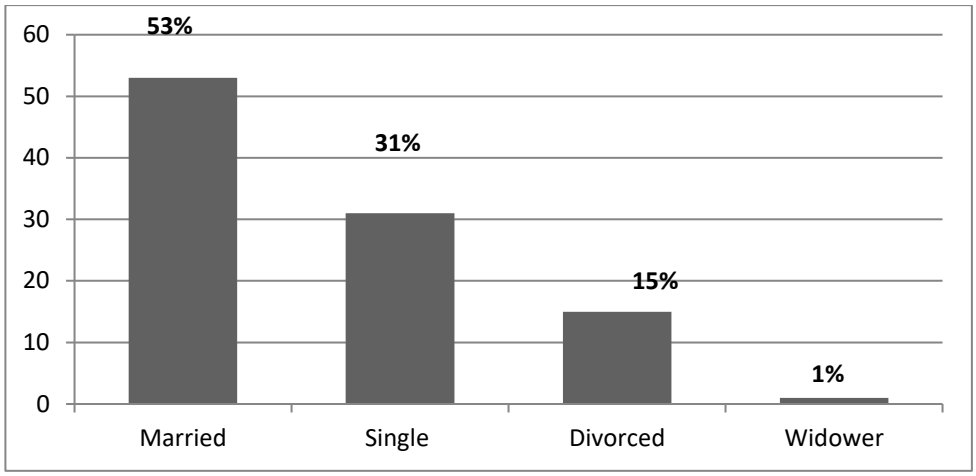

Figure 4 Marital status; source: own processing

The Figure 4 portrays graphical representation of the marital status of respondents. From all respondents (males and females) 53 % belong to the group of married, 31 % of respondents belong to the category of single parent, 15 % were divorced and 1% is widowed. Most of those who were surveyed said that they have at least two children (See Figure 5).

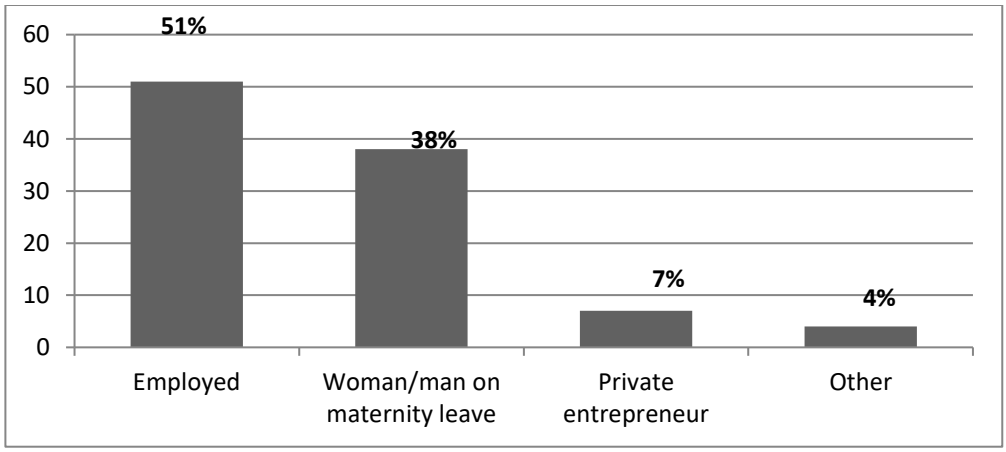

Figure 5 Social status; source: own processing

Figure 5 shows which social statute respondents occupy. Almost half of the respondents were employed, 38% were women or men on maternity leave (working in the household), the rest of parents occupied private entrepreneur (5%) or unemployed (2%) social status.

According to Figure 6, 76% of all respondents are living together with their partner and with their own child/children, followed by 12% who live alone. Answer together with my partner and my or his child/children chose 7 % of respondents. Lastly, 5 % of all respondents live in multi-generation family (See Figure 6).

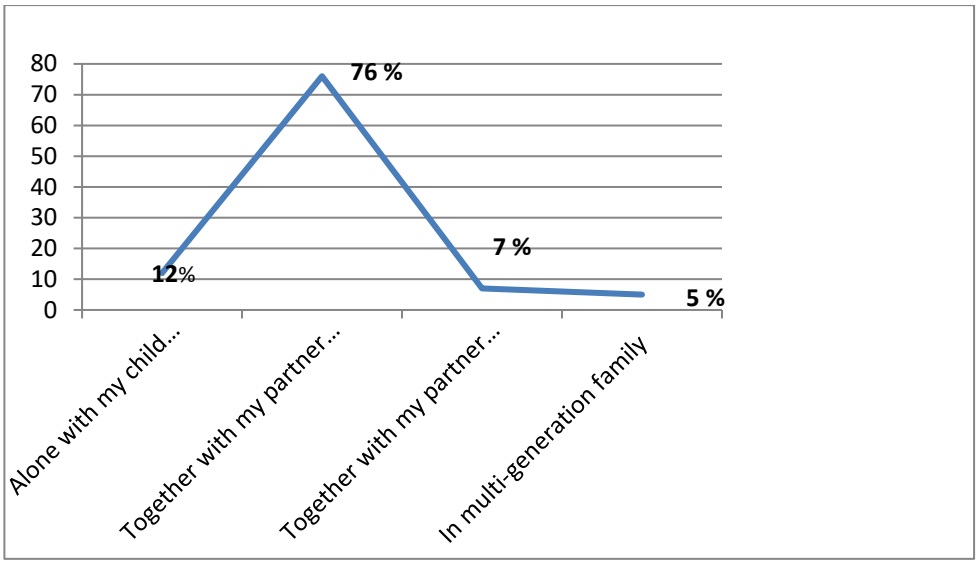

Figure 6 Type of family; source: own processing

According to Figure 7, which was related to the place of spending vacation, had the largest proportion of response - alternately at home country and abroad with a share of 44% of all. Furthermore, 31% of parents reported that during the vacation they stay in the Czech Republic. In most cases, these respondents represented parents with at least one child aged 0-3 years. It is therefore understandable that the main reason for this response was probably the age of the child. Additionally, 20% said they only spend their stay abroad (See Figure 7).

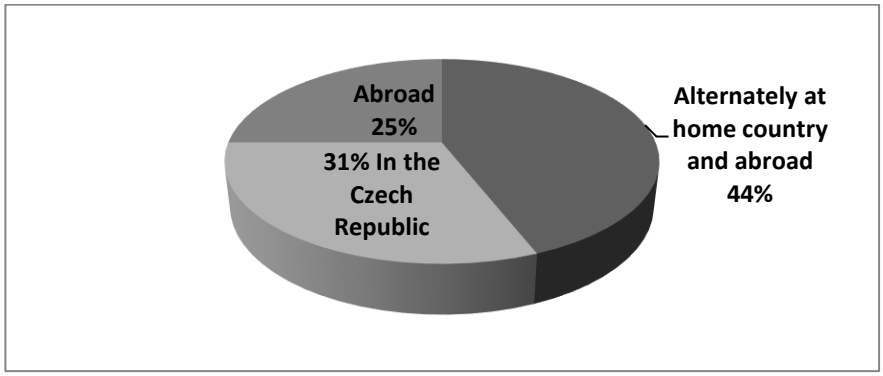

Figure 7 Place of vacation; source: own processing

Figure 8 is graphical representation of transportation which parents of children use when they are going on vacation. The majority, 53% use car as a type of transportation. Subsequently, 28% of respondents usually use bus. These means of transport are fully dominant, others were chosen by only a few percent of parents. Transportation by train use 15% of parents, while 4% stated plane as a transportation mode. The car chooses especially parents of preschool children. The same group of parents represented travel by bus or train. Families with older children prefer air transport (See Figure 8).

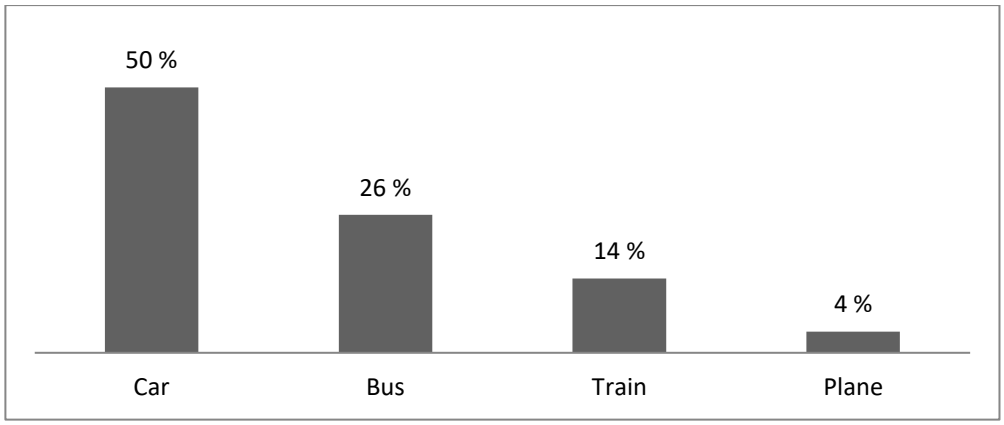

Figure 8 Form of transportation; source: own processing

More than half of the respondents were married individuals having in most cases two children. Furthermore, large proportion consisted of single respondents with one child. Largest proportions of respondents were parents with youngest child from 0 to 3 years old (49%), followed by parents with the youngest member of the family aged 4 to 6 years (24%). Parents with youngest child from 7 to 12 years old (14%) and from 13 to 18 years old represented smaller amount of respondents (13%). More than half were employed. Large amount made women/men on maternity leave (in household). Most of the mothers with children aged 0-3 years stated that they are currently on maternity leave. We can say that in our country is still dominating the traditional model of parents and 2 children. During the first three years of child's life, mother is on maternity leave and father is employed. 76% of respondents are living with their partners and with their children. 19% compose incomplete families, which are represented by divorced mothers living alone with their children. Following lines deal with common characteristics of families with children all age groups and specifics for each age group (See Figure 9).

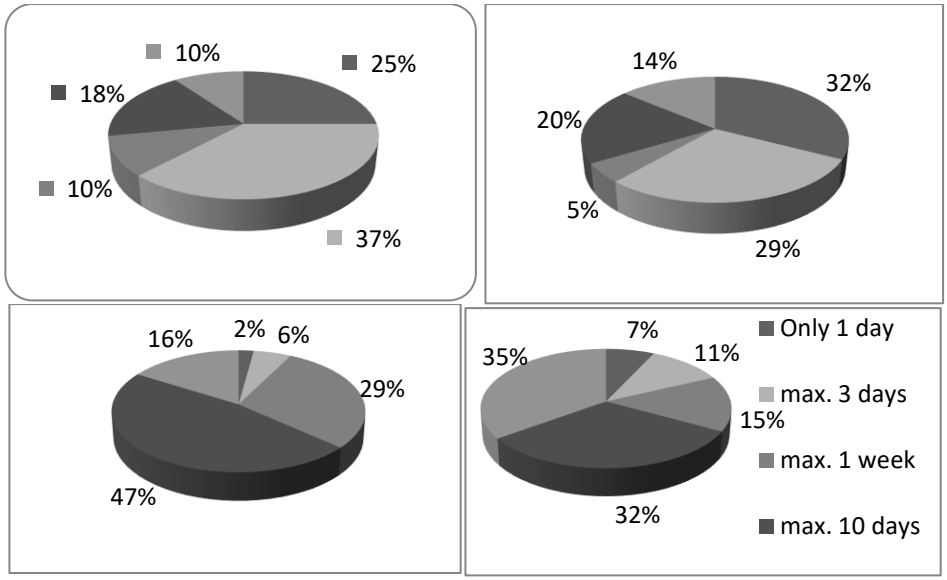

Figure 9 Duration of vacation; source: own processing; age group 0-3 years (top left), 4-6 years (top right), 7-12 (bottom left), up to 13 (bottom right)

4 Discussions and Conclusion

Family is characterized primary by higher demand on supply and infrastructure of services, by need for greater security and flexibility during travelling. Like in the real life there is a need for taking care of family and family relationships, it is necessary to take care of family tourism. It is important to support, stimulate and develop. The aim of this study was to identify those factors which lead families to travel, to identify their needs in travel industry and answer the question whether or not to support this market segment. This analysis was preceded by a study of the family as consumers, family buying decision and how children affect this decision. The influence of children on buying decision should not be overlook because they are also part of demand in tourism industry. And very often they are the reason why family organize trips or vacations. On the other hand, of course, they are reasons why families cannot travel because of the children. Mostly, it is just a temporary or short-term situation. Thus, if the family has the ability and interest to travel together, parents must adapt to children, for example to select an appropriate intensity of choose the adequate destination. From the analysis of families as a marketing profile in tourism industry which was based on survey can be stated that:

- Families with children compose a smaller part in tourism industry demand.
- We should strictly distinguish between families with young and older children, as well as among families with younger and older parents.
- Vacation and time spend together has a big significance for the family. It is a time when parents can be with their children, relax and have a fun together or do sport activities.
- Recognition, relaxation, tourism, sport and entertainment are the main motives for families to travel.
- Families are generally satisfied with the range, quality and price of offered services. Usually they feel lack of entertainment and attractions for their children.

By short cogitation on families in tourism I concluded that is appropriate to encourage family travelling. First, as already has been mentioned form the travelling in childhood, children take on the habits of behaviour and that fact that learn to respect the nature and other people create their own scale of popular destinations. In addition, tourism would be greatly depleted without a segment of families. The most important thing is still the knowledge of demand and the willingness and dedication to meet its needs. Only then will be the families more motivated to stay in the Czech Republic and they will not leave the borders.

References

Alfer'ev, D. (2018) "Approaches to Assess Enterprise Efficiency Depending on the Implementation of Information Computer Technology in Financial and Economic Activity", *Social Area / Социальное Пространство.* Vol. 5, No. 17.

An, W., Western, B. (2019) "Social capital in the creation of cultural capital: Family structure, neighborhood cohesion, and extracurricular participation", *Social Science Research*. Vol. 81, pp. 192–208.

Attreya, B. (2018) "Consumer Buying Behaviour", *Journal of Advances and Scholarly Researches in Allied Education.* Vol. 15, No. 9, pp. 1–4.

Balint, E. (2018) "Unconscious communications between husband and wife", In: Ruszczynnski, S., *Psychotherapy with Couples*. pp. 30–43.

Bertilsdotter Rosqvist, H. (2019) "Doing things together: Exploring meanings of different forms of sociality among autistic people in an autistic work space", *Alter*. Vol. 13, No. 3, pp. 168–178.

Böckler, A., Tusche, A., Schmidt, P., Singer, T. (2018) "Distinct mental trainings differentially affect altruistically motivated, norm motivated, and self-reported prosocial behaviour", *Scientific Reports*. Vol. 8, No. 1., article no. 13560.

Chan, E. K. (2019) "The role of personal relevance in the value creation process of edutainment consumption", Journal of Consumer Behaviour. Vol. 18, No. 3, pp. 190–204.

Gijsbers, I., Gonzalez Gutierrez de Leon, A. (2018) "Responsible Tourism: Using Tourism for Sustainable DevelopmentResponsible Tourism: Using Tourism for Sustainable Development", Journal of Tourism Futures. Vol. 5, No. 1, pp. 100–101.

L'Esperance, M. (2018) "Who Manages Household Finances in Couples? The Role of Relative Income and Gender", *SSRN Electronic Journal.* Vol. 7, pp. 1–32.

Malmberg, B., Andersson, E. K. (2019) "Adolescent neighbourhood context and transition to parenthood: A longitudinal study", *Population, Space and Place*. e2228.

Martelaer, K., D'Hondt, E., Van Driel, J., Bardid, F., Bierens, J. (2018) "Effective Water Competence Training for School-Aged Children: Teaching Strategies for Skills, Knowledge, and Attitudes", *International Journal of Aquatic Research and Education*. Vol. 11, No. 2.

Mishra, V., Schifko, M., Suriyababu, V. K., Eslamian, A. (2019) "Autonomous Data Cleaning by Keeping Internal Structure and Homogenous Volumes between Objects", *SAE Technical Paper Series*. 2019-01-0808.

Muhdi, L., Boutellier, R. (2019) "Motivational Factors Affecting Participation and Contribution of Members in Two Different Swiss Innovation Communities", *Series on Technology Management.* pp. 71–90.

Nonaka, S., Shimada, H., Sakai, M. (2018) "Characteristics of Family Interaction of Individuals with Hikikomori (Prolonged Social Withdrawal) From the Viewpoint of Behavior Theory", *Japanese Psychological Research*. Vol. 61, No. 3, pp. 153–165.

Schall, J., Gibbons, M. (2018) "Evaluation results from family Caregiver training sessions on shared decision making", *Innovation in Aging*, Vol. 2(suppl_1), pp. 158–159.

Smit, J. A. H., van Oers, K. (2019) "Personality types vary in their personal and social information use", *Animal Behaviour*. Vol. 151, pp. 185–193.

Tsoi, M. (2014). "Assessment of family members infuence on the purchase decision-making process", In: *SGEM 2014 Scientific SubConference on Political sciences, law, finance, economics and tourism*.

Way, M. M. (2018) "Families: Economic Functions and Decision-Making", In: *Family Economics and Public Policy, 1800s–Present*, pp. 23–44.

Wood, R. C. (2015) "Researching Tourism, Leisure and Hospitality for your Dissertation", *Tourism Management.* Vol. 50, pp. 55–56.

Yao, L. (2018) "Think about the Common Debt between Husband and Wife", *Advances in Social Sciences.* Vol. 7, No. 4, pp. 406–410.

Application of the Competitiveness Model in city Poprad

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Abstract

There has been a lot of talk about competition and competitiveness recently, the reason is that competition on the market in all areas is very large, and if an enterprise, facility, or destination wants to "survive" and remain on the market, it must know its competitive environment and they must try to be competitive and unique. The issue in assessing competitiveness is that most methodologies focus on a general assessment of the region's competitiveness, companies, ... and do not specifically focus on tourism. While it is worth noting that the situation in recent years has been improving, and tourism companies, tourism destinations are interested in the level of their competitiveness from a professional or scientific point of view, and many articles have arisen on this issue. The aim of this paper is to assess the competitiveness of tourism in a particular Slovak city.

Keywords: competitiveness; destination; tourism; slow city.

JEL Classification: L83

Article Classification: Research article

1 Introduction

Travel and tourism are important part of service economy. Tourism is considered a full-fledged sector of the Slovak economy and its importance is constantly increasing. According to the Statistical Office in April 2019 number of visitors (442 297) increased in comparison to the previous year by 10,3%. Development of domestic visitors was more dynamic (+13,5%).

The competitiveness of tourist destinations cannot be separated from the creation of high added-value products and their integration into the tourism market while at the same time maintaining a relatively larger market share with respect to competitors (Mangion, Durbarry, Sinclair, 2005).

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President Clinton's Council of Economic Advisors Laura D'Andrey Tyson created a well-known definition of competitiveness: "Competitiveness is our ability to produce goods and services that are able to successfully pass an international competition test, with our citizens enjoying a growing and sustainable living standard (Klvačová, 2007)".

The current definition of competitiveness used by the European Union is quite different from the previous definition by Laura D'Andrey Tyson and is "more European". It says: "Competitiveness is the country's ability to provide its citizens with a high and ever-growing standard of living and employment for all who want to work (Klvačová, 2007)".

Business can also be defined as a competition between companies or destinations where only the best or the most original will survive. Pitra's definition also compares them to a competitive struggle to compete: "Competitiveness is a feature that allows a business entity to succeed in competing with other businesses and its assessment is therefore related to the conditions of that competition. The winner will be the one who can use the (competitive) advantage in the competition to gain superiority over his rivals. Being competitive at the same time means for a company, a destination to create tomorrow's competitive advantages faster than just its opponent to copy today's competitive advantages. Representatives of their choice of entrepreneurial orientation seek to focus on aspects of competitive advantages."

The success of tourism destinations in world markets is influenced by their relative competitiveness . Tourism destination competitiveness is becoming an area of growing interest amongst tourism researchers (Crouch & Ritchie, 1999; Pearce, 1997).

Crouch and Ritchie's approach to destination competitiveness extends previous studies that focused on destination image or attractiveness (see Chon, Weaver,& Kim, 1991; Hu & Ritchie, 1993; Enright, Newton, 2004).

Tourism services in generalare recognised as being important elements of destination image or product (Murphy, Pritchard, & Smith,2000) it is less common in destination image research topay explicit attention to the firms that supply theservices and to the factors that may affect the competi-tiveness of these firms (Enright, Newton, 2004).

The scientific literature introduces a number of classification of indicators for assessing competitiveness, eg. according to the OECD definition it is divided into three main groups: Core indicators, Supplementary indicators, Future development indicators. Key indicators include: Tourism Direct Gross Domestic Product, Inbound tourism revenues per source, Overnights in all types of accommodation, Tourism services, Labor productivity in tourism services, Purchasing Power Parity (PPPs) and tourism prices, Country entry visa requirements, National resources and biodiversity, Cultural satisfaction, Visitor satisfaction, National Tourism Action Plan (OECD,2013).

Scientist (Go and Govers, 2000, Wahab, 2001, Hassan, 2000, Crouch and Ritchie, 1999, Enright, Newton, 2004, Yoon and Uysal, 2005, Dwyer and Kim, 2003, Navickas, Malakauskaite, 2009, Das, Dirienzo, 2012, Jackman, Lorde, Lowe, Alleyne, Antonio, 2011) who have analyzed the tourism destination competitiveness confirmed its importance and emphasized that it is related to the well-being of local people. Tourism destination competitiveness is associated with the area's ability to provide goods and services to tourists better than others do.

2 Material and methods

To analyse and review the information that provided us with a basis for defining an optimal strategy for raisers competitiveness were used SWOT and PEST analysis. An important part and stepping stone for calculating and measuring the competitiveness of the city's tourism is 14 established tourism indicators. To determine the competitiveness of the city of Poprad was used a model of tourism competitiveness. Based on the synthesis of the results of the above analyses, we have based the strategy on promoting competitiveness by modelling the strongest and weakest aspects of tourism development. In solving the issue of supporting the competitiveness of the city, we used the method of descriptive statistics to determine trends in selected tourism indicators. We used basic mathematical-statistical quantifiers to determine the most and least significant indicator of tourism directly determining the competitiveness of a destination.

After implementation the above analyses, we have identified an optimal strategy for supporting competitiveness. Based on a subjective assessment of clearly defined tourism development indicators and their combinations, based on predetermined importance weights, i. e. each alternative (A1-A14) was quantified on the basis of the highest weight of importance of the factor under consideration, while other factors were assessed by the lower weight of importance and their interactions pointed to the value of the factor under consideration in promoting the competitiveness of the selected destination.

In order to achieve the desired results, indicators of tourism development tendencies in the selected city Poprad were identified and a model for the management of tourism competitiveness was used. By design of systemic management of the competitiveness of a specific tourism destination was based on the methodological approach defined below:

- to the assessed factor (A1-A14) it was attributed the highest weight of importance of cardinal scale<1.5>, i.e., 5 = maximum importance, 1 = minimum importance in the context of subjective assessment,
- other indicators are less important, i.e., didn´t reach weight the 5,
- in reciprocal interaction links of appraisal the primary indicator was assigned weights of importance at the interval 1 - 4, i.e., the highest weight was determined by the assessed factors of which weight of importance was primary, i.e. = 5,
- other indicators of the assessment were quantified with explicitly defined conditions, which was based on the fact that the point assessment of the weights from the scale of pointing can´t reach the same weight from the scale of weighted pointing <1.5>.
- - the need of quantification of the specific indicator of touristic destination competitiveness was based on a modified formula:

$$(A1*v1+A2*v2+.....An*vn)/\Sigma vn, \text{ where:} \quad (1)$$

A1 - Assessment indicator of trends in tourism,
vn - weight, which was subjectively attributed,
Σvn - the amount imputable values of weights of importance.

The system of effective management of support for competitiveness, and hence the further development of tourism of the destination, must have explicitly defined rules

for monitoring and regular evaluation of predefined quantitative tourism indicators, an integrated matrix of negative and positive aspects of promoting competitiveness of tourism and subjective assessment of competitiveness on the basis of comparable indicators.

2.1 SWOT analysis of city Poprad

Table 1 SWOT analysis of Poprad, own elaboration

STRENGHTS	importance	rating	score	**WEAKNESSES**	importance	rating	score
Terrain homogeneity	0,15	8	1,20	Insufficiently formed city brand	0,10	7	0,7
Location within the EU	0,15	9	1,35	Insufficient marketing communication	0,10	6	0,6
Traffic accessibility	0,10	7	0,70	Absence of precisely defined tourism offerings	0,15	6	0,9
Sequent on international transport corridors	0,15	6	0,90	Not using ecological transport	0,15	6	0,9
Existing transport facilities and the trend of their modernization	0,05	7	0,35	Missing demand analysis	0,05	7	0,35
Cultural events	0,20	9	1,80	Insufficient city-entrepreneur communication	0,20	5	1
Cultural and historical monuments	0,20	9	1,80	Insufficient information marking	0,25	9	2,25
SUM	**1,0**		**8,1**		**1,0**		**6,7**
OPPORTUNITIES	importance	rating	score	**THREATS**	importance	rating	score
Use of external financial resources	0,20	9	1,80	Strong competition-High Tatras	0,05	6	0,3
Implementation of free public transport	0,05	5	0,25	The non-conceptual development of tourism	0,10	8	0,8
Creating an appropriate marketing strategy	0,15	6	0,90	Insufficient cooperation of tourism entrepreneurs	0,25	9	2,25
Extending the network of paths and bike paths	0,25	7	1,75	Unoriginal offer	0,20	5	1
Implementation of alternative forms of transport	0,05	5	0,25	Transit city	0,10	4	0,4
New forms of advertising	0,10	5	0,50	Lack of development finance	0,20	7	1,4
New forms of tourism-slow tourism	0,20	9	1,80	Demographic development	0,10	7	0,7
SUM	**1,0**		**7,3**		**1,0**		**6,85**

Positive internal factors of tourism in the conditions of the Slovak tourist destination - Poprad are those that would allow it to gain superiority over the competition. The most significant are cultural and historical monuments as well as geographical location suitable for visiting other European Union countries.

Negative factors of the tourism of the city of Poprad, which could lead to a decrease in the attractiveness of the area, are mainly the poor promotion of the city, the unclear profile of tourism or the insufficient infrastructure especially for pedestrians and cyclists.

The main tourism development opportunities in this tourist destination include eg. use of external sources of financing to increase the development of tourism in selected territory, cross-border relationships or to expand the network of paths and cycling routes as an alternative way of transport, while the threats are competition of the High Tatras region, weak cooperation and competitiveness of small enterprises or decreasing budget for projects.

The following graphical representation of the results of the SWOT analysis (Fig.1) Clearly shows that the city of Poprad should continue its activities in the sense of further supporting the development of tourism. How strengths and opportunities outweigh weaknesses and threats, i.e. external opportunities coincide with its internal weaknesses, implying that the principles of the offensive strategy should be followed.

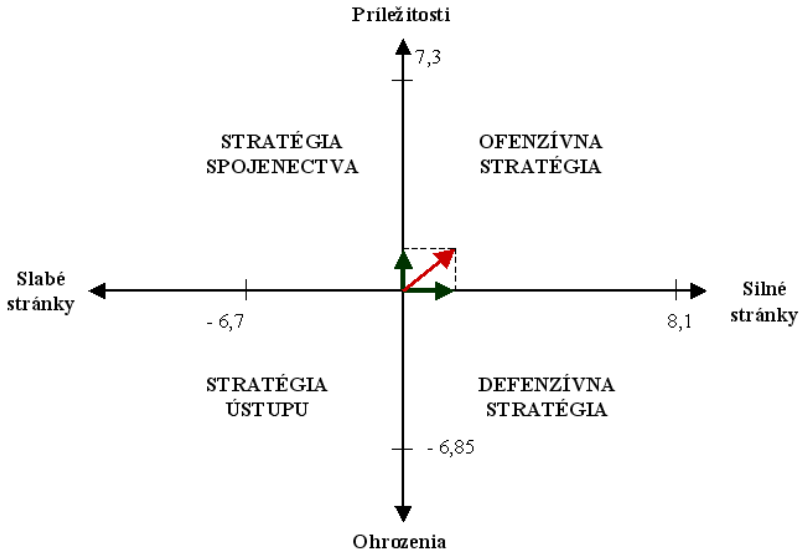

Figure 1 Graphic representation of SWOT analysis; source: own elaboration

2.2 A model for the competitiveness of a tourist destination

Based on the results of the used analyses, the model of competitiveness (Fig. 2) was subsequently used. After the globalization of quantitative analyses implemented so far, it can be stated that:

- a tourist destination is a specific tourism product,
- both external and internal aspects determine the excellence of the tourism product,
- specifics of tourist destination determines the competitiveness of the offered final product of tourism,
- internal aspects determine the specificity of the offered tourism destination
- development tendencies of explicitly defined tourism indicators predetermine its predicted developmental trends.

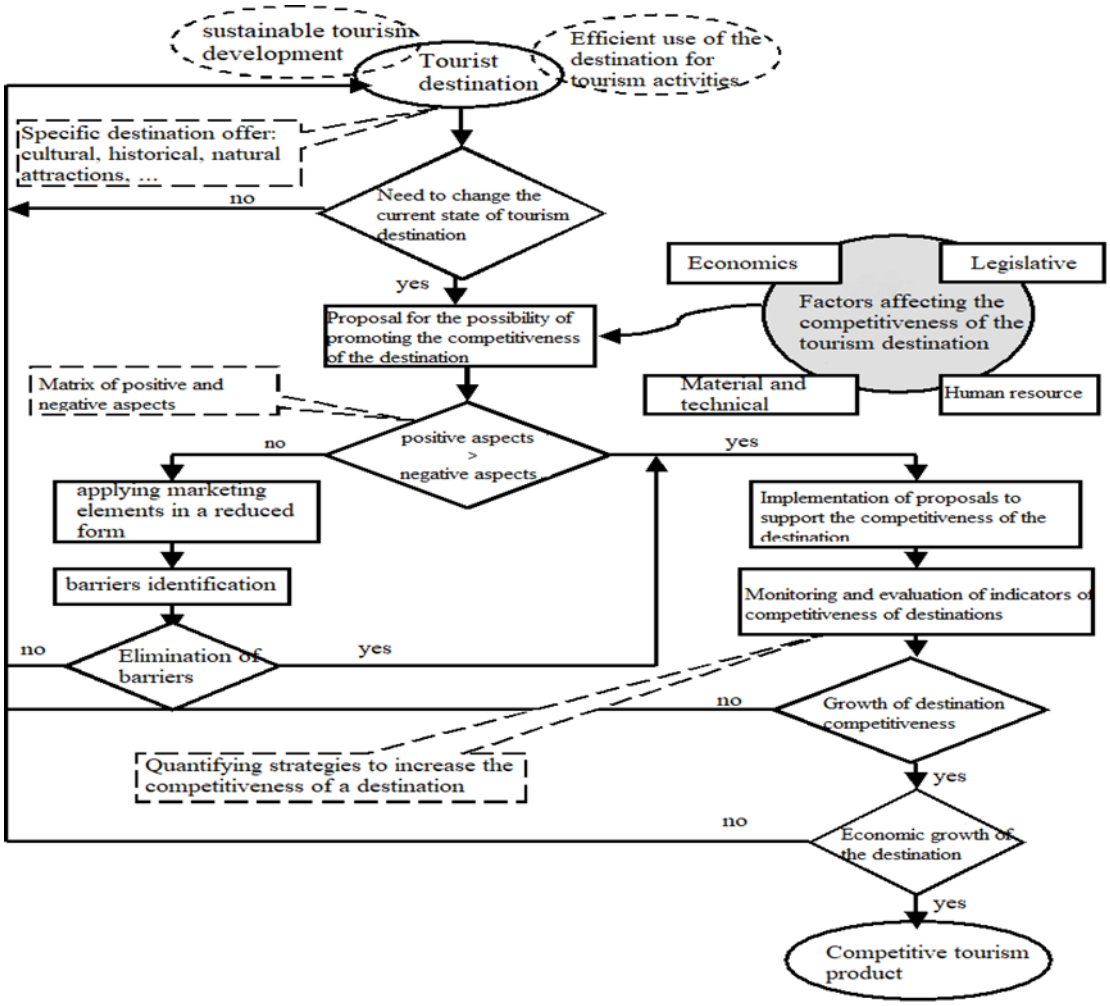

Figure 2 A model for managing the competitiveness of a destination; modified by: (Tomková, 2012)

Performed quantitative analysis, based on the subjective evaluation of considered relevant indicators of the development of tourism in Poprad, pointed to the priorities of the assessed development indicators, while we could create a descending order of the assessed indicators for the selected CR destination: was created descending sequence of assessed indicators:

1. financial support,
2. average expenditures of tourism,
3. number of overnight stays,
4. population,
5. area of protected areas,
6. number of beds,
7. catering facilities,
8. number of accommodation facilities in total,
9. area,
10. tourist density,
11. organized events,
12. number of historical monuments,
13. number of cultural monuments,
14. tourist intensity.

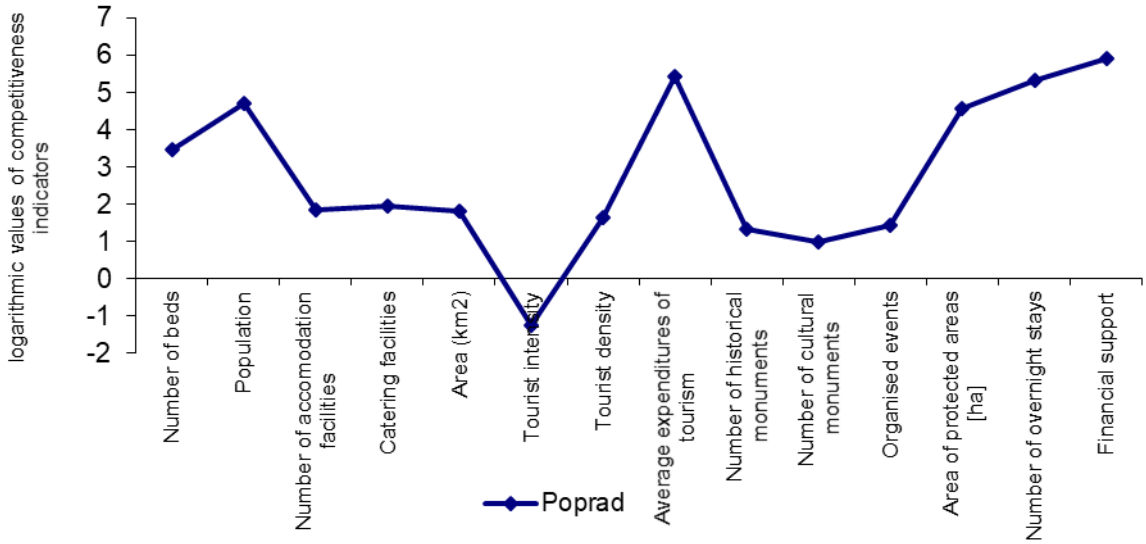

Figure 3 Development of tourism indicators in logarithmic conversion; source: own elaboration

In terms of the above-mentioned clearly defined methodological steps, we could state that in the systemic management of competitiveness support the highest priority in the systemic management of the analysed destination was shown by the indicator "Financial support" and the lowest indicator "Tourist intensity (ratio indicator)" (Fig. 3). The values of individual indicators of tourism were in logarithmic terms (in terms of adequate comparison of values of predefined indicators of development of tourism).

Based on the competitiveness model was approched a subjective assessment of the defined indicators of tourism (A1 - A14), accepting the methodological procedure defined above, related to the assessment of the competitiveness of the city of Poprad as a tourist destination, on the basis of which were quantified individual evaluation strategies (V1 - V4) (Tab. 2).

Table 2 Quantification strategies for assessing the competitiveness; source: own elaboration

	Indicators	**Value**	**Scale**				
A1	Number of beds	2 882	3,46	3,27	2,65	2,79	2,63
A2	Population	50 718	4,71	2,99	2,89	3,03	2,77
A3	Number of accommodation facilities	71	1,85	2,66	2,70	2,57	3,03
A4	Catering facilities	92	1,96	2,36	2,49	3,36	2,73
A5	Area (km2)	63	1,80	2,76	2,61	2,78	2,77
A6	Tourist intensity	0,057	-1,24	2,54	2,83	2,32	2,30
A7	Tourist density	45,710	1,66	2,46	2,96	2,72	2,75
A8	Average expenditures of tourism (mil. €)	264 300,0	5,42	2,81	2,86	3,05	2,45
A9	Number of historical monuments	21	1,32	2,82	2,58	2,82	2,46
A10	Number of cultural monuments	10	1,00	2,93	2,37	3,02	2,41
A11	Organised events	28	1,45	2,67	2,81	2,55	2,81
A12	Area of protected areas [ha]	37 551,53	4,57	3,04	3,06	2,63	2,88
A13	Number of overnight stays	207 362	5,32	2,52	3,02	3,27	3,05
A14	Financial support by state (€)	783 019	5,89	3,27	3,05	2,95	2,72

The graphical representation of the assessed indicators of tourism competitiveness support clearly showed that the support strategy V3, which prioritizes the indicator

"catering facilities", is the most important in subjective evaluation; the V4 strategy, which placed the highest emphasis on the "tourist intensity" indicator, was the least important (Fig. 4). Each aspect of foodservice quality must be addressed to satisfy the expectations and needs of the consumer (Namkung, N., S. Jang, 2007). Furthermore, ensuring the quality of both the food and service is critical for the continuing success of restaurants and foodservice operations (Olsen, Harmsen ,Friis, 2008).

Even at this point, the idea of prioritizing, respectively the application of the less traditional form of tourism, namely Slow Tourism, whose origin is in Slow Food, Italy The main idea is to use it local markets and farms as a support of development of services in selected destination.

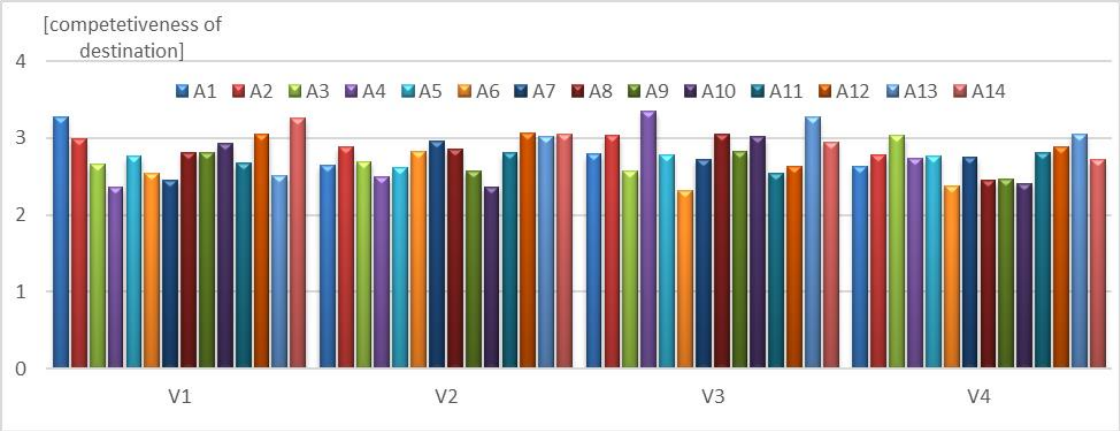

Figure 4 Quantification of alternatives subjective assessment of tourism indicators; source: own elaboration

2.3 Matrix of valuation of competitiveness in tourism regions

The detailed quantitative analyses of the tourism indicators highlighted the following partial conclusions:

- The tourist destination has a relatively strong potential for tourism development
- In promoting the competitiveness of the tourism destination under consideration in view of the above information, it should be invested mainly in the development of tourist information offices and the promotion of events organized by the city
- In promoting the competitiveness of a tourist-attractive destination, it would be appropriate to take into account in this context all the positive aspects determining their competitive advantage as well as the negative aspects determining their degradation in interaction with their overall competitiveness, which could lead to a decrease in their competitiveness.

Table 3 Matrix of positive aspects of support the competitiveness of tourist destinations; source: own elaboration

indicators	insufficient infrastructure for cyclists	non-conceptual development of tourism	poorly defined city offer	unwillingness to cooperate between entrepreneurs of tourism	transit city	competition	missing motivation system for entrepreneurs and organizations	financial resources deficit for development	sum	**scale**
insufficient infrastructure for cyclists	**X**	0,5	0	0,5	0,5	0,5	0,5	0,5	3	10,71%
non-conceptual development of tourism	0,5	**X**	0,5	0,5	0,5	0	0	1	3	10,71%
poorly defined city offer	1	0,5	**X**	1	0,5	0,5	1	0,5	5	17,86%
unwillingness to cooperate between entrepreneurs of tourism	0,5	0,5	0	**X**	0,5	0	0,5	0,5	2,5	8,93%
transit city	0,5	0,5	0,5	0,5	**X**	0	0,5	0	2,5	8,93%
competition	0,5	1	0,5	1	1	**X**	1	0,5	5,5	19,64%
missing motivation system for entrepreneurs and organizations	0,5	1	0	0,5	0,5	0	**X**	0	2,5	8,93%
financial resources deficit for development	0,5	0	0,5	0,5	1	0,5	1	**X**	4	14,29%

The globalization of the above-mentioned facts and results pointed to a matrix of positive (Table 3) and negative (Table 4) aspects of increasing the competitiveness of the tourism destination.

Table 4 Matrix of negative aspects of support the competitiveness of tourist destinations; source: own elaboration

Indicators	positive	negative	value	rate
insufficient infrastructure for cyclists		3	43,75%	1,29
non-conceptual development of tourism		3		
poorly defined city offer		5		
unwillingness to cooperate between entrepreneurs of tourism		2,5		
transit city		2,5		
competition		5,5		
missing motivation system for entrepreneurs and organizations		2,5		
financial resources deficit for development		4		
natural resources	3		56,25%	
location	4			
events	5,5			
cultural-historical monuments	3,5			
tourist intensity	5			
tourist density	4,5			
number of accommodation facilities	4			
average tourism spending	2,5			
visit rate	4			

The above-mentioned matrix of positive and negative aspects of promoting competitiveness of the destination, whose individual indicators were identified based on the analyses implemented so far, were identified based on the quantification of their relative ratio (Table 5). The ratio of negative and positive aspects for the area under review was 1.3 which indicates a satisfactory competitiveness of the region, as its positive aspects prevail over the negative ones affecting its competitiveness, which is determined by the use of its competitive advantages.

Table 5 Ratio of positive and negative aspects of the competitiveness of the tourism destination; source: own elaboration

indicators	natural resources	location	events	cultural-historical monuments	tourist intensity	tourist density	number of accommodation facilities	average tourism spending	visit rate	sum	**scale**
natural resources	**X**	0,5	0,5	0,5	0,5	0,5	0	0,5	0	3	**8,33%**
location	0,5	**X**	0	1	0,5	0,5	0,5	1	0	4	**11,11%**
events	0,5	1	**X**	0,5	0,5	0,5	0,5	1	1	5,5	**15,28%**
cultural-historical monuments	0,5	0	0,5	**X**	0,5	0,5	0	0,5	1	3,5	**9,72%**
tourist intensity	0,5	0,5	0,5	0,5	**X**	0,5	1	1	0,5	5	**13,89%**
tourist density	1	0,5	0,5	0,5	0,5	**X**	0,5	0,5	0,5	4,5	**12,50%**
number of accommodation facilities	0,5	0,5	0,5	1	0	0,5	**X**	0,5	0,5	4	**11,11%**
average tourism spending	0,5	0	0	0,5	0	0,5	0,5	**X**	0,5	2,5	**6,94%**
visit rate	1	1	0	0	0,5	0,5	0,5	0,5	**X**	4	**11,11%**

By identifying the categories of competitiveness that accept the numerical expression of the ratio of defined positive and negative aspects directly affecting the competitiveness of the destination, we can say that the selected destination belongs into category 4, which is a satisfactory level (Table 6).

Table 6 Categorization of competitiveness of tourism region, source: own elaboration

Category of competitiveness of tourism		Ratio
I. Category	excellent	over 2,0
II. Category	very good	1,99 – 1,70
III. Category	good	1,69 – 1,40
IV. Category	satisfying	1,39 – 1,10
V. Category	sufficient	1,09 – 1,00
VI. Category	insufficient	0,99 and less

3 Results and Discussion

The systemic approach to increasing the competitiveness of the tourist destination should consist in the effective planning of projects in the area of increasing the attractiveness of the destination with the priority of accepting their specificities and further developing tourism, which affect the overall economic prosperity. Like most cities and regions in Slovakia, Poprad does not use the level of its tourism potential. Despite the fact that comparing with previous years the number of visitors is increasing in the Prešov region, in which the city of Poprad is also situated, the potential of the city is still underused. The city should focus on its strengths and opportunities that it does not have to remain just as a transit city during a visit High Tatras or a substitute alternative for tourists in bad weather. Although the findings suggest that the positive aspects prevail over the negative ones, we can say that the city of Poprad has acquired almost limit values.

According to statistics, the most frequent reason for visiting the city was sports events, festivals, relaxation, wellness, business trips, training and visiting friends and family. The city should go in this direction and expand, respectively strengthen his offerings in organizing events and linking with gastro experiences. The use of new forms of tourism is also a way for visibility of the "brand" of the city, eg. Slow Tourism (Slow city, Slow Food), as a sustainable alternative to tourism development in the city.

The Slow City, Cittá Lenta movement is a spin-off of the Slow Food movement. It has variously been defined as an urban social movement and a model for local governance. The Slow City movement seeks to extend the Slow Food movement´s philosophy to all aspects of urban living, providing an agenda of local distinctiveness and urban development. Building from ideas of the Slow movement the same principals and philosophy can be easily applied to tourism. Central to the meaning and concept of Slow Tourism is the shift in focus from achieving a quantity and volume of experiences while on holiday towards the quality of (general fewer) experiences. It is a form of tourism that respects local cultures, history and environment and values social responsibility while celebrating diversity and connecting people (tourists with other tourists and with host communities) (Robinson, Heitmann, Dieke).

Certain criteria and conditions must be completed in order for a tourism destination to be able to use this form of tourism in its territory. The core pillars of Slow tourism are Enviromental policies (air quality control, waste management, light pollution control, alternative energy source,...) Infrastructurals policies (urban planning and

transport measures – reduction af traffic, restoration of old building,...), Technologies and facilities for urban quality (urban design that bans neon signs), Safeguarding autochthonous production (promoting local markets, support of local products,...) Hospitality (increase local gastronomic tradition, ...), Awareness (education programms for both locals and visitors, taste education in the school,...).

The development of catering facilities, favouring local products, local dishes and traditions is the way in which the city could strengthen its competitiveness, as well as focusing on the completion of cycle-infrastructure and alternative modes of transport. People and their demands are changing and therefore it is necessary to adjust the offer of tourism according to the current trend.

References

Crouch, G.I., Ritchie, J.R.B. (1999) "Tourism, competitiveness, and societal prosperity", *Journal of Business Research*. Vol. 44, No. 3, pp. 137–152.

Das, J., Dirienzo, C. E. (2012) "Tourism competitiveness and the role of fractionalization", *International Journal of Tourism Research*, Vol. 14, pp. 285–297.

Dupeyras, A., N. MacCallum (2013) "Indicators for Measuring Competitiveness in Tourism: A Guidance Document", *OECD Tourism Papers*, 2013/02, OECD Publishing, Paris. France.

Enright, M.J., Newton, J. (2004) "Tourism destination competitiveness: a quantitative approach", *Tourism Management*, Vol. 25, No. 6, pp. 777–788,

Klváčová, E., Malý,J., Mráček, K. (2007) *"Základy evropské konkurenceschopnosti",* Professional Publishing, Praha, Czech Republic.

Mangion M.-L., Durbarry R., Sinclair M. T. (2005) "Tourism competitiveness: price and quality", *Tourism competitiveness: price and quality //Tourism Economics*, Vol. 11, No. 1, pp. 45–68.

Murphy, P., Pritchard, M.P., Smith, B. (2000) "The destination product and its impact on traveller perceptions", *Tourism Management*. Vol. 21, No. 1, pp. 43–52.

Namkung, N., S. Jang, (2007) "Does Food Quality Really Matter in Restaurant: Its Impact of Customer Satisfaction and Behavioral Intentions?" *Journal of Hospitality and Tourism Research*. Vol. 31, No. 3, pp. 387-410.

Olsen, J. R., Harmsen, H.,Friis, A. (2008) "Linking Quality Goals and Product Development Competences", *Food Quality and Preference*. Vol. 19, No. 1, pp. 33–42.

Porter, M. (1994) *"Konkurenční výhoda",* Victoria Publishing, Praha, Czech Republic.

Robinson, P. (2011) *"Department Head",* Leeds Beckett University, UK.

Tomková, E. (2012) *"Konkurencieschopnosť cestovného ruchu vo vymedzenom regióne Slovenska v porovnaní s vymedzeným regiónom v Taliansku",* Thesis, Technická universita of Košice, Košice, Slovakia.

Environmental management of the municipatily

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Abstract

The paper deals with analysis of chosen village near High Tatras Spišské Bystré. The theoretical part is devoted to general characterization of community, geographical location, history, geomorphology, geology, hydrology, flora and fauna and cultural monuments, which are located in the village. The analytical section contains information on population, health, education, transport infrastructure and community, SWOT analysis and the last part are the proposals for the development of the community. The aim of this work is to bring the best inform ation about the village from a theoretical and analytical point of view and describe the design of possible proposals for the development of the community.

Keywords: environment; development of the municipality; SWOT analysis.

JEL Classification: D18, K22, M31

Article Classification: Research article

1 Introduction

Slovakia is a country with great tourist opportunities that are still underused. It is rural tourism that strengthens the relationship with nature and local culture and is therefore a solution for Slovakia. Folklore, local customs or crafts attract holidaymakers from countries where the traditional culture is no longer in existence. Slovakia as a mountainous country with many foothill villages is ideal for mountain hiking. The village of Spišské Bystré belongs to the region of Prešov, to the district of Poprad, and is centered on Poprad as the center of supra-regional importance in the Spiš area. The cadastral area of the municipality has a large part of the territory under the Act of the National Council of the Slovak Republic No. 543/2002 Coll. on nature and landscape protection as amended - a diverse landscape environment, several declared specific landscape areas, on the other hand, it is a low-used part of the natural area for the needs

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of tourism. The village provides a pleasant environment for rural living with good and fast access to the city and job opportunities. All cadastral districts of the territory are passing through the cadastral district, while parts of the territory insufficiently served by public technical facilities are in the built-up areas of the cadastre.

2 Material and methods

The village of Spišské Bystré is situated in the western part of the Slovak Paradise protected area, in the valley of the river Hornád. The village is located 8 km from the center of Poprad (see Fig. 1), which is the gateway to the High Tatras. In the Low Tatras, the village borders the cadastral area of Hranovnica, Kravany and Vikartovce.

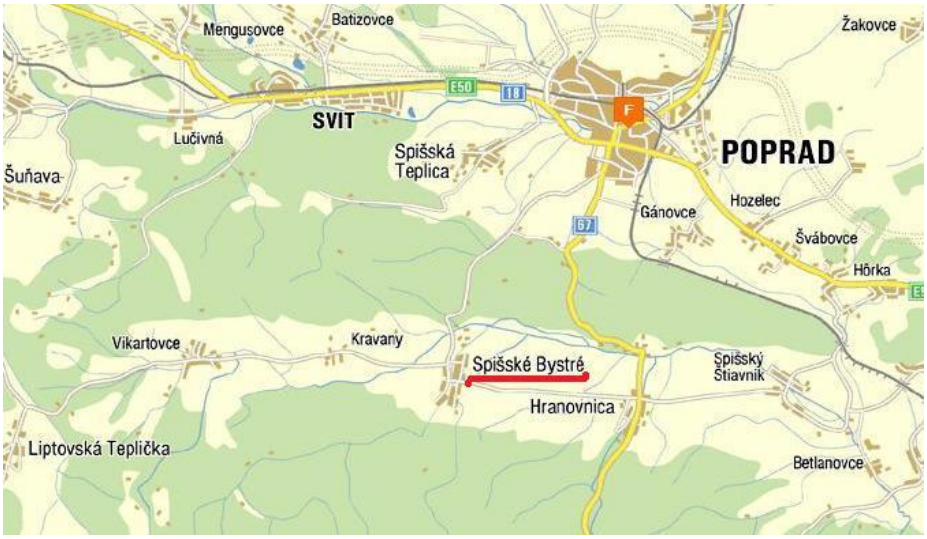

Figure 1 Localization of municipality Spišské Bystré; source: modified by (www.google.maps.com)

The first mention of the village Kubachy (Spišské Bystré) is from 1294 - villa Cubach, Kuhbach, Kuhenbach. The first concrete information about the village dates from 1553. The name of the village Spišské Bystré was established in 1945 after the Bystrá stream.

The territory of the village of Spišské Bystré lies on the border of the Hornádska basin (Vikartovská priekopa) and the Slovak Paradise. The area has a mountainous character and a rich tectonic past. The area is quite rich in minerals. In the surroundings, in the quarries of Kvetnica and Dubina, a high-quality building stone is mined - one of the highest quality in eastern Slovakia.

The character of the village is created by three streams (Hornád from the spring below Kráľová hoľa, Kubašok and Bystrá). Their shores are covered with shrubs. The Bystrá brook springs in adjacent forests, flows to the north through a narrow valley and flows into the Hornád River behind the village. Kubašok stream rises under Človeča hlava and flows equally with Bystrá stream. Originally, it flows back of the village, but in 1916 the village's citizens transferred it to the village, where it also mouths into Bystrá stream.

The majority of the area is covered by forests, spruce, fir, larch and forest pine occupy the largest areas. The willow is the most common. Forests, meadows and pastures are brightly blooming throughout the growing season. The part of the Low Tatras is the only place in central Slovakia where all the big beasts live together - bear, lynx and wolf.

There is a hare in the forest zone. Deer, roe deer, and lesser animals are hunting here. Wild boar is often found near the fields, in the foothills. The majority of the waters belong to the trout zone (Zeleňáková et al., 2018).

Cultural monuments in the built-up area of the village are the memorial to the victims of the war and the Roman Catholic Church of St. Michael Archangel, originally gothic, was modified after 1706 and neo-gothic extended in 1926 (Budaj et al., 2018).

Cultural activities in municipality are provided mainly by the Kubašok complex (cottage of fire brigade, amphitheater). In the village there is a general library, a cultural house, a church, a rectory and a chapel, a cemetery and a house of mourning. Cultural traditions are preserved in the village (Jánske fires, Festival of Peter Stašák). In the area of clubs and interest associations, there is a chess and tourist association and pigeon breeding. Habits and customs are kept by the local population in both original and altered forms. Very interesting is the architecture and development of the village. The relationship to land, agricultural production, craftsmanship and immense ingenuity is typical for the inhabitants of the entire Hornád Basin. Folk clothing, dialect, the whole area of oral and music is alive in the village.

The total number of permanently living inhabitants of the municipality is about 2500. The increase over the last 10 years is 15% mainly because of a new built area in Kamenec part. Interesting is the slight predominance of men. The village has a favorable age structure (pre-productive 24%, productive 58%) with an average age of 34 years. The development of permanently occupied dwellings in the municipality increased directly in proportion to the increase in population, and currently there are about 800 permanently occupied dwellings in the municipality.

There is a health center (its own separate building) with ambulances for general practitioners for adults and dentists in the village. In addition, there is a children's ambulance in the school area and a pharmacy is located in the village center.

There is a kindergarten and primary school in the village. The elementary school has its own premises in its own area, with the number of classes 18, the number of students is 400 (maximum capacity of about 550 pupils). The school has its own dining room with kitchen and gym. The kitchen also provides food for kindergarten. There is a school park and school workshops in the school. There is a newly built football field with a running track with an artificial lawn. Kindergarten is in the school area in the central part of the village, with the number of registered children 70 (capacity 70 seats). The kindergarten provides all-day care for preschool children, has its own dining room, behind the object is a courtyard with greenery.

The stationary house for elder people is also located in the municipality.

The village is connected to the Poprad city by roads of the 1st class: from the north to the road I/18, E50 using the road III / 06717 Poprad - Spišské Bystré, from the east to the road I / 67 via the road III/06716 Hranovnica - Spišské Bystré - Liptovská Teplička. The village gravitates to the city of Poprad and is used as the shortest link (7.5 km) with this city. The municipality itself is accessible by means of relatively long service access roads, mostly in the north-south direction.

Agricultural production in the cadastral area is concentrated in the agricultural cooperative. Agricultural cooperative deals with plant and animal production. Crop production is predominantly focused on cereal and potato cultivation, it also manages permanent grassland, which is used as pasture. There are hay and artificial fertilizer stores in the cooperative. In the area belonging to the cooperative there is an office building, workshops and garages.

As for the current state of tourism in the village, there are the following tourism facilities providing public catering and accommodation:

- Pizzeria Columbiana - capacity of 90 people;
- Bistro Alžbetka - capacity 45 people (bistro), capacity 14 people (pension);
- Hospitality Kľúčik - capacity of 40 people (no kitchen);
- Pension Adana - capacity 45 people.

For recreation (in conjunction with sports): Kubašok is located on the outskirts of the built-up area, adjacent to the ski-resort area. The ski resort is facilitated with restaurant and hostel. There is area of Kubašok, as was mentioned, with a cottage of voluntary fire brigade, football field and gazebo with outdoor seating, small stage for occasional performances. The area is used mainly by the village inhabitants for recreation. Apart from this, there are solitary chalets of individual recreation in the area. Within the built-up area of the village there is a football field, in the village there is a football section, and the football field is also a place of recreation for the inhabitants of the village.

The cadastre of the village is quite close to the attractive part of the Slovak Paradise (Tomášovský view, Kláštorisko, Suchá Belá), but it is not connected to its marked trails by tourists. Similarly, it is relatively close to the Low Tatras (Kráľova hoľa, etc.), also without a tourist connection. Forest stands in the southern part of the cadastre are the western part of the Slovak Paradise and are mainly used for forestry and hunting purposes.

This information is obtained mainly from Municipality office of Spišské Bystré (OÚ Spišské Bystré, 2018).

3 Results

From the point of view of the SWOT analysis focused on the territory of the municipality of Spišské Bystré, it can be stated that the strengths prevail over the weak in the given municipality. There are many opportunities for development of individual areas, but also risks that prevent this development.

Strengths

- traditional foothill character of the area accurate for rural recreation,
- a relatively clean environment with clean natural surroundings,
- proximity to forests and mountain massifs very suitable for tourism and hiking,
- forestry which could be connected with agrotourism,
- focus on traditional agriculture as well as farming,
- proximity to the center of Poprad city and using its facilities of urban tourism,
- proximity to the airport, railway and main roads,
- proximity of the Low and High Tatras, the most beautiful Slovakian mountainous areas,
- localization just at the entrance to Slovak Paradise National Park,
- average technical infrastructure available to visitors.

Weaknesses

- location is outside of the scope of supra-regional interest,
- unsettled property relations of land,
- lack of free space for business,
- limiting infrastructure for development,
- insufficient facilities of National Park.

Opportunities

- partnership and good collaboration possibilities in the microregion,
- quite regular visits to the Slovak Paradise National Park,
- tourism development,
- development of agritourism in the area,
- an appropriate environment, especially natural,
- exploiting of human potential
- modernization of basic infrastructure.

Risk

- insufficient documentation of territory development,
- little interest of partners in the micro-region for joint actions,
- poor cooperation in their implementation,
- lack of available information,
- unprepared community development projects.

The village of Spišské Bystré with its territory and population creates a space that has an irreplaceable social, cultural, ecological and economic significance. The natural and territorial characteristics of the village resulting from the immediate vicinity of the Low and High Tatras as well as the Slovak Paradise National Park, the proximity of communication links (airport, railway, future highway), Poprad, along with good human potential, are the main starting points for the development of the given municipality.

4 Discussion

Regarding the environment, one of the priorities of the municipality at present is the reconstruction of the infrastructure and the related modernization, especially in the waste water treatment. The next measure will be to address the high costs of waste disposal and improving the collection of sorted waste (Šlezingr and Zeleňáková, 2011). The municipality would define the area for this purpose, ensure its functionality and transport for further processing.

One of the proposals is also the modification of the streams of the Kubašok and Bystrá streams. This goal pursues two goals: the flood control of these streams (also in relation to bridges and local roads and also the cleanliness that will always be in the spotlight with the intentions of developing tourism and agro-tourism. The next measures include the modification of public spaces and parks.

Promoting land use and cultural heritage is also important. An important opportunity for further development of the municipality is to use unpolluted environment and traditional, healthy agriculture with a focus on environmental food production (safe food) for the development of agrotourism with a link to the micro region. This opportunity is enhanced by the surrounding nature and rural environment.

5 Conclusion

The basic idea of every municipality is the universal development of the territory in order to improve the quality of life of its inhabitants. The East of Slovakia is one of the least developed parts of the Slovak Republic, yet it has countless municipalities that have not only natural but also cultural wealth (Ondrejka Harbuľáková et al., 2016).

In this paper, basic information about the village of Spišské Bystré from the theoretical and analytical point of view is presented as part of the ecological and tourist values in the Carpathian region. Based on this information, it is known to be an attractive tourist and tourism area of international importance and it has a large number of cultural and natural heritage for tourism development. The program of development of this village will not only contribute to the improvement of the quality of life of the inhabitants, but also the conditions for its sustainable development will be created by creating new job opportunities and improving the technical and transport infrastructure and especially by developing the potential of the municipality.

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References

Budaj, P. et al. (2018) "*Sacral buildings and tourism management in Poprad",* VERBUM Catholic University in Ružomberok, Ružomberok, Slovakia.

Ondrejka Harbuľáková, V., Zeleňáková, M., Fialová, J., Gross, M. (2016) "Criteria of the proposed activities for enviromental impact assessment", In: *J. Fialova, D. Pernicova (Eds.), Public recreation and landscape protection - with nature hand in hand*. Mendel University, Brno, Czech Republic.

OÚ Spišské Bystré. (2018) "*Municipal economic and social development plan",* Spišské Bystré, Slovakia.

Šlezingr, M., Zeleňáková, M. (2011) *"Stabilisation of banks of water streams and reservoirs - examples of the use of geonets",* In: Colloquium on Landscape Management Location: Brno, Czech Republic.

Zeleňáková M., Vitko Š., Budaj P. (2018) "*Environmental preconditions for the management of the Poprad municipality",* Popradská tlačiareň, Poprad, Slovakia.

Regional development and tourism from consumer perspective

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Abstract

The tourism industry is gaining more and more economic but also social importance in the world, but also in the Slovak Republic. It becomes part of the support and investment of national governments, but also of local and regional authorities. Tourism is an important and relevant area of each single region and directly affects its economic as well as overall development. The delimited area, which we devoted to this contribution, is the city of Štúrovo, more specifically the thermal resort of Vadaš and its services. We focused on this issue because the tourism industry and its services are still a topical issue, with the main theme of the paper being services. The main objective of the contribution is to analyse the current state of the thermal sector and assess the level of consumer satisfaction and to make proposals for future development and development.

Keywords: tourism; regional development; tourism services; consumer

JEL Classification: D12, O12, R11

Article Classification: Research article

1 Introduction

Tourism industry is gaining increasing economic and social importance worldwide and Slovakia as well. It has become a target sector for investment by national governments, but also local and regional authorities. Tourism is an important and relevant sector in different regions and has direct impact on economic and overall development of the area. This article focuses on tourism in Štúrovo, particular attention is devoted to

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Vadaš Thermal Resort and its services. Since we targeted to analyse the customer satisfaction, it was also important to define the customer with regard to quality tourism. The analysis focused on measuring the customer satisfaction level visiting Vadaš Thermal Resort and using its services.

1.1 Theoretical background of the issue discussed

Tourism is already an important economic sector for many countries and regions around the world. It is important that such destinations understand the ways in which modern tourism can be harnessed (Dambe and Atstaja, 2013). Modern tourism is strongly associated with development and increasing number of new tourism destinations. Tourism industry equals or even exceeds the export of oil, food produce or automobiles. Tourism has become a key player in international trade, as well as also one of the main sources of income for many developing countries. Despite the growing importance and proven contribution to GDP (3 to 5% worldwide), workplaces (7 to 8% of workplaces) and export (30% of the world's service export), tourism industry is still lacking political and economic recognition (Chreneková et al., 2016; Mura and Kljucnikov, 2018).

According to Ministry of Transport and Construction of the Slovak Republic, tourism is one of the most dynamically developing sectors, even in Slovakia. Recreation facilities have been developed in Slovakia, which are utilized in winter and summer seasons as well. (Pachingerová et al., 2013). Tourism in Slovakia is not an integrated industry with measurable outputs and inputs e.g. industry, agriculture or construction industry. However, it is a conglomerate of products and activities from several diverse sectors being a part of tourism industry. Tourism fulfils the following important economic roles in the national economy: multiplier effect, source of revenue, has impact on GDP, essential factor of regional development, employment and payment balance (Cestovný ruch na Slovensku, online).

The main goal of destination marketing should be to optimize the impact of tourism and maximize the benefits for the region. The complexity of target marketing explains the concept and attempts to synthesize the dynamic model of stakeholders for strategic marketing and destination management. Many popular and less popular destinations are ineffective in providing and maintaining the balance between the participants involved, which can jeopardize the achievement of strategic goals to achieve long-term competitiveness and prosperity of destinations. Marketing should be applied not only to increase the number of visitors in destinations, but also as an important mechanism to increase stakeholder interest. Destination Management Organizations (DMOs) should focus on four key general strategic goals to ensure the satisfaction of visitors and service providers (Mensah and Dei Mensah, 2013).
Strategic management and marketing goals for destinations:

- Increase long-term prosperity for local inhabitants
- Maximizing the visitor satisfaction
- Maximize the profitability of local businesses
- Optimize the impact of tourism and ensuring the sustainability between the economic benefits and the socio-cultural-environmental costs

If tourism is to be maintained by bringing satisfaction into the interaction between the tourists and hosts, it must adopt social marketing strategies. This involves monitoring the level of tourist satisfaction and utilize it as a criterion for success (instead of constantly increasing the number of tourists), as well as constantly monitoring the responses of hosts on tourists (Swain, 2007).

In current economic conditions, it is more evident than ever that tourism services can act as catalysts for destination development. Based on the size and dynamics of tourism sector, it is easy to track the development process and diversification of services. The development and diversification of services as strategic approaches are supported by considerations about reshaping the international context, influenced by economic instability and uncertainty. They have the potential to increase competitiveness and dynamics of the sector, strong competition on the market, as well as changes in consumer behaviour (Moraru and Daniela, 2011, online).

According to Parasuraman, Zeithaml and Berry (1985), we can distinguish five major dimensions of service quality, which are based on the principle of an extended research. These dimensions have impact on the customers' perception of the service quality. We will introduce them in order of their importance and presence in different types of services.

Reliability: providing accessible and reliable services. Reliability is required from hotel staff, but also in other service providing businesses. It means we have to deliver the service promised to customer. If we promise to customer, we have to be sure that the promise is delivered, otherwise the customer may lose trust in service provider.

Responsible approach: Sensitive approach to customer, prompt delivery of a particular service. If an above-standard service is required by the customer, the travel agency has to provide the required service. These additional services also provide financial benefits, since customer has no problem to pay for the service.

Credibility and security: Courtesy, hospitality, developing customer trust, qualification and competence of the staff. If a tour operator utilizing her experience and skills is trying to increase her professional performance, will be highly appreciated by the customer.

Empathy: Sensitive approach, attention devoted to client, empathy towards the requirements of the client. Some customers might have specific requirements (gay friendly hotel, vacation without children) that may sound strange to tour operators and it requires special attention compared to standard services required e.g. sea view or balcony. Tactility: Influence of the environment and materialization of the service. Materialization of services is also a candy prepared for guests in the hotel.

The above mentioned dimensions of quality represent the functional quality of services. It is a subjective perception of the form, how service is provided to the customer (Rašovská and Ryglová, 2017).

Over the past decade, the perception of tourism has changed. It is not perceived as a product or service, but as an experience. This shift in perception is the result of work "The experience of economy" by Pinea and Gilmore (2011), who invited the service providers to sell commercial products as experience. It is essential to differentiate experience and product. While product is sold, experience is a tool to sell products and services. Experience as a concept and independent paradigm first appeared in marketing and management theory (Čapošová, 2015). The key aspects of experience are the quality of service, emotions, loyalty, satisfaction and commitment. Standard STN EN ISO 9000:2000 – Systems of Management and Quality is approaching the customer satisfaction from the perspective to what extent the requirements of the customer are satisfied. According to Jones (1995), customer satisfaction is achieved, when expectations and demands of customer are met during the lifetime of products and services. Without this approach, we cannot achieve customer loyalty. Again, according to Hill (1996), when satisfying customer needs and expectations, we get informed how successful service providers were in meeting or exceeding the customer expectations. The assessment of customer satisfaction is therefore the assessment of the organization's

activity perceived by its customers. According to Gierl and Hoser (1992), the customer compares his personal experience after trying a particular product or service with expectations, desires and individual standards. If this „predicted" performance is met or exceeded, customer satisfaction is achieved. According to Hund (1997), customer satisfaction is the result of a comprehensive psychological comparison process (Mateides and Ďaďo, 2002).

2 Material and methods

The main goal of this paper is to present the level of customer satisfaction through good practices introduced by Vadaš Thermal Resort and propose solutions to increase the quality of services that might also be applied in other resorts of similar character.

By addressing the issue, the article is focusing on introducing the potentials of Vadaš Thermal Spa, elaborate a proposal to improve the services of the resort, as well as rank the resort among the most interesting tourist destinations in the region.

As a research method, a questionnaire survey was applied. We were trying to get objective data about the level of customer satisfaction with services offered by the resort. Our research sample is represented by customers visiting the resort. The questionnaire survey was conducted in the resort. More specifically, it was available for the visitors of accommodation facility of the resort. 205 completed questionnaires were submitted by the respondents, but only 200 questionnaires could be evaluated. No random sampling technique was applied; we used the snowball sampling method. The initial group of respondents were the visitors of the thermal resort. After submitting the questionnaires, we asked them to suggest additional target group respondents from the visitors of the resort.

Our questionnaires were accessible to visitors at the accommodation facility of the resort in printed form, containing 23 questions. Visitors could fill in the questionnaires voluntarily and anonymously. We set three months for the research, so the respondents had a possibility to fill in the questionnaires from June 2018 to September 2018. The main goal of the survey was to find out which services the visitors have tried and how these services were evaluated. The questionnaire survey contained open and closed questions, as well as questions where they could evaluate the services of the resort on a 5-point scale (5-absolutely satisfied, 1- not satisfied at all). Structured interviews were used to obtain more data and information regarding the main focus of the thermal resort and the future forecast.

2.1 Statistical methods of data analysis

We decided to exclude the incomplete questionnaires from the survey. It did not prove to be a difficult task, since the rate of respondents providing inadequate answer was low, they did not clearly differ from respondents providing satisfactory answers. The excluded questionnaires were not included in the research sample.

The processed data was coded and recorded in a statistical programme. The outliers were identified during preparing the data, the appropriate strategy for data analysis was chosen as well.

We used a single-variable, double-and multivariate analyses. The univariate analysis served as a starting point of the research, while the variables were analysed independently. The aim of the bivariate analysis was the quantitative analysis between the variables. The multivariate analysis focused on dependency between the variables, and also the definition of the nature and strength of this relationship.

3 Results

The temperature of thermal water in Vadaš resort is 41 °C, the temperature of the pool with the hottest thermal water is 36 °C. The thermal resort has a capacity of approx. 10 000 visitors. It offers 7 outdoor and 2 indoor pools. The plans of thermal resort were completed in 1976, and less than two years later the resort opened to first visitors. In 2003, the construction work of Hotel Thermal ***, the new accommodation facility was finished. The investment into the new hotel reached 60 mill Slovak Koruna. In 2004, the wave pool Lagun opened to visitors with a dimension of 3 800 m². 2006 was a significant year in the history of the resort, when Ing. Endre Hogenbuch became the general manager of the resort. The accommodation facility Smaragd was built in 2013, reconstruction of the car camp and Hostel Gold finished in 2015. Reconstruction of the multifunctional playground and Hotel Thermal *** finished in 2017.

The questionnaire survey aimed at determining the satisfaction level of visitors of Vadaš Thermal Resort and its services, as well as the factors influencing it. Since we focused on this particular thermal resort and the services, we found it important to collect the opinion of the visitors. Analysis of the survey results helped us to formulate our suggestions for improvements.

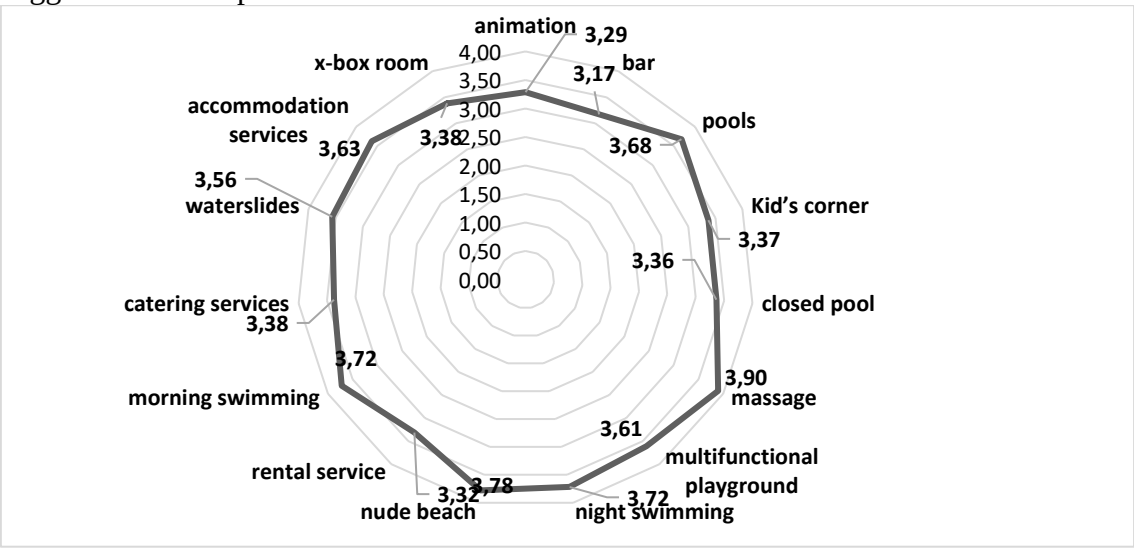

Figure 1 Utilization of services and satisfaction rate; source: own processing

The most important issue to address was to measure the satisfaction level of visitors with services and factors that have impact on Vadaš Thermal Resort. The most frequently used were the accommodation facilities by visitors (100%), followed by swimming pools (99,5%). The utilization of accommodation facilities can be explained by the fact that visitors had easy access to questionnaires at these facilities, while the popularity of swimming pools can be explained by the fact that the survey took place in summer. These are the most attractive services to be provided during summer. The respondents of the survey expressed high level of satisfaction with swimming pools in the resort. 144 respondents from 199 rated pools as the most satisfactory service. This represents 72,36% of the respondents. 135 respondents from 200 expressed satisfaction with accommodation facilities, representing 67,5% of the respondents. Waterslides were found popular by 85 respondents from the sample of 126, which represents 67,46% of the respondents. The key to success of the mentioned services is probably the reconstruction. Innovation of these services is necessary to maintain the interest of visitors. The least attractive services were the following: nude beach (4,5%), rental service (9,5%) and massage (10%). Since visitors were accommodated in the thermal resort, they did not

have to use rental services. Using massage services might be unpleasant from hygienic point of view during hot summer days. The reason why nude beach is less attractive is probably the shame preventing the respondents to try this service. Among the weakest services was listed the bar. The respondents were either dissatisfied or moderately satisfied. 17 from 88 respondents provided these answers (19,32%). The bar is situated in Hotel Thermal ***. The negative rating might result from the fact that the bar offering limited services is open only during the summer seasons. The animation was rated as moderately satisfactory by 10 from 56 respondents (17,86%). The reason for this rating was again that this type of service is only offered in summer and only at certain time of the day. The reason for weaker evaluation of services was the outdated equipment, lack of reconstruction and seasonality of the service. The thermal resort should focus on improvement of the mentioned services, due to negative rating received by visitors. One of the most positive factors according to visitors was the pleasant atmosphere of the resort. This was the most frequently chosen answer, but also the option to provide written response for open questions.

We examined, whether a mutual relationship between the level of satisfaction and the amount of money spent by visitors for services exists. We were trying to find an answer for the question, whether satisfaction of visitors depends on the amount of money spent for their holiday. A variance analysis was conducted to examine the relationship. Several criteria had to be met to perform the variance analysis. As a first step, the dependent variable had to show a normal distribution. This was verified by applying the non-parametric test by Kolmogorov-Smirnov and Shapiro-Wilk. The variables did not show normal distribution in all cases, since they were close to it, the analysis proved to be feasible. Subsequently, all the sub-variables were examined. Since the Levene test was significant in some of the cases, we could not include all the satisfaction variables.

Table 1 The relationship between the satisfaction with services and the amount of money spent during a visit; source: own processing

Types of services	F-test	Sig. ($p < 0,05$)
accommodation services	17,4	0,000
catering services	2,82	0,036
animation	17, 952	0,382
swimming pools	25,973	0,185
waterslides	2,816	0,026
massage	13,431	0,472

Based on the results presented in the table, there is no significant difference between providing animation services, visitor satisfaction with pools, massages and the amount of money spent by the visitors. However, the group variables related to accommodation, catering and waterslides (highlighted lines) are affected in a different way by the amount of money spent during the visit.

Figure 2 Distribution of respondents according to their satisfaction with the factors of Vadaš Thermal Resort; source: own processing

Other examined data were the data on customer satisfaction with several factors of Vadaš Thermal Resort. The highest level of satisfaction was expressed in relation to location of the resort and the staff. These two options were rated similarly: location 79 (39,5%) and the staff 78 (39%). The location was rated as moderately satisfactory by 1 (0,5%) and dissatisfactory by 2 (1%) of the respondents. Moderately satisfied were the respondents with the staff 13 (6,5%). Price for the services was evaluated as satisfactory by 104 (52%) respondents, absolute satisfaction was expressed by 49 (24,5%) respondents, moderate satisfaction and dissatisfaction was shown by 3 (1,5%) of the respondents. Cleanliness of the resort achieved high rating. 95 (47,5) of the respondents were satisfied with cleanliness, while 93 (46,5 %) of the respondents were absolutely satisfied. Moderately satisfied were 11 (5,5 %), while dissatisfaction was felt by 3 (1,5 %) respondents. We have found that the highest rated factor affecting the thermal resort is the location. The reason of high rating might be that the resort is located in Štúrovo, close to Hungary. During summer seasons, visitors can enjoy the good weather and visiting the neighbouring Hungary as well. Since Vadaš Thermal Resort covers not a wide area, visitors can experience a cosy, family atmosphere. The worst evaluated factor was the price. The resort should focus on offering discounts or gifts to visitors, especially in summer seasons, when the resort is visited by families with children.

Another important information to be mentioned is that the resort is visited mainly by the employees (66,5 %) and the age of these visitors is 36-45 (42 %). They visit the resort with family members (88 %) and come by car (86 %). This means that the resort should maintain private parking space for the employees, since it is difficult to find free parking places during the peak seasons. The focus should shift on offering discounts for kids and attractions, since majority of the respondents of our survey were the families with children. The most popular discount offered was the Family Package, which was mentioned by 75% of the respondents. Therefore, it would be a positive decision to provide frequent animation services during the whole year. Respondents received information about the thermal resort from their friends (68 %) and the website of the resort (40,5 %). These prove the fact that the resort is popular, but investment into other marketing tools would be essential, since the marketing tools used were not so popular

among the respondents. We also found that 88,5 % of the respondents had already visited the resort before and 96 % of them plan to visit the thermal resort again. This information sounds positive for the resort, because it means visitor loyalty.

The research has also examined the correlation between the age of visitors and the motivation of choosing the thermal spa. A cross-table analysis was used to analyse the relationship. We chose Pearson's Chi-Square as a possible solution for statistical analysis. The results show strong significant correlation ($p = 0,01$). Choosing the Vadaš Thermal Resort is highly influenced by the age group the respondents belong to. Information based on structured interviews was compared to data obtained during our questionnaire survey. The results of questionnaire survey confirmed that majority of visitors are families with children. Similar results we obtained with the help of structured interviews, which also confirmed that summer seasons are dominated by families with children. Children until the age of six have free entry to the resort, which was a motivating factor for families. Further motivation for potential visitors can be that those local residents offering accommodation facility for visitors can obtain discount tickets for their guests. The questionnaire survey also revealed that majority of visitors received information about Vadaš Thermal Resort from acquaintances, web site or social media. This information was confirmed as a result of structured interviews, which revealed that the resort prefers direct communications with the visitor. The most popular forms of marketing communication are the newsletters and the social media. As it was mentioned earlier, we propose lengthening of active seasons to attract new visitors. Since the thermal resort expanded with wellness center in 2018, this proposal does not figure as an alternative solution. Further attraction for visitors might be the construction of the new pool.

4 Discussion

The main benefit of this contribution was to present the current state of Vadaš Thermal Resort using secondary data obtained and the opinion of the respondents. We were also interested in how satisfied the visitors were with the services offered by the resort and which services, factors of the resort they found the most attractive. These could serve as ideas for expansion strategy of the resort in the future.

The most positive factor of the resort was the pleasant environment. The reason might be that the resort is located close to the Hungarian border in Štúrovo. The summer seasons are warm and the visitors can easily travel to the neighbouring country. Since the area of resort is not big, it offers cosy, family atmosphere for the visitor. The worst evaluated factors were the cleanliness of the resort and prices. Further important information was that the resort is visited mainly by the employees aged 36-45. They visit the resort with their family members. The target group of visitors are families with children. The Family Discount Package was the most popular product sold to visitors. Most of the respondents received information about the resort from their acquaintances and the website of the resort. We came to conclusion that the resort has high reputation. As a negative factor we should mention that the respondents were not informed about the introduction of further marketing tools. We also found that majority of the respondents had already visited the resort before and plan their visit again. Information received by conducting questionnaire survey confirmed the results of the structured interview.

References

"Cestovný ruch na Slovensku", Available at: http://www.telecom.gov.sk/index/index.php?ids=102744

Čapošová, E. (2015) "The importance of human resources in quality management in public administration", *Acta Oeconomica Universitatis Selye*. Vol. 4, No. 1, pp. 34–42.

Chreneková M., Jarábková, J., Gubáňová, M. (2016) "Social enterpreneurship in tourism", *Acta Oeconomica Universitatis Selye*. Vol. 5, No. 2, pp. 97–108.

Dambe, G., Atstaja, D. (2013) " Knowledge, skills and attitude in tourism industry: case study of Latvia", *European Integration Studies*. Vol. 7, pp. 177–184.

Mateides, A., Ďaďo, J. (2002) *"Služby",* EPOS, Bratislava, Slovakia.

Mensah, I., Dei Mensah, R. (2013) "*Management of Tourism and Hospitality Services",* Xlibris Corporation, United States.

Moraru, A., Daniela, A. (2011) "Development and Diversification of Tourism Services. A Strategic Approach in International Context", *European Journal of Tourism Research*. Vol. 4, No. 1.

Mura, L., Kljucnikov, A. (2018) "Small Businesses in rural tourism and agrotourism: study from Slovakia", *Economics & Sociology*, Vol. 11, No. 3, pp. 286–300.

Pachingerová, M., Micháková. A., Kubičková, V. (2013) "*Ekonomika cestovného ruchu",* EKONÓM, Bratislava, Slovakia.

Rašovská, I., Ryglová, K. (2017) "*Management kvality služieb v cestovním ruchu",* Grada Publishing, Praha, Czech Republic.

Swain, S. K. (2007) "A paradigm shift in strategic marketing for tourism destination management", *Journal of Hospitality Application and Research.* Vol. 2, No. 2, pp 62–81.

Small Sacred Structures with a Focus on Stations of the Cross as Tourist Attractions in the Liberec Region

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Abstract

The significance of small sacred structures—primarily those of Stations of the Cross—as tourist attractions has continued to grow in recent years. More and more, travel agencies are including them into the programmes of their tours, and tourist traffic to these sites is on the rise. Despite this fact, the younger generation's knowledge about them is insufficient. This was documented in a survey that was carried out among the students of the Technical University of Liberec and of the Secondary technical school, Česká Lípa in late 2018. The results of the survey are listed in the text of the document.

Keywords: sacred structures; shrines; crosses; chapels; stations; tourist attractions.

JEL Classification: P49, L38, Z30

Article Classification: Research article

1 Introduction

Small sacred structures as tourist attractions are integral to the landscape. These include, in particular, Columns of Flagellation, crosses, chapels, and conciliation crosses. Statues of saints are less common, and typically depict St John of Nepomuk. They are remarkable, inspire respect, and induce humility. They conceal amazing stories and are the waymarks of ancient routes and pilgrimage trails.

Shrines at crossroads and wooden crosses erected by monks in an effort to disseminate Christianity prior to the advent of Constantine and Methodius may have been the first sacred structures to have been built as early as the 7th century. During the missionary era, these crosses began to crop up increasingly more often, in large part due to a decree by Charlemagne from the beginning of the 9th century in which he ordered

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crosses be erected along roadsides and at crossroads. This custom persisted until the early 20th century.

These crosses—likely made of wood—have not survived. It was not until the early 13th century that we began to see the first stone crosses, which were large and bulky. In subsequent centuries these were followed by stone crosses that were more narrow in form and design.

Occasionally, we may also come across so-called conciliatory crosses in the landscape. These are low stone crosses hewn from a single piece of stone that were erected on the site of a tragic event, most commonly a murder. In the Medieval period, the erection of these conciliatory crosses was an attempt at reconciliation and atonement. Sometimes a text describing the event for which the conciliatory cross was built is even etched into it. Conciliatory crosses did not have to be erected solely by the murderers themselves but would often be built by loved ones and survivors of the victim in honour of those they lost.

Around the 13th century, we begin to see Columns of Flagellation, which depict the column at which Jesus was flogged by Pontius Pilate. Today, Columns of Flagellation take the form of four-sided square or rectangular column-like structures with niches hosting depictions of the suffering of Christ or other saints.

Columns of Flagellation are usually stuccoed in white and are often complemented with a small cross. They were built along pilgrimage routes and on sites of various events, whether joyous and miraculous or tragic. They serve as a stopping point for reflection, make up the memory of the land, and are waymarks for routes and points of orientation for pilgrims as well as local people.

Of all of the small sacred structures, chapels are probably the most recent. The first were built at the beginning of the 18th century. However, the majority can be dated to the 19th century. We may encounter them at important sites such as springs and wells (often healing or miraculous), on hills, and at Stations of the Cross trails.

2 Stations of the Cross

From a historical-cultural standpoint, outdoor Stations of the Cross are a particular part of the Czech landscape. They are often considered valuable cultural monuments and remind us all of Jesus's work for salvation and as well as the Christian roots that are the foundation of the culture of not just Europe, but the Western world as well and the Czech Republic specifically. They are evidence of the religious nature of our ancestors and their ability to stop, listen, and contemplate. The faithful walk along the individual stations, contemplate how the Lord suffered for us, thank him, and establish resolutions to commit no more sins.

The Stations of the Cross is a part of the Roman Catholic religion. It is based on brief evangelical references about the carrying of the cross. The practice of establishing Stations of the Cross trails belongs to the Catholic Church (domestically this means Roman and Greek Catholics), and have been slowly and to a limited degree also adopted by Eastern Churches in disunity (orthodox). The Czechoslovak Hussite Church and the Old Catholic Church also adopted this custom during their inceptions.

These trails originally only consisted of a route during which one would contemplate the suffering of Jesus Christ. Later the specific events to should be contemplated at which part of the route were defined. Following a complicated and inconsistent development, it was not until the Baroque Era that authorities settled upon fourteen stations with set themes. This number was stipulated in 1540 by the Franciscans

in Jerusalem. The primary element of the individual stations is not the image, but the cross.

Some Stations of the Cross also take on the character of so-called Holy Routes depicting Jesus's suffering from the Last Supper and the Agony in the Garden of Gethsemane.

2.1 Stations of the Cross Formats

The Stations of the Cross depict the suffering of Jesus Christ before his death and his final journey to Calvary Hill (more commonly known as Golgotha). It includes the events surrounding the condemnation of Jesus by Pontius Pilate, the carrying of the cross along the Via Dolorosa and the subsequent crucifixion on Golgotha, through the laying to rest of His body into the tomb. It also captures the event that took place on Good Friday. With this, the Stations of the Cross become a part of Holy Week, which begins with Passion Sunday (Palm Sunday), commemorating Jesus's entry into Jerusalem, and culminates in Jesus's resurrection from the dead.

In 1731, Pope Clement XII recognised the fourteen stations as binding for the entire Catholic Church.

The Stations of the Cross can be depicted as a series of pictures in a church as a series of chapels in the natural landscape with scenes from the Passion of Jesus Christ. A cross or the tomb of Jesus sit at the highest point of a Stations of the Cross trail. Devotions take place on the trail on Good Friday. A Stations of the Cross trail in the natural landscape usually entails a series of niched chapels or Columns of Flagellation. The chapels frequently ascend a hill, where the Stations of the Cross trail ends in a chapel of the Holy Sepulchre. A list of the fourteen stops along the Stations of the Cross is included in section 2.3.

2.2 The History of Stations of the Cross

People of the Middle Ages travelled much more than is commonly thought today. Pilgrimages were a special type of journey. In essence, pilgrimages are a spiritual matter. They serve to remind us that we are travelling toward a single goal our entire lives—to eternity. The destinations of a pilgrimage are either so-called local pilgrimage sites or international pilgrimage sites. Pilgrims most often visited Rome, Israel, or Santiago in Spain. During visits to Israel, they visited the Church of the Holy Sepulchre and often first travelled along Jesus's path of crucifixion. Local Stations of the Cross trails began emerging for those who could not undertake a pilgrimage to the Holy Land yet still wanted to experience the path of the crucifixion.

The history of Stations of the Cross is linked to the dissemination of Christianity and Christians' desire to experience the places of Jesus Christ's death. Mention of Christians' journeys to the Holy Land survive from as early as 4th century. In order to undertake this pilgrimage to the Holy Land, one needed resolve, good health, independence, and sufficient funds. A large number of citizens of this time could not fulfil these requirements, since the majority did not have the option of free movement and were under the authority of their lords. These people found aid in the Bishop of Bologna, Saint Petronius, who had a replica of the Holy Sepulchre built in his diocese, along with other sites. It was with this event that the gradual expansion of the erection of replicas of holy sites began. The buildings began to decrease in size to chapels and columns, and the distances between the sites also decreased. Under the influence of the Franciscans, Stations of the Cross expanded to multiple countries across Europe.

The oldest Stations of the Cross in the Czech Republic is the trail on Holy Hill by Mikulov, which was built around the year 1623 at the behest of Cardinal Franz von Dietrichstein. It is an important pilgrimage site that encompasses St Sebastian Church, a belfry, and a Stations of the Cross chapel with early Baroque decorations.

Stations of the Cross located inside churches are most often in the form of paintings or bas-reliefs (or "low relief," a semi-raised sculptural decoration of a surface). On rare occasion, one may also encounter an haut-relief (or "high relief," a raised sculptural decoration of a surface).

2.3 Descriptions of the Individual Stations

1st Station: Jesus is condemned to death by Pontius Pilate

Jesus is brought before Pilate, who acting on behalf of the emperor and has the highest authority. Pilate condemns Jesus to death by crucifixion under great duress and with reluctance.

"Pilate therefore, willing to release Jesus, spoke again to them. But they cried, saying: 'Crucify him, crucify him!' And he said unto them the third time: 'Why, what evil hath he done? I have found no cause of death in him. I will therefore chastise him and let him go.' And they were instant with loud voices, requiring that he might be crucified. And the voices of them and of the chief priests prevailed. And Pilate gave sentence that it should be as they required." (Bible, Luke 23:20–24, 1993)

2nd Station: Jesus carries his cross

This is where the path of the crucifixion begins. Jesus is depicted with a crown of thorns on his head that mockingly symbolises a king and with a heavy wooden cross.

"...twisting together a crown of thorns, they put it on his head and put a reed in his right hand. And kneeling before him, they mocked him, saying: 'Hail, King of the Jews!'" (Bible, Matthew 27:29, 1993)

3rd Station: Jesus falls for the first time

Jesus's steps take him to Golgotha ("the place of the skull"), the execution site. Jesus's legs, however, give way beneath the weight of the cross, and he falls to the ground. After a short rest, he resumes his journey of suffering.

4th Station: Jesus meets His mother, Mary

On his agonising journey among the malevolent people, Jesus encounters his mother, the Virgin Mary. The Virgin Mary's face radiates not just pain, but comfort and encouragement as well. But the soldiers chase her away.

5th Station: Simon of Cyrene helps Jesus carry the cross

Jesus is overcome with pain and fatigue, and his pace slows. One of the soldiers reaches for the first man standing along the road and forces him to help with the cross. This man is Simon of Cyrene, and at first he is reluctant and simply observes the scene; however, once he senses Jesus's momentary relief from the heavy burden, he is overcome with bliss.

"And as they led him away, they laid hold upon one Simon, a Cyrenian, coming out of the country, and on him they laid the cross, that he might bear it after Jesus." (Bible, Luke 23:26, 1993).

6th Station: Veronica wipes the face of Jesus

Jesus passes a young woman, a stranger, who, without a second thought, kneels and wipes his bloodied face with her veil. His face imprints upon her veil.

7th Station: Jesus falls for the second time

The long journey that Jesus undertakes is almost one thousand steps long. Jesus's entire body is bleeding, his arms and legs are trembling, and his mind is gradually becoming faint; Jesus falls for the second time.

8th Station: Jesus meets the women of Jerusalem

Jesus sees women weeping inconsolably by the side of the road. But Jesus turning unto them said:

"Daughters of Jerusalem, weep not for me! But weep for yourselves, and for your children!... For if they do these things in a green tree, what shall be done in the dry?" (Bible, Luke 23:28–31, 1993).

9th Station: Jesus falls for the third time

The entire procession ascends the hill and nears its peak where the execution site lies. Soldiers are already waiting at the top. Just a few dozen steps from His destination, Jesus falls to the ground for the third time.

10th Station: Jesus is stripped of His garments

Jesus has arrived and releases the heavy burden from his arms, barely able to hold his body upright on his legs. Before He is nailed to the cross, the soldiers rob him of his garments. With this act, they inflict even more pain, because the cloth had adhered to his wound-riddled body. One of the soldiers divides the garment into four pieces and gives them to the others, having drawn lots to decide who shall receive them.

Then the soldiers, when they had crucified Jesus, took his garments, and made four parts, to every soldier a part. And they also took his coat: now the coat was without seam, woven from the top throughout. They said therefore among themselves: "Let us not rend it, but cast lots for it, whose it shall be," that the scripture might be fulfilled, which saith: "They parted my raiment among them, and for my vesture they did cast lots." (Bible, John 19:23–24, 1993).

11th Station: Jesus is nailed to the cross

They lay Jesus on the cross, above which are the words: "This is the king of the Jews;" they nail both of His hands to the cross with heavy nails through the palms of His hands. Then they cross Jesus's feet and nail them to the cross with a single nail.

"Then two criminals were crucified with him, one on the right and one on the left. And they that passed by reviled him, wagging their heads. And saying: "Thou that destroyest the temple, and buildest it in three days, save thyself! If thou be the Son of God, come down from the cross!" (Bible, Matthew 27:38–40, 1993).

12th Station: Jesus dies on the cross

The three crosses are erected atop Golgotha at high noon and the crowd of people simply waits to see if Jesus will come down from the cross. The Virgin Mary, John the Apostle, and Mary Magdalene stand closest of all to the crosses. The remaining apostles are cowardly and hide behind the soldiers. Jesus succumbs to his injuries after three hours.

"When Jesus had received the vinegar, He said: 'It is finished.' And bowing His head, He yielded up His spirit." (Bible, Mark 15:33–37, 1993)

13th Station: Jesus is taken down from the cross

Jesus has died on the cross in a mere three hours. One Roman soldier confirms Jesus's demise and pierces his side with a spear. Jesus's loved ones take down his body and lay him in the lap of this mother.

14th Station: Jesus is placed in the tomb

2.4 Stations of the Cross in the Liberec Region

There is a whole range of small sacred structures across the Liberec Region. These include such things as small crosses as well as Stations of the Cross. They can be found both in churches and outdoors in the natural landscape.

2.4.1 Crosses in the Liberec Region

There is a whole range of small crosses and memorials in the Liberec Region. It is said that there are 176. These include examples such as Lichteneckterův kříž, Stammelův kříž, Kříž Dagmar Spinové, Červenkův kříž, Gregorův kříž, Gahlerův kříž, and Tetřeví kříž.

- **Lichteneckterův kříž (Lichtenecker's Cross)** - This is a simple metal cross that was completely replaced in 2018. It was placed here by forest ranger Lichteneckter.
- **Stammelova smrt (Stammel's Death)** - A cross erected on the site of a shootout and death between the famous poacher, Augustin Zenker (nicknamed Stammel), and forest rangers. The memorial was built by the family of one of the rangers.
- **Kříž Dagmar Spinové (Dagmar Spinová's Cross)** - This cross was placed on its site to commemorate the tragic event of 8 December 1974, when Dagmar Spinová decided to end her life here by jumping into the reservoir.
- **Červenkův kříž (Červenka's Cross)** - This is another cross memorialising the site of a death.
- **Gregorův kříž (Gregor's Cross)** - This cross is linked to the unrequited love between the monk, Gregor, and an unknown woman.
- **Gahlerův kříž (Gahler's Cross)** - The original cross was placed on the site some time, around the year 1843. It was erected by forest ranger Gahler in honour of his daughter. The cross was subsequently removed in the 1960s due to road construction. On 21 September 2016 the cross was restored.
- **Tetřeví kříž (Tetřev Cross)** - Another cross that forest ranger Gahler had erected in honour of his daughter. It is not very distinctive and was erected atop a boulder.

2.4.2 Niched Chapels as a Part of Stations of the Cross Trails

A typical example of niched chapel Stations of the Cross trails in the Liberec Region are the trail in Hodkovice nad Mohelkou, the trail in Liberec behind the Church of the Discovery of the Holy Cross, as well as the Stations of the Cross trail to Bezděz. An example of a Column of Flagellation trail is the trail in Horní Maxov. Depictions in the niches of the individual stations are most typically in the form of paintings on sheet metal and wood and wooden, stone, cast iron, or fired clay bas-reliefs. An example of paintings on sheet metal in the Liberec Region is the trail on Křížový vrch Hill near Frýdlant. One can encounter wooden bas-reliefs in Hodkovice nad Mohelkou and fired

clay bas-reliefs can be visited in Janov nad Nisou. Cast iron bas-reliefs can be seen on the trail in Chlum u Lomnice nad Popelkou. Currently, colour reproductions of paintings are the most typical form. One example is the Stations of the Cross trail in Janovice v Podještědí.

Chapel of Saint Anne (Vyskeř)

This is located in the District of Semily in the Liberec Region, on Vyskeř Hill.

The Chapel of Saint Anne, with its Empire style, dates back to 1830 and lies at an elevation of 465 metres above sea level. The chapel was built at the behest of the nobility of Hrubá Skála, and hosted masses for the Czechoslovak Hussite Church during the interwar period.

The chapel is registered in the list of cultural monuments for its historical and artistic value. The legend that explains the origin of its name and location of the chapel is that of a miraculous apparition around 1403–1458, when the popular yeoman, Ctibor, and his daughter lived at the fortress in nearby Mladějov. Its final modifications were carried out in 2011. In addition to the chapel, the hill also hosts three crosses and a Holy Sepulchre—an artificial cave in basalt rock. (Soukup & David, 2002)

U Obrázku Stations of the Cross Trail

The Stations of the Cross trail by the Art Deco Church of Our Lady at the Image in the Liberec quarter of Ruprechtice was built in 1907 and leads from Horská Street along a tree-lined alleyway of mature horse chestnut trees to a chapel and miraculous spring with healing water. The full name of the church is Church of the Immaculate Virgin Mary Queen of Angels at the Image. The author of the set of statues by the spring is Benedikt Herden from Březnice u Broumova. The path originally lead solely to the spring, and was later planted with chestnut trees. The trail leads from an adjacent street all the way to the nearby quarry. It is made up of a total of fourteen stations. Each is comprised of three stone blocks, two of them making up the base, and the third bearing a depiction of the specific scene from Christ's crucifixion.

The Modlivý důl Stations of the Cross Trail

Svojkov is a town in the District of Česká Lípa, in the southern foothills of the Lusatian Mountains, south of Sloup v Čechách, in the direction of Zákupy, at an elevation of 362 metres. A former pilgrimage site, it includes Modlivý důl (the Holy Trench). Modlivý důl is a roughly 1 km long rocky valley carved deep into the sandstone beneath Slavíček and Tisový vrch Hill on the north-eastern edge of Svojkov. After World War II, the pilgrimage site was mostly destroyed, so at the turn of the 21st century, only the chapel carved into the cliff and the empty oratory niche remained. It was not until the second half of 2016 that the road to Modlivý důl was repaired thanks to the Lesy ČR forest service, and new Stations of the Cross images were placed along it, painted according to the original paintings that now hang in St Wenceslaus Chapel in Svojkov. The oratory the end of the gorge was also repaired, to which wooden stairs were built. After repairs were completed, the pilgrimage site was inaugurated on 27 November 2016.

The repaired road to the valley leads from the former hunting lodge in Svojkov. A large wooden cross stands in the area past the last houses, where the Stations of the Cross trail begins and from which the trail through the side ravine to the peaks of the Svojkovský skály Cliffs turns off. The main road continues to the forested valley, at the beginning of which is an enclosed covered pool at the base of a small rock formation, called Pramen u Strážce (the Spring at the Guardian) according to the rock-climbing tower Strážce Modlivého dolu (the Guardian of Modlivý důl). The valley gradually

narrows and becomes a ravine, enclosed on the sides by steep sandstone cliffs. There are a number of additional rock-climbing towers called Novoborská věž Tower, Přeskoková, Houbová věž tower, and Žofie. Wooden stairs ascend the narrowest section of the ravine to a small stone hollow with benches on the southern end of which there is a chapel carved into the face of the cliff.

The Stations of the Cross trail also includes the Baroque St Wenceslaus Chapel (once designated as a Baroque church), belonging under the Sloup v Čechách Roman Catholic parish. Since 1958, the chapel has been protected as a cultural monument of the Czech Republic. The chapel was built in 1726 in the Baroque style and dedicated to Saint Wenceslaus. It was structurally renovated in 1868 and 1902, and a tower was added in 1902. It was renovated once again in 2000.

The Stations of the Cross trail culminates in the Chapel of Our Lady of Lourdes. A wooden chapel originally stood here since 1772, which was replaced at the end of the 18th century with a chapel carved into the side of the sandstone rock face. In 1903, the chapel was reconstructed as a Lourdes cave. During World War II and its aftermath, the surrounding area was damaged, but was gradually renovated after 1989.

The Stations of the Cross Trail by the Church of the Discovery of the Cross in Liberec

The Church of the Discovery of the Cross in Liberec is a Roman Catholic filial church and an important Baroque monument. The church was a pilgrimage site in Liberec's New Town. It is protected as a cultural monument of the Czech Republic.

The Stations of the Cross trail is located at the northern side of the church, a wall separating it from the former cemetery. It was relocated to this church in 1760 from Keilův vrch Hill. The original wooden pictures were replaced during reconstructions to the surroundings of the church in 1854–1855 with pictures painted on sheet metal. They were repaired several times, and on 28 September 1888 the Stations of the Cross trail was consecrated. Additional repairs were carried out in 1982. The Stations of the Cross trail has 14 stations that are made of sandstone and is one of the oldest in Liberec.

Janov nad Nisou Stations of the Cross Trail

The Janov nad Nisou Stations of the Cross trail lies 1 kilometre west of the town centre beneath Vysoký hřeben Hill, on the trail around the Trniště rock formation. The Stations of the Cross trail was built in 1878 at the behest of Josef Klamt on his property through the intercession of the parish priest after his eyesight had improved following the use of the water from the local spring. The trail is comprised of column stations the niches of which originally contained folk-style pictures painted on sheet metal. The trail leads through a pilgrimage site with the spring. Miller Christian Hirschmann from Hraničná had construction improvements carried out at the spring and its surrounding area after his eyesight improved, attributing it to the local miraculous water. A stone area was erected around the spring with a niche and a statue of the Virgin Mary, with an additional prayer area nearby. The entire grounds were then modified into an area for peaceful moments of meditation and was consecrated in 1903. Additional niches for statuettes were added, a sandstone memorial with a place for a statue was also erected, a sandstone statue of the Virgin Mary was placed at the spring, and a polychrome statute of Our Lady Immaculate was placed in another niche in 1921. After the end of World War II, the site fell into disrepair, and all of the original pictures of the Stations of the Cross trail disappeared, as did the statue of the Virgin Mary.

It was not until after 1989 that the site was renovated in the original style, however the original paintings on sheet metal were replaced by ceramic depictions.

Slovanka Stations of the Cross Trail

The Stations of the Cross trail in Horní Maxov lies approximately 1.5 kilometres north-west of town. The Stations of the Cross trail begins at a chapel dedicated to Our Lady of Sorrows, and then leads approximately 500 metres along a long, steep ascent toward a lookout tower of the same name and continues all the way to Seibtova studánka Spring. The chapel was built at the behest of citizen Anton Seibt in 1827 using his own funds saved up as a dowry for his daughter who died following a long illness. An altarpiece with the Virgin Mary was placed in the chapel, and a small bell tower once used to adorn the roof. Fifteen stops along a Stations of the Cross trail were not built until 1840, also by Anton Seibt. The columns line the trail leading from the chapel across Seibtův vrch Hill—known today as Slovanka Hill—all the way Seibtova studánka Spring in the forest. On 11 August 1840, the granite-columned Stations of the Cross trail was consecrated by parish priest Petr Jun. Around the year 1895, however, the trail began to fall into disrepair, and the granite columns lay toppled across the forest. The Stations of the Cross trail was renovated in 2013 thanks to a project in participation with the Lesy ČR forestry service, the Spolek Patron association, the Liberec Region, and the town of Lučany.

This Stations of the Cross is designed for pedestrian tourism and has 15 stops. A short educational trail with three stops is also part of the Stations of the Cross trail. The first stop informs visitors about the history of the foundation of Maxov and the origin of the chapel and Stations of the Cross trail. The second is dedicated to Seibtův vrch Hill—today's Slovanka—and the idea to renovate the Maxov Stations of the Cross trail. The third stop is dedicated to Seibtova studánka Spring, which, according to legend, contains healing water. The displays for the Stations of the Cross trail also include period photographs of the area.

2.4.3 New Stations of the Cross Trails

These are being created with the approval of the bishop and are to be duly consecrated. When new depictions for individual stations are created, they must also first be submitted to the diocese for approval.

Urban's Stations of the Cross Trail

This 850-metre long Stations of the Cross trail in the town of Smržovka is the work of cartoonist Petr Urban. The trail was inaugurated in 2017 and currently includes fifteen paintings. Additional depictions will be added, and plans are to end the trail with a lookout tower and chapel. The trail leads through a forest to a ravine where Smržovské peklo (Smržovka's Hell) originates; thus far, it hosts the paintings Hate and Slander, and Petr Urban is working on more. The plan is to end the trail with a lookout tower and chapel.

3 Materials and Methods

In the second half of 2018, a survey was carried out among the students of the Technical University of Liberec and of the Secondary technical school, Česká Lípa about the topic of Stations of the Cross. The survey was submitted by 384 students who answered 9 questions.

4 Results

The first question: Do you know of any Stations of the Cross trail in the area of your place of residence? If yes, please list where this trail is located. Was answered in the affirmative by 168 respondents, 167 students stated that they do not know of any Stations of the Cross, and 49 respondents answered that they did not know.

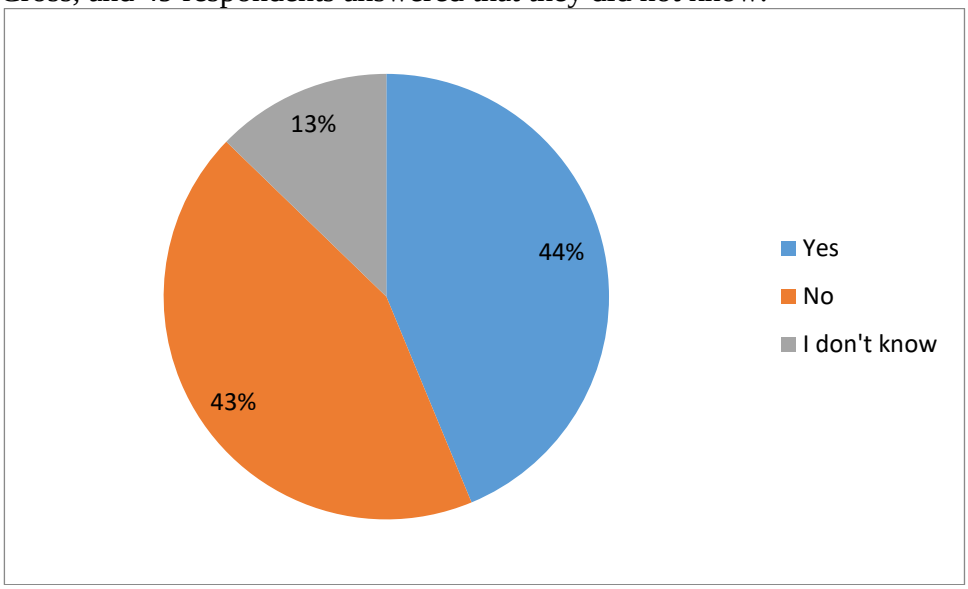

Figure 1 Do you know of any Stations of the Cross trail in the area of your place of residence? source: own processing

To the second question: How many stops does a Stations of the Cross trail typically include? 141 respondents answered that they did not know how many stops a Stations of the Cross trail has. 136 surveyed stated an incorrect number of stops, and only 107 students stated correctly that there are 14 stops.

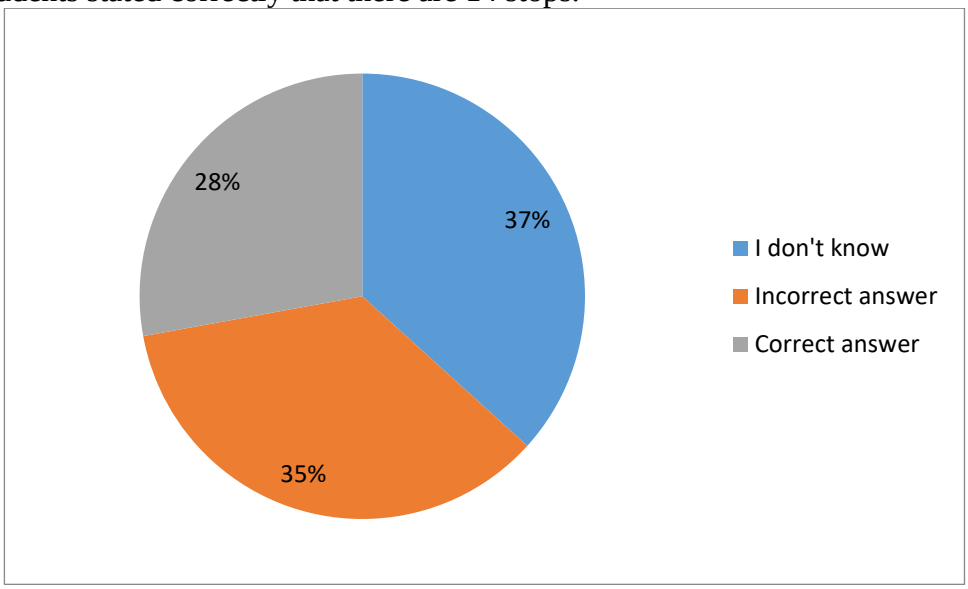

Figure 2 How many stops does a Stations of the Cross trail typically include? source: own processing

To the third question: Have you ever visited a Stations of the Cross in the Czech Republic? 191 surveyed answered that they have not visited any Stations of the Cross, 183 respondents have visited a Stations of the Cross, and 10 students did not know.

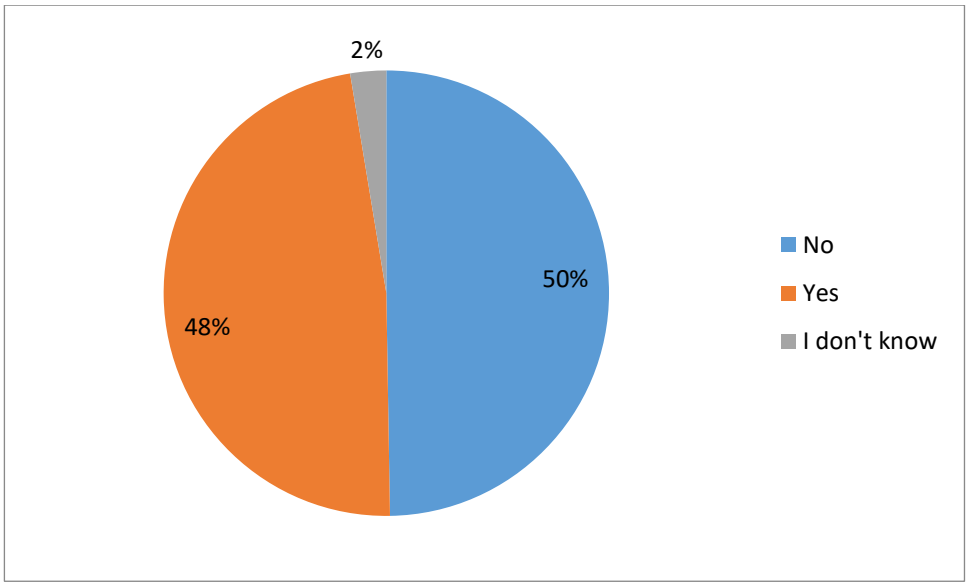

Figure 3 Have you ever visited a Stations of the Cross in the Czech Republic? source: own processing

To the fourth question: Do you see the Stations of the Cross more as a tourist attraction or a sacred monument? 159 respondents answered that they see the Stations of the Cross as a sacred monument. 14 students listed that they do not know, and 3 students see the Stations of the Cross as a sacred monument and tourist attraction. 1 respondent stated that they did not see the Stations of the Cross as either.

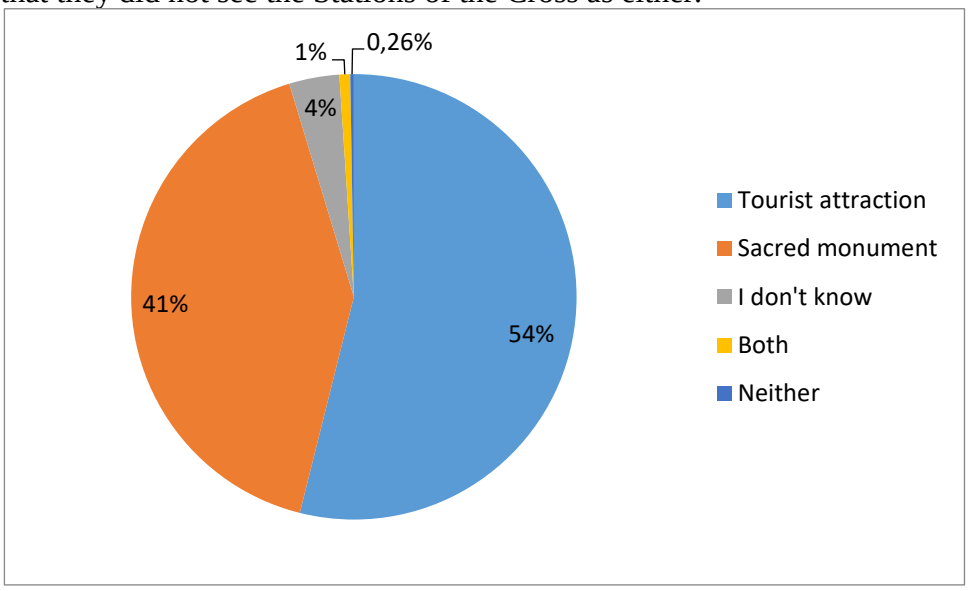

Figure 4 Do you see the Stations of the Cross more as a tourist attraction or a sacred monument? source: own processing

To the fifth question: According to you, what is the most common location of a Stations of the Cross trail? 275 respondents stated that Stations of the Cross are most often located outdoors in the natural landscape. 85 students stated that Stations of the Cross are most often located in churches, and 14 surveyed did not know. According to 8 respondents, Stations of the Cross are located on the way to a church and in areas surrounding the church, and 2 students thought that Stations of the Cross can be found outdoors in the natural landscape as well as in churches.

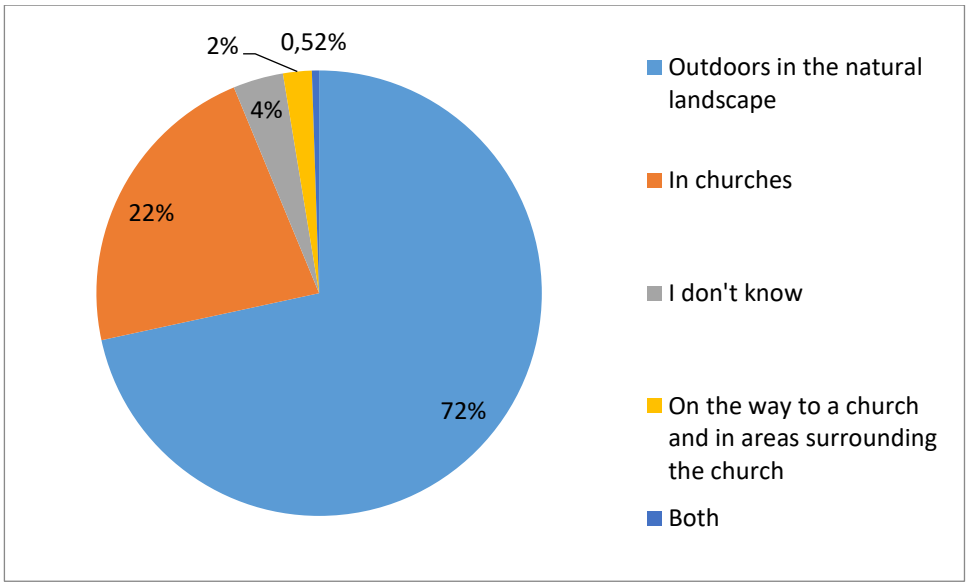

Figure 5 According to you, what is the most common location of a Stations of the Cross trail? source: own processing

To the sixth question: Have you encountered Stations of the Cross more in church or in the natural landscape? 281 students responded that they have encountered Stations of the Cross more in the natural landscape, 57 respondents in churches, and 38 answered that they have not encountered Stations of the Cross in natural landscapes or in churches. 4 respondents did not know, and 4 students encountered them both in the natural landscape and Stations of the Cross in churches.

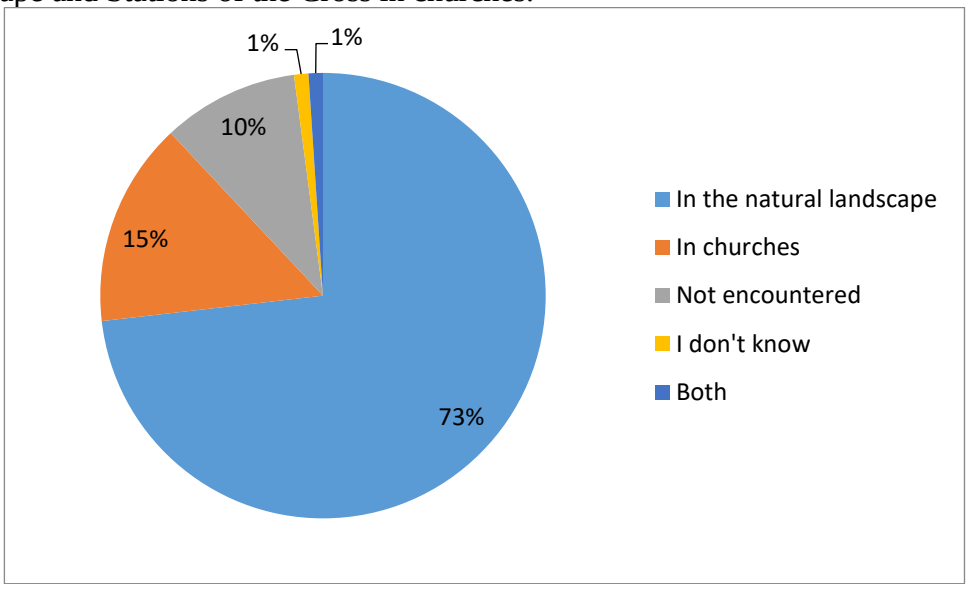

Figure 6 Have you encountered Stations of the Cross more in church or in the natural landscape? source: own processing

To the seventh question: Do you think that towns or other entities should invest in renovating derelict Stations of the Cross? According to 228 respondents, towns or other entities should invest in renovating derelict Stations of the Cross. 143 students stated that they should not invest, 10 surveyed did not know whether they should invest, and 3 thought that it depends on where the Stations of the Cross are located.

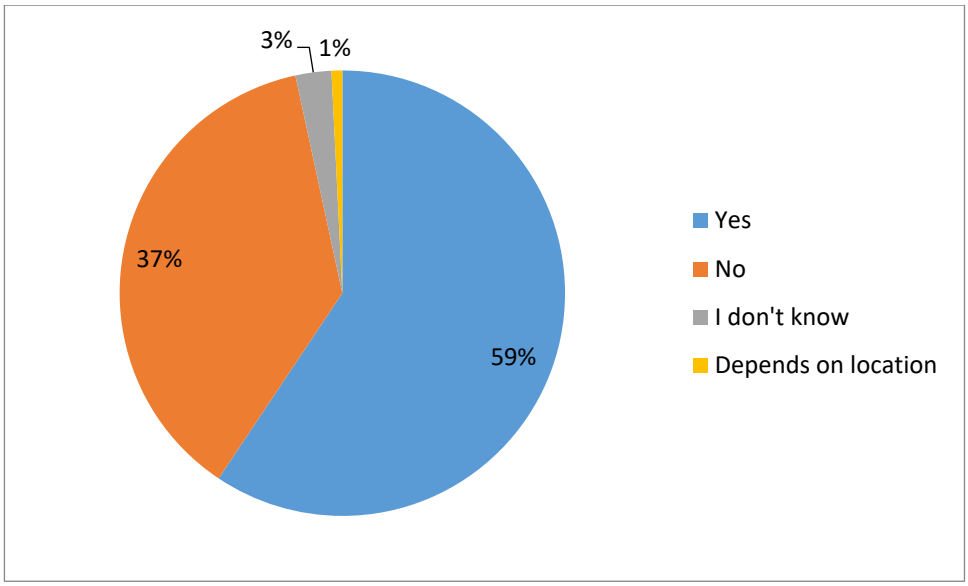

Figure 7 Do you think that towns or other entities should invest in renovating derelict Stations of the Cross? source: own processing

To the eighth question: Are you familiar with the original meaning of Stations of the Cross? What are the Stations of the Cross about? 206 answered that they did not know what the original meaning of Stations of the Cross is, nor did they know what the Stations of the Cross are about. 314 respondents stated that they are familiar with the original meaning of the Stations of the Cross and what they are about. 147 student specifically stated their opinion. Some are surprising and clearly show that they do not really know much about the Stations of the Cross or religion.

Some of the respondents' answers were quite unusual. For instance, respondents stated that it is a fabrication from the Bible, or is about the liberation of Jerusalem from occupation by Muslims, is a road for Crusaders, the road that the Crusaders took on the Crusades ordered by the pope, a battle of Muslims and non-believers, or Christians' attempt to conquer Jerusalem.

On the other hand, some incited contemplation: A liberation from evil thoughts, actions, or sins, reflection on oneself, a life path to walk along and stop, contemplating with each step one's small troubles in comparison with those that Jesus experienced.

To the ninth question: Are you familiar with the events or scenes that the Stations of the Cross capture? 165 students answered that they are not familiar with the events or scenes that the Stations of the Cross capture. 165 respondents stated correctly that the Stations of the Cross capture the events of the crucifixion of Jesus Christ. 57 participants answered incorrect events that the Stations of the Cross capture.

5 Discussion and Conclusions

The Stations of the Cross—sometimes titled according to its destination, Calvary—is a symbolic path tracing the events linked to the crucifixion of Jesus Christ. It includes the events surrounding His condemnation by Pontius Pilate, the carrying of the cross along the Via Dolorosa, and the subsequent crucifixion atop Golgotha Hill (Calvary). The Stations of the Cross is typically divided into fourteen stops that correspond with individual events traditionally linked to the Passions.

Stations of the Cross trails are included among small sacred structures categorised under tourist attractions. In the Liberec region, Stations of the Crosses are located in churches and are also found in the natural landscape. They are popular tourist attraction.

They are destinations for both pedestrian and vehicular tourism. Travel agencies are increasingly including them in their programmes for travels across the Czech Republic. They promote their visitation not just to Czech tourists, but to Polish and German tourists as well.

The survey that was carried out at the end of 2018 among the students of the Technical University of Liberec and of the Secondary technical school, Česká Lípa showed that young people are not very familiar with the Stations of the Cross. They were unable to state what the Stations of the Cross represent. The survey thus introduced the issues of the Stations of the Cross to the students.

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References

"Bible: Písmo svaté Starého a Nového zákona", (1993), Česká biblická společnost, Praha, Czech Republic.

Čičo, M., Palinová, M., Paulusová S. et al. (2002) *"Kalvárie a Krížové cesty na Slovensku"*, Pamiatkový ústav Bratislava, Bratislava, Slovakia.

David P., Soukup, V. (2002) *"777 kostelů, klášterů, kaplí České republiky"*, Nakladatelství David and Soukup, Praha, Czech Republic.

Drozden, R., Kašpar, J., Koláček, K., Mlýnková, M., Simm, O., Tichý, B. (2016) *"Jablonecké kulturní a informační centrum"*, Jablonec nad Nisou, Czech Republic.

Folprecht, J. (2005) "*Známé a neznámé pověsti – písně a báje z Českého ráje"*, Presstar, Turnov, Czech Republic.

Jaburková, I., Mágrová, K. (2011) *"Křížové cesty Šluknovska"*, Římskokatolická farnost – děkanství Rumburk, Czech Republic.

Koláček, L. Y. (2013) *"Krajinou Jizerských hor"*, Regia, Praha, Czech Republic.

Nejedlý, V., Zahradník, P. (2003) *"Mariánské, trojiční a další světecké sloupy a pilíře v Libereckém kraji"*, Národní památkový ústav Praha, Praha, Czech Republic.

Syrovátková, J. (2011) *"Cestovní ruch v Libereckém kraji"*, Technická univerzita v Liberci, Liberec, Czech Republic.

Syrovátková, J. (2011) *"Sakrální stavby - jako objekty cestovního ruchu v Liberci"*, Technická univerzita v Liberci, Liberec, Czech Republic.

Water Tourism on the Example of the Brda River (central Poland)

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Abstract

The article presents the degree of interest in water tourism on the section of the E70 waterway within the administrative limits of the city of Bydgoszcz. There are 6 locks in the Bydgoszcz section of the E-70 waterway. These are Czersko Polskie and the Śluza Miejska on the Brda and the locks Okole, Czyżkówko, Prądy and Osowa Góra on the Bydgoszcz Canal. The Czersko Polskie lock and the Śluza Miejska are the most used locks along the entire waterway, as evidenced by the number of lockaged floating objects. The biggest interest in water tourism is there on the urban section of the Brda River, in the city center. This reflects the number of lockaged vessels, including canoes, sports and motor boats on the Śluza Miejska, which account for about 80% of the total number of lockaged vessels. Increased interest in water tourism in Bydgoszcz results from promotional activities of the city, outdoor events in the vicinity of the Brda River, and revitalization works carried out in the city center and on the Bydgoszcz section of the waterway.

Keywords: water tourism; freight traffic; tourist traffic; the E70 waterway; Bydgoszcz; Poland.

JEL Classification: Z32, Q26

Article Classification: Research article

1 Introduction

Inland waterway transport is considered the safest, energy-efficient, cheap and environmentally friendly among the known types of transport (Kulczyk and Winter, 2003; Bolt and Jerzyło, 2013). However, in recent years there has been observed a reduction or at best a stagnation of the share of inland waterway transport in total transport in Europe (Jurum-Kipke et al., 2007; Caris et al., 2014; Wiegmans and Konings, 2017). Inland navigation in Poland in comparison to other European countries plays a marginal role in total transport. There are many reasons for this. The crucial factor is hydrological

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conditions, which make inland navigation impossible due to low water levels, floods or ice phenomena (Kubiak-Wójcicka and Pokropski, 2019). Apart from natural conditions, the main reason for the low utilization of water transport is lack of funding, which leads to degradation of technical conditions of waterways and decapitalization of the fleet. Inland water transport has significant, untapped potential (Miloslavskaya and Plotnikova, 2018). Therefore, the European Commission places great emphasis on long-term investment in transport infrastructure, which will contribute to progress in the area of sustainable transport (Ivaković et al., 2008; Mihic et al., 2011; López-Navarro, 2013; Fichert et al., 2017). In recent years, international agreements have been made in the area of making navigable major waterways and adapting their navigational conditions to those appropriate for waterways of international importance (matching at least class IV navigability). This will allow for better utilization of the potential of waterways in inland water transport. Despite the smaller interest in inland waterway transport, the interest in water tourism, including the use of recreational and sports facilities, is growing. The increase in the attractiveness of water tourism entails more interest in this form of recreation and is an element of regional and local development. In Western Europe, water tourism is one of the best-growing types of tourism (Tourism and the European Union, 2015).

Poland has a dense network of inland waters, which favors the development of water tourism. Water routes are very diverse in terms of navigability, length, landscape values of the nearest surroundings and available infrastructure. In recent years, revitalization of riverside areas has been carried out in many Polish cities, which contributed to the increase in the attractiveness of the area, and thus to the increased interest in water tourism (Parkitny, 2013; Gus-Puszczewicz, 2018). One of the first cities in Poland where revitalization of riverside areas was carried out was Bydgoszcz. The city of Bydgoszcz is one of the first Polish beneficiaries of non-returnable financial aid granted in this field under the Financial Mechanism of the European Economic Area and the European Regional Development Fund (Renovation of the Cultural Heritage of Mill Island in Bydgoszcz).

2 Material and methods

The aim of this study is to present water tourism and the degree of its development on the E70 waterway within the administrative limits of the city of Bydgoszcz. This analysis will allow to assess the role of this section of the waterway, which is the bottleneck on the route connecting Eastern and Western Europe. The issue of shipping traffic was presented on the basis of data on the number and type of vessels on a monthly and annual basis, which crossed locks located on the Bydgoszcz stretch of the E70 waterway. The Czersko Polskie lock and the Śluza Miejska on the Brda River are currently administered by the Polish National Water Service, Regional Water Management Board (RZGW) in Gdańsk. The remaining locks, i.e. Okole, Czyżkówko, Prądy, and Osowa Góra are located on the Bydgoszcz Canal and are administered by the Polish State Water, Regional Water Management Board in Bydgoszcz. Records of the use of locks operated by the RZGW employees include the division of vessels by their type, i.e. barges, pushers and tugs, passenger ships and other ships. Freight traffic includes the number of lockaged barges, pushers and tugs. In turn, the tourist traffic includes passenger ships, sports and recreational boats, e.g. motor boats, kayaks, yachts and others. The monthly registers of the number of locks in the last 20 years (1999-2018) allowed to determine the level of traffic during a year. Thanks to the division into the type of vessels, the importance of freight and tourist traffic has been determined. The obtained data

illustrates the utilization of technical infrastructure in inland water transport, with particular emphasis on tourist traffic. The information collected is unique, as it is not widely available in statistical yearbooks by region. This information is supplemented with data obtained from the Główny Urząd Statystyczny (GUS), which present the number of passengers transported by inland waterways in Poland in the period 2001-2017. In Poland, information on passenger transport by inland waterways includes only the number of passenger ships, the number of passengers and passenger seats on an annual basis.

3 Study area

The research area covers the Bydgoszcz section of the international waterway E70. This waterway connects Western Europe, from Antwerp through the Berlin waterway node, northern Poland, with the region of Kaliningrad and further with the Nemunas waterway system. The section in the city of Bydgoszcz includes fragments of the rivers Brda, Vistula and of the Bydgoszcz Canal and constitutes a class II waterway, according to the Polish classification of waterways. As much as 14.4 km of the canalized Brda river, 6.2 km of the Bydgoszcz Canal and 13.8 km of the Vistula River are located within the administrative limits of the city. The locks in Bydgoszcz were built during the construction of the Bydgoszcz Canal, which was built in 1773-1774. It required systematic deepening and modernization of hydrotechnical equipment.
In total, there are 6 active locks in Bydgoszcz. These are Czersko Polskie and the Śluza Miejska on the Brda and the locks Okole, Czyżkówko, Prądy and Osowa Góra on the Bydgoszcz Canal (Figure 1). The Czersko Polskie lock was put into use in 1999 in place of the existing Brdyujście lock. Currently, the Brdyujście lock is closed. It has been renovated and will serve as a tourist lock in the future, while Czersko Polskie is going to be a freight lock for larger units (Table 1).

Table 1 Technical parameters of locks in the area of Bydgoszcz; source: Own study on the basis of the study Międzynarodowa droga wodna E-70. Mapa dla wodniaków

No	Lock name	Kilometer of the Vistula-Oder waterway	Pitch (m)	Length (m)	Width (m)	Depth (m)
1	Czersko Polskie	1.4	5.28	115.0	12.0	3.58
2	Śluza Miejska	12.4	3.33	57.4	9.6	2.46
3	Okole	14.8	7.58	57.4	9.6	2.58
4	Czyżkówko	16.0	7.52	57.4	9.6	2.66
5	Prądy	20.0	3.82	57.4	9.6	2.56
6	Osowa Góra	21.0	3.55	57.4	9.6	2.55

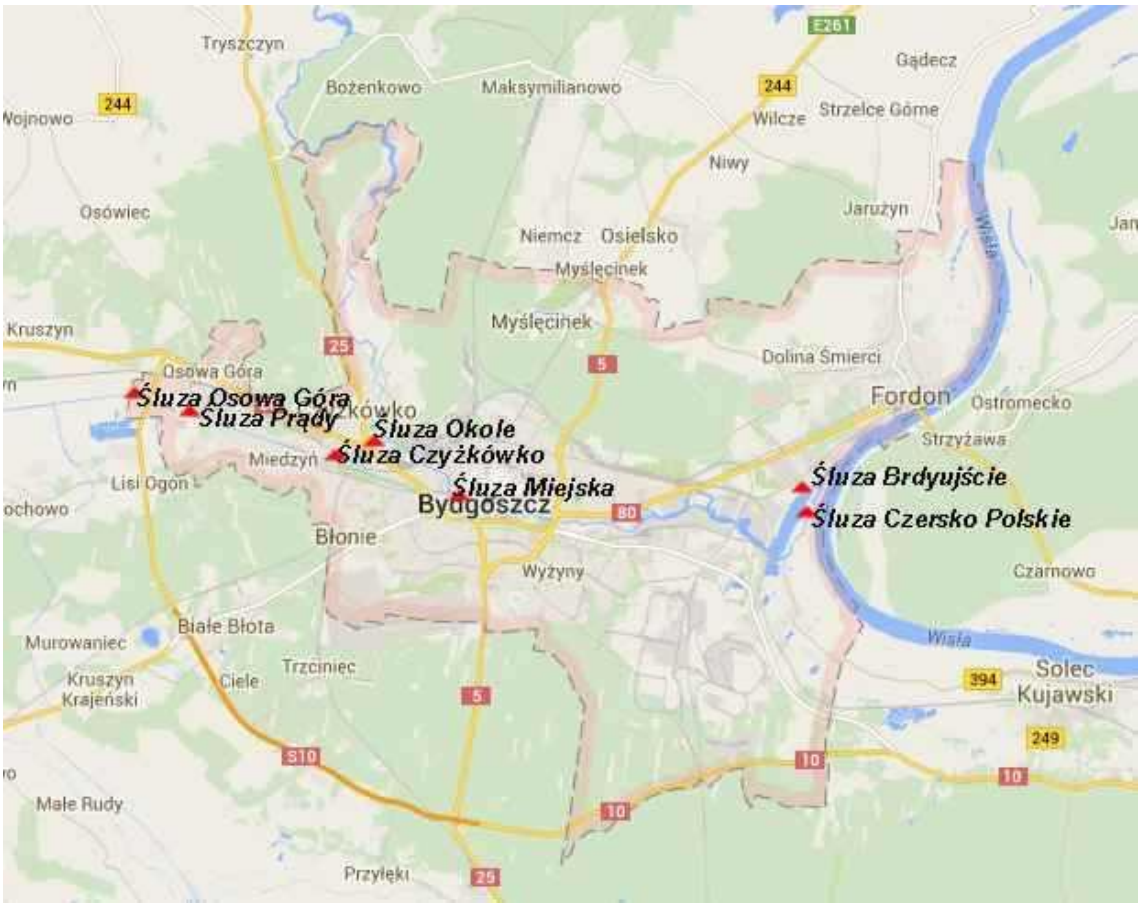

Figure 1 Location of locks within administrative limits of Bydgoszcz; source: own study on the basis of https://maps.google.pl/

Bydgoszcz, with the population of approximately 355,000 residents, is 8th largest city of Poland in terms of the number of inhabitants. The city is characterized by convenient car, rail and air transport which favors the increased tourist interest in the city. This is evidenced by the increasing number of tourists visiting Bydgoszcz and using hotel services. One of the main tourist attractions of Bydgoszcz is the Mill Island, which is located in the city center by the Brda River. In the years 2005-2012, the Mill Island was revitalized together with the renovation of historic cultural heritage objects, construction of the recreational infrastructure of the Mill Island and its immediate surroundings as well as the construction and reconstruction of degraded sports facilities. The total cost was approximately PLN 79.2 million, i.e. EUR 18.5 million (https://www.bydgoszcz.pl/rozwoj/projekty-europejskie/rewitalizacja-wyspy-mlynskiej-w-bydgoszczy/).

4 Results and discussion

4.1 Inland waterway in Poland

Three international waterways run through Poland: E30, E40 and E70. Waterway E30, connecting the Baltic Sea with the Danube in Bratislava, runs through the Oder Waterway. Waterway E40, connecting the Baltic Sea with the Black Sea, leading from Gdańsk up the Vistula to Warsaw, then through Narew and Bug to Brest, where it connects with the waterway leading through Polesie to the Dnieper. The E70 waterway connects the Atlantic coast in Belgium with the Baltic Sea in Lithuania.

Total length of waterways in 2017 in Poland was 3654 km (including 2417 km of regulated navigable rivers, 644 km of canalized sections of rivers, 336 km of canals and 259 km of navigable lakes). There were 3365 km (92.1%) of effectively used navigable routes. Adjustment of the dimensions of ships and waterways is the main factor determining the efficiency of inland waterway transport. The requirements for waterways of international importance (classes IV and V) in 2017 were met in Poland by 5.9% of total length of waterways (214 km). This is a value that has remained unchanged since 2007, similar to the total length of waterways. The remaining network of waterways consists of regional significance class I, II and III waterways, whose total length in 2017 was 3440 km (94.1%) (Transport wodny śródlądowy …, 2018). Other waterways that do not meet the requirements of international or even local navigation are more and more often used for recreational navigation.

Insufficient development of navigable roads in Poland, both in terms of character (canalized rivers, freely flowing rivers, canals) as well as shipping parameters (dimensions of sluices, depth and width of the route, heights of bridges) affects the specifics of inland waterway transport and causes that it does not play a significant role in the Polish transport system.

In 2017, as much as 5777.5 thousand tons of cargo was shipped and as much as 877.3 million ton-km of transport work was done. The share of inland waterway transport in total transport in the years 2000-2017 decreased from 0.8% to 0.3% (Transport wodny śródlądowy …, 2018).

According to the GUS, information on inland transport that can be obtained concerns freight and passenger traffic. The statistical summaries cover only passenger ships registered in the Shipping Offices. Passenger transport in the years 2001-2017 ranged from 884,000 passengers (2006) to 1.6 million passengers. The largest passenger transports were carried out in 2001 and 2002, while in 2016 and 2017 transports amounted to around 1.2 million people (GUS, 2017).

In 2001-2017, there were on average 102 passenger ships on record, on which there were 9,420 passenger seats. The number of passenger ships varied from 87 units in 2003 to 117 units in 2017, and an upward trend is noticeable. In the analyzed period 2001-2017, an average of 9420 passenger seats were recorded on inland waterway vessels. The largest number of seats was recorded in 2003 (13317), while the lowest in 2010 (7988). The general trend is decreasing, however, the number of passenger seats in 2017 in relation to 2015 and 2016 deserves attention. This situation is related to the replacement of old river fleet having large numbers of seats on board, with smaller units with fewer passenger seats and better adapted to the conditions prevailing on the waterway.

The aforementioned indicators and parameters show that in recent years there has been an increase in inland passenger navigation. According to Wojewódzka-Król and Rolbiecki (2013), the minimum goal is to restore transport levels of around 2 million passengers per year from the period 1965-85. The GUS data does not provide full information about the state of water tourism, because they include only passenger ships. Water tourism on waterways and water routes is connected with the use of various types of equipment and floating units. In addition to passenger ships, there are water trams, yachts, passenger boats, sailing boats, kayaks, rowboats and houseboats.

3.2 Intensity of total shipping traffic on locks in Bydgoszcz

Determination of the degree of utilization of the waterway in the area of Bydgoszcz was possible through the register of units that cross the locks on particular sections of the E70 waterway. The largest number of vessels was lockaged at facilities

located on the Brda River, i.e. Czersko Polskie and Śluza Miejska. The average number of units lockaged on the lock in Czersko Polskie was 1237, while on the Śluza Miejska it was 1349. Depending on the year, the number of lockaged units ranged from 1,500 to over 2,500. The largest volume of units was recorded at the Śluza Miejska in 2010. The intensity of total traffic on other sluices indicates much less utilization of sluices located on the Vistula-Oder waterway. Depending on the lock, on average, in the analyzed multi-year, from 160 on the lock in Osowa Góra to 218 on the Okole lock. Vessel traffic intensity on the Bydgoszcz Canal constituted only between 12% and 16% of the traffic on the Brda River. The reason for this is poor condition of the waterway and lack of tourist infrastructure, which transposes into less tourist interest.

In some cases, a small number of lockaged units or absolute lack of such in a given year resulted from renovation works carried out on locks or their failure. An example is the failure of the Śluza Miejska in 2013 or its renovation in 2015 and the renovation of the Okole lock in 2017 and 2018. The growing interest in inland waterway transport in Bydgoszcz has been noticeable since 2005 (Figure 2). The largest traffic of vessels takes place on short distances and covers Czersko Polskie and Śluza Miejska locks, while units crossing the remaining 4 locks reflect utilization of the waterway on the longer section.

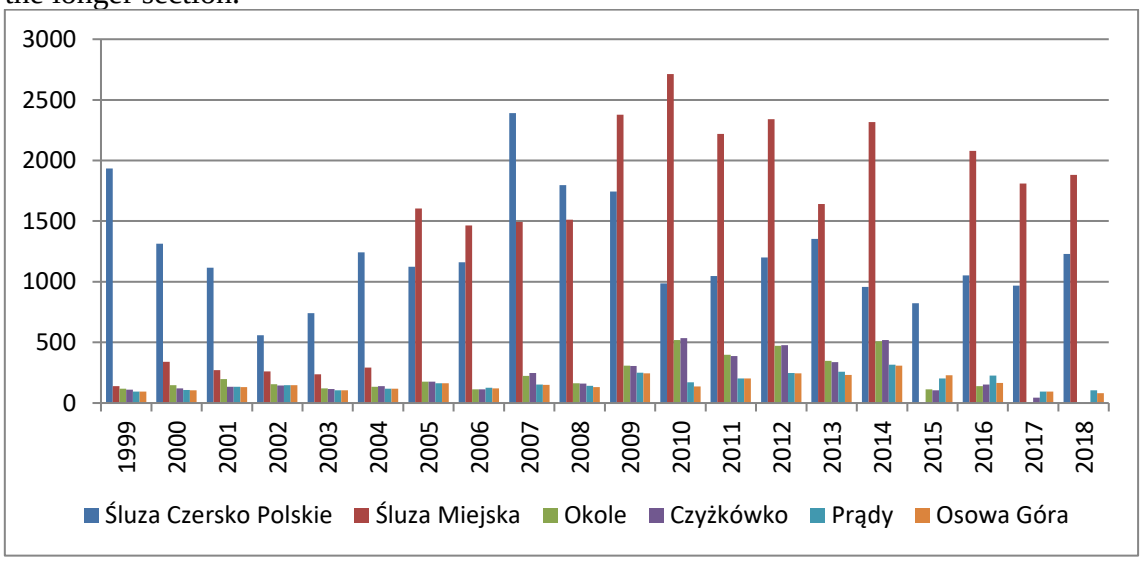

Figure 2 Number of units lockaged in sluices in Bydgoszcz (own study based on data obtained from RZGW Bydgoszcz and Gdańsk)

3.3 Freight and tourist traffic

The register of locking, taking into account the type of floating objects, allowed for a division into freight and tourist traffic. Freight traffic includes cargo transport using such units as barges, pushers and tugs. On the other hand, tourist traffic includes sport boats, kayaks and other boats.

The destination of navigation of particular units is of great importance for determining the economic role played by individual locks. The sluice Czersko Polskie serves mainly freight units that transport mainly sand and gravel from the Vistula. The freight traffic on the Czersko Polskie lock comprised, on average, 82% of all units crossing the lock in 1999-2018. That share was various and to a large extent depended on the economic situation of enterprises (Figure 3).

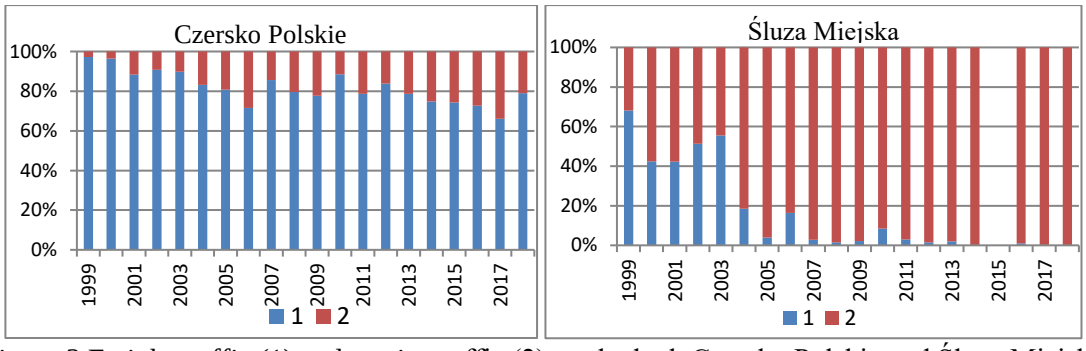

Figure 3 Freight traffic (1) and tourist traffic (2) on the lock Czersko Polskie and Śluza Miejska in 1999-2018 (own study on the basis of data obtained from the RZGW Gdańsk)

Tourist traffic dominated on the Śluza Miejska, which has been particularly visible since 2005, when the number of tourist units crossing the lock accounted for over 90% of the traffic. Starting the Bydgoszcz Water Tram in 2005 has had an impact on such a large tourist traffic.

During the analyzed period of 1999-2018, significant changes took place not only in the number of lockaged units, but also in the structure and type of transport on all locks. For example, the year 2002 (before revitalization) and 2014 (after revitalization) was presented (Figure 4).

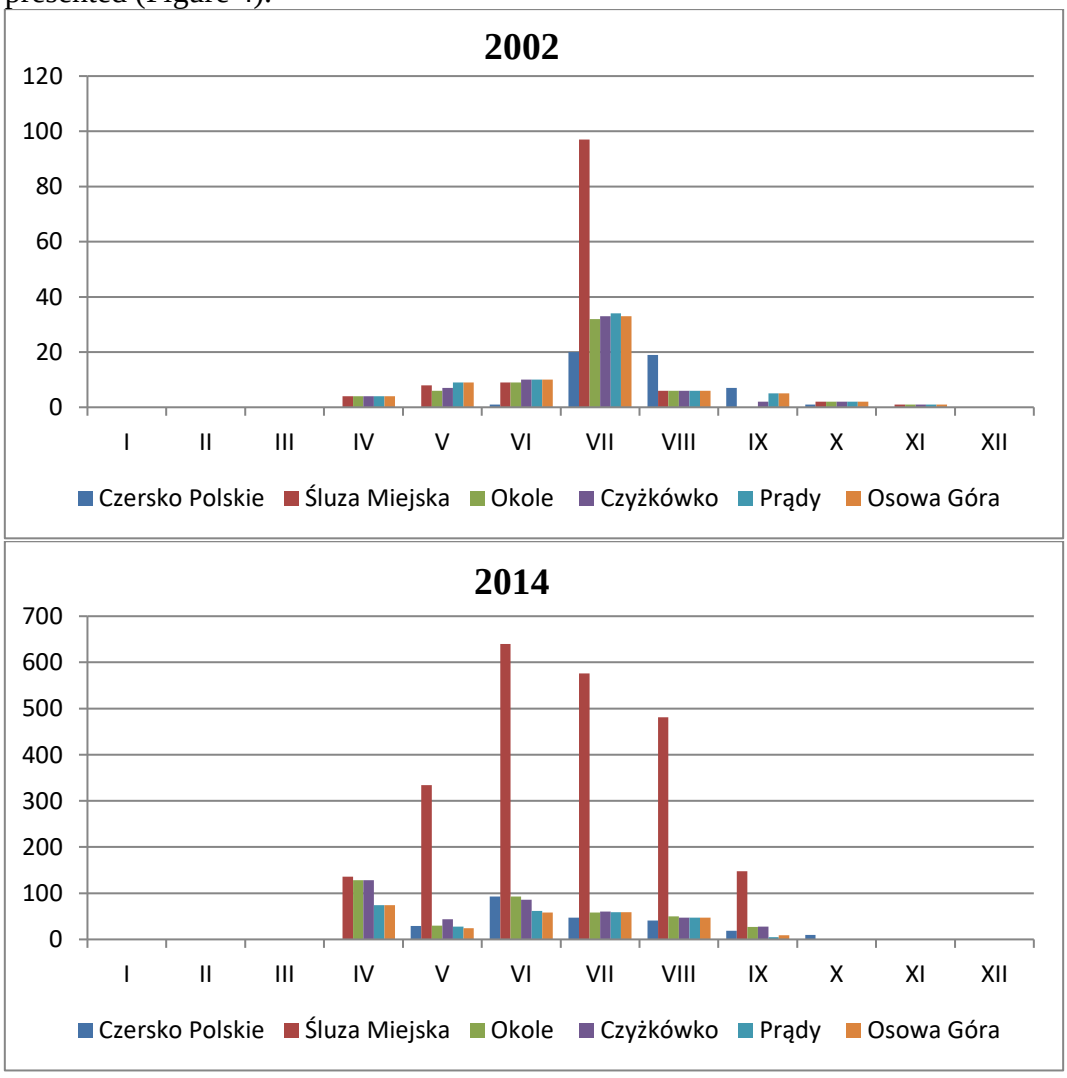

Figure 4 Number of tourist units lockaged in 2002 and 2014 (own study based on data obtained from RZGW Bydgoszcz and Gdańsk)

In 2002, 91% of lockaged units in the Czersko Polskie lock were freight, and only 9% were tourist. On other sluices, the traffic was evenly distributed, i.e. about 50-60% for freight traffic and 40-50% for tourist traffic (Figure 5).

In 2014, there is a visible increase in the total number of lockaged vessels, which is particularly noticeable on the Czersko Polskie lock and the Śluza Miejska (over sixfold increase). The increase was recorded both in freight and tourist traffic. At the Czersko Polskie lock, the traffic of freight units prevailed (75%) over tourist units (25%). At the Śluza Miejska, the share of freight units accounted for only 0.1% of all transport and the remaining 99.9% were tourist units. The locks Okole and Czyżkówko were crossed mainly by tourist units (76%), and about 24% by freight. The Prądy and Osowa Góra locks served a much smaller share of freight units (about 11-12%), and tourist units accounted for 87-88%.

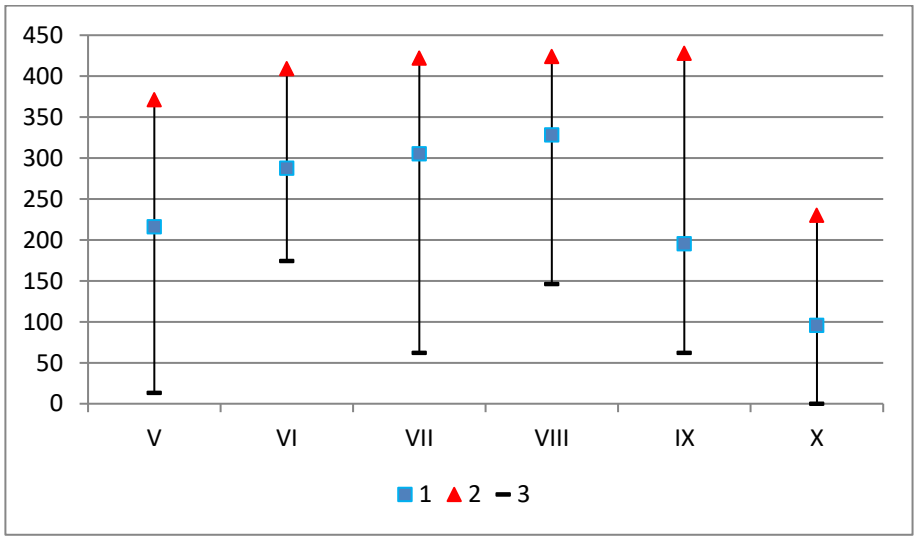

Figure 5 Average (1), maximum (2) and the minimum number of passenger ships lockaged in the summer half of the year in the Śluza Miejska in the years 2006-2018 (own study based on data obtained from RZGW Gdańsk)

The rapid increase in the number of vessels in tourist traffic at the Śluza Miejska resulted primarily from the launch of regular routes of passenger ships serving the Bydgoszcz Water Tram. The Bydgoszcz Water Tram consisted of 3 units: 2 solar-powered units: Słonecznik I and Słonecznik II, and m/s Bydgoszcz. Bydgoszcz Water Tram has been incorporated into the municipal public transport system and is a tourist attraction of the city. As part of their route, these vessels crossed the Śluza Miejska at least several times a day. From 2018, the Słonecznik I and II ships, which take 28 passengers on board, were transferred to management of the Bydgoszcz Information Center. The cruises take place from April 26 to September 30. Passenger ships perform most of the shipping traffic in the summer months, i.e. from May to October, which accounts for 66-98% of the total number of tourist lockages per year (Figure 5).

Among other tourist vessels, apart from passenger ships, a large number of lockages at the Śluza Miejska accounts for sports units, e.g. kayaks or rowing boats belonging to Bydgoszcz sports clubs. The remaining large numbers of lockages result from outdoor events organized by the city or individual organizations and institutions. An example is the Bydgoszcz Water Festival "Ster na Bydgoszcz" organized every year in June for 11 years already. The use of vessels such as boats, canoes or motor boats for recreational purposes by the inhabitants of Bydgoszcz and tourists is increasing. The exact number of rented floating equipment in Bydgoszcz is difficult to determine due to large number of companies renting floating equipment. The owners of rental companies

indicate that in the last 3 years there has been a noticeable increase in interest in water tourism, which is associated with the improvement of wealth of Polish families and the Sunday trade ban put on large shops. The tourist attractiveness of Brda cruises, in addition to the high landscape and sightseeing values, is influenced by the tourist infrastructure. The accommodation, gastronomic and accompanying base in the center of Bydgoszcz influence the increase of tourist attractiveness. Around the remaining sluices, the tourist infrastructure is poorly developed, which forces tourists to a short stay.

The increase in interest in water tourism in Poland is associated with the development of infrastructure in the waterside areas. A factor that facilitates and makes inland waterway more attractive is the existence of a marina network, tourist wharfs or floating equipment rental spots. They emerge primarily as a result of the efforts of communities and local authorities, non-governmental organizations and companies contributing to the development of the region's economy. The increase in interest in water tourism has been noticed in other Polish cities, e.g. Kraków (Parkitny, 2013), Warszawa (Owsiak, 2013), Wrocław (Łach and Włostowski, 2013), Toruń (Kubiak-Wójcicka, 2016), Włocławek (Kubiak-Wójcicka and Pokropski, 2019) and others (Gorączko, 2017). Improvement in the quality of service of inland navigation will contribute to further development of water tourism (Berrio et al. 2019).

4 Conclusions

Based on the analysis of data on the number of vessels crossing the locks located within the administrative limits of Bydgoszcz in the years 1999-2018, the following conclusions were inferred:

- the Bydgoszcz section of the waterway was utilized to various extent. The increase in the number of lockaged units on all locks is visible after 2005
- the largest traffic of units took place at the Śluza Miejska and Czersko Polskie locks located on the Brda, while on the 4 other locks, i.e. Okole, Czyżkówko, Prądy, and Osowa Góra on the Bydgoszcz Canal, the traffic was small. The inland waterway transports are local in nature, and carried out on short sections of the waterway
- lock in Czersko Polskie served mainly the traffic of cargo units, i.e. barges, pushers, and the Śluza Miejska - tourist and sports units
- the increase in interest in water tourism on the section of the waterway at the Śluza Miejska results from its convenient location in the city center, as well as the availability of tourist infrastructure, including lodging, catering and accompanying facilities. The tourist attractiveness of this place results from revitalization works on the Mill Island, starting the Bydgoszcz Water Tram, but also promotional activities of the city, e.g. organization of sporting and cultural-entertainment events, including canoeing trips in the city center.
- the other locks are less attractive to tourists, which results from the lack of appropriate infrastructure on that section of the waterway.
- the existing technical infrastructure such as locks enables the development of water tourism in the Bydgoszcz section of the waterway, but it requires significant investment.
- other locks are characterized by high potential, however, their usage is small, which requires significant investment.
- the increase in interest in water tourism on longer distances is possible through modernization of the whole E70 waterway accompanied by numerous tourist attractions and modern water fleet.

References

"Międzynarodowa droga wodna E-70. Mapa dla wodniaków", 2012.

"Renovation of Items of Cultural Heritage of Mill Island in Bydgoszcz", Available at: http://www2.um.bydgoszcz.pl/binary/renowacja%20wyspy%20mlynskiej_tcm29-55325.pdf)

"Tourism and the European Union", (2015) European Union.

"Transport wodny śródlądowy w Polsce w 2017 roku. Informacje sygnalne", (2018).

Berrio, L., Cantillo V., Arellana J. (2019) "Strategic modeling of passenger transport in waterways: The case of the Magdalena River", *Transport.* Vol. 34, No. 2, pp. 215–224.

Bolt, A., Jerzyło, P. (2013) "Determinants of inland navigation on the Vistula from Warsaw to Gdańsk", *Acta Energetica.* Vol. 2, No. 15, pp. 56–63.

Caris, A., Limbourg, S., Macharis, C., van Lier, T., Cools, M. (2014) "Integration of inland waterway transport in the intermodal supply chain: a taxonomy of research challenge", *Journal of Transport Geography*. Vol. 41, pp. 126–136.

Fichert, F. (2017) "Transport policy planning in Germany – An analysis of political Programs and investment masterplans", *European Transport Research Review.* Vol. 9, No. 2, pp. 1–12.

Główny Urząd Statystyczny (2017) *"Turystyka w woj. kujawsko-pomorskim w 2017 roku. Informacje sygnalne",* Poland.

Gorączko, M. (2017) "E70 waterway as a stimulator of tourism development in Nakło County – status quo and prospects", *Geography and Tourism.* Vol. 5, No. 2, pp. 105–114.

Gus-Puszczewicz, A. (2018) "Potencjał turystyczny śródlądowych dróg wodnych województwa pomorskiego, Studia i Prace", *Kolegium Zarządzania i Finanse*. Vol. 170, pp. 91–103.

Ivaković, C., Rogić, K., Orlić Protega, A. (2008) "Traffic on the Croatian inland waterways in the context on the European Programme Nainades", *Promet – Traffic & Transportation.* Vol. 20, No. 6, pp. 383–393.

Jurum-Kipke, J., Maković, B., Sumpor, D. (2007) "Current condition of vessels on inland waterways in Croatia", *Promet – Traffic & Transportation.* Vol. 19, No. 5, pp. 301–309.

Kubiak-Wójcicka, K. (2016) "Uwarunkowania i stan obecny rozwoju żeglugi turystycznej na Wiśle w Toruniu", In: *Turystyka wodna jako produkt turystyczny regionu*, Zachodniopomorski Uniwersytet Technologiczny, Szczecin, Poland.

Kubiak-Wójcicka, K., and Pokropski, T. (2019) "Natężenie ruchu żeglugowego na dolnej Wiśle na podstawie analizy śluzowań we Włocławku w latach 1997-2016", *Prace Geograficzne.* Vol. 156, pp. 79–99.

Kulczyk, J., Winter, J. (2003) *"Śródlądowy transport wodny",* Wrocław, Poland.

Łach, J., Włostowski, B. (2013) "Uwarunkowania, stan obecny i perspektywy rozwoju żeglugi turystycznej na Odrze we Wrocławiu", *Geography and Tourism.* Vol. 1, No. 1, pp. 23–30.

López-Navarro, M.A., (2013) "The Effect of Shared Planning by Road Transport Firms and Shipping Companies on Performance in the Intermodal Transport Chain: the Case of Ro-Ro Short Sea Shipping", *European Journal of Transport and Infrastructure Research.* Vol. 13, No. 1, pp. 39–55.

Mihic, S., Golusin, M., Mihajlovic, M. (2011) "Policy and promotion of sustainable inland waterway transport in Europe –Danube River", *Renewable and Sustainable Energy Reviews.* Vol. 15, pp. 1801–1809.

Miloslavskaya, S., Plotnikova, E. (2018) "Current situation and optimization of inland waterway infrastructure financing", *Transport Problem.* Vol. 13, No. 3, pp. 51–63.

Owsiak, J. (2013) "Diagnoza stanu zasobów i inwestycji w turystyce wodnej w Polsce", *PTiR.* Vol. 1, pp. 62–78.

Parkitny W. (2013) "Jednostki pływające wykorzystywane w obsłudze turystycznej na Wiśle w Krakowie", *Logistyka.* Vol. 5, pp. 66–70.

Wiegmans, B., Konings, R. (2017) *"Inland waterway transport. Challenges and prospect",* New York: Routledge, USA.

Wojewódzka-Król, K., Rolbiecki R. (2013) "Grounds and opportunities for the development of passenger and cargo shipping on the lower Vistula", *Acta Energetica.* Vol. 2, No. 15, pp. 106–112.

Creating Smart 3D Models as a Supporting Instrument for the Region's Development

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Abstract

With the development of information technology, 3D models of objects and cities have also come to the fore, which are then used in various analyses and applications. In addition to the basic topological and geometric features of the 3D model, additional building information is required for building the Smart City and, above all, the ability to modify and repair these pieces of information in a relatively short time. One of the options of creation is also procedural modelling, which has found its application in the creation of small as well as large and wide objects. The basis is the possibility of creating and generating 3D objects according to defined rules and procedures, which significantly accelerates the creation of wide places. In this paper, we discuss the possibilities of automating the creation of 3D models of objects and cities using procedural modelling tools. The created models will also be made available to the general public through a web interface through virtual tours and virtual reality.

Keywords: procedural modelling; smart cities; 3D object; CityGML; CityEngine; LOD.

JEL Classification: R14, R30, R58

Article Classification: Research article

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1 Introduction

Currently, 3D models play a very important role not only in the real-world display of objects in space but also with the possibility of applying various spatial analyses on created models. In addition to the basic geometry and typology of objects, other additional object information is also included. Multiple ways and modelling techniques such as procedural modelling, semantic modelling, or the use of different modelling software can be used to create a 3D object model (Dimopoulou *et al.* 2014). 3D city models can be defined as digital representations of the Earth's surface and related objects belonging to urban areas. However, modelling itself is not only linked to cities but also suitable for rural areas and landscapes. Due to its expansion and its use, it is required that the entire modelling process be as cost-effective and time-consuming as possible.

Spatial modelling is now becoming the standard for any type of spatial analysis from flood modelling (Gergel'ová *et al.* 2013), creating noise maps in built-up areas (Kurakula and Kuffer 2008; Stoter *et al.* 2008; Deng *et al.* 2016), seismic simulation in built-up areas (Xu *et al.* 2014; Xiong *et al.* 2015), hillshade analysis and solar radiation modelling (Rybar *et al.* 2002; Catita *et al.* 2014; Eicker *et al.* 2014; Liang *et al.* 2015) to urban studies of cities with an environmental focus (eg. with regard to climate change warming city centers). They find their place in solving the burning problem of today, and that is transport (Tavares *et al.* 2009) and with it the pollution of cities (Zahran *et al.* 2012).

A prerequisite for high-quality spatial analysis is a 3D model of the selected site with the requirements for the quality of input data. The most commonly used methods of spatial data collection are geodetic methods (universal measuring station, GNSS), aerial and terrestrial photogrammetry, remote sensing and laser scanning. In the case of a complex object or condition, a combination of the methods used may occur.

Classical methods for creating 3D objects are suitable especially for individual objects, or for a very small area, as they require a lot of time and money. Rule-based modelling has great potential in this respect, as it is based on the programming language and uses it to define individual objects, which saves time. This way of modelling and creating 3D city models is of great importance especially for urban planning (Luo *et al.* 2017).

3D modelling is closely related to the Smart City concept. The Smart City concept combines several components: innovative use of information technology, efficient transport, sustainable energy consumption, clean environment. The European Commission and the European Parliament see smart cities as key elements for the future of the Union. Cities can exchange best practices in platforms such as the Global Covenant of Mayors, which is home to more than 7400 cities worldwide. So far, four Slovak cities have signed the Convention: Bratislava, Nitra, Moldava nad Bodvou and Turčianske Teplice. Currently, there is no city in Slovakia that could be labelled Smart City.

2 Material and methods

The spatial model of the tracked object can be displayed in multiple display levels. 3D city models are usually designed and created at different levels of detail and resolution and then created as required by the level of detail. Open Geospatial Consortium (OGC) develops and implements standards for geospatial data in both 2D and 3D (www.opengeospatial.org/standards). Among the standards that characterize 3D objects are CityGML, IndoorGML and 3D Tiles. CityGML and IndoorGML represent open data models and XML schema, while IndoorGML focuses on building modelling from within.

The CityGML data model contains a semantic and topological component in addition to object geometry data. Based on the XML markup language (CityGML, OGC).

CityGML provides a standard model and mechanism for describing 3D objects with respect to their geometry, topology, semantics and appearance, and defines five different levels of detail. Also included are generalization hierarchies between thematic classes, aggregations, relationships between objects and spatial properties. CityGML is highly scalable (extensible for theme) through the CityGML Application Domain Extensions (ADE). Data sets can include different urban entities supporting the general trend towards modelling not only individual buildings but also extensions, districts, cities, regions and countries.

The CityGML standard defines five levels of detail. LOD provides an idea of the spatial distribution of an object at different levels of abstraction, including spatial semantic coherence and texture (Biljecki *et al.* 2014).

LODs are required to respond to independent data collection processes with different application requirements. Furthermore, LODs facilitate efficient visualization and data analysis. In the CityGML data file, the same object can be represented simultaneously in different LODs, allowing analysis and visualization of the same object with respect to different degrees of resolution. In addition, two CityGML data files containing the same object in different LOD can be combined and integrated. However, it is the user or application's responsibility to make sure that objects that are independent of LOD refer to the same object in the real world.

Levels of details for building modelling (Figure 1):

- LOD 0: 2.5D footprints,
- LOD 1: Block Model,
- LOD 2: building with the roof structure,
- LOD 3: exterior detail building model,
- LOD 4: exterior and building interior model.

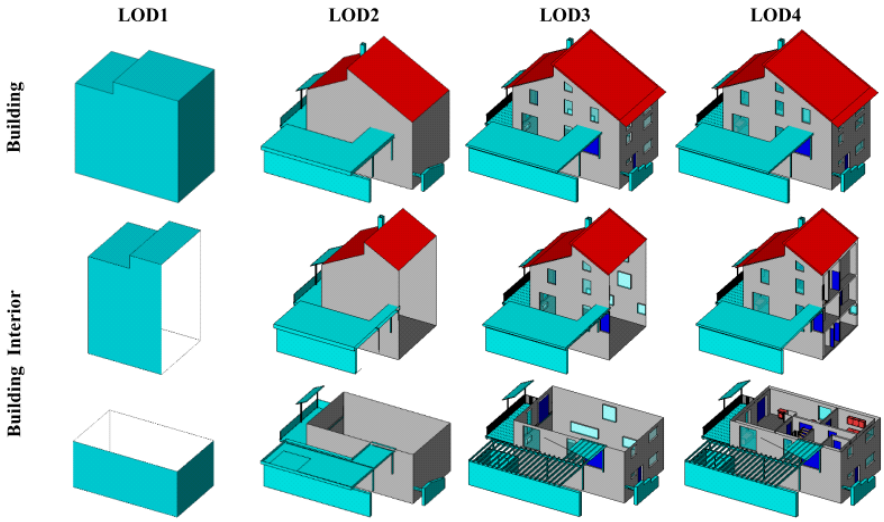

Figure 1 Level of details – model building (source: Institute for Automation and Applied Computer Science (IAI) / Karlsruhe Institute of Technology (KIT))

CityGML allows multiple representations to be used in different LODs simultaneously, meaning that the LoD concept is object-oriented and not directed to the scene.

2.1 Procedural modelling

The actual process of creating 3D models is currently associated with the concept of procedural modelling, which includes CGA procedures (shape grammar). Procedural modelling is the process by which the resulting model is not created by manual object modelling, but by rules and algorithms that determine how the resulting model is to be created. This process of creating 3D models is particularly suitable for modelling urban environments because there are often repetitive structures and a large number of similar 3D objects. One disadvantage is the need to know the programming language, which may initially complicate the modelling process (Dobraja 2015).

Initial procedural modelling techniques were based on the Lindenmayer system (L-systems), which were mainly used in vegetation modelling (Deussen *et al.* 1998; Parish and Müller 2001). L-systems recursively generate symbol strings based on specified rules, which can be graphically interpreted as fractal structures.

"Grammatical" or "procedural" modelling has a wide range of applications but is mostly used when a large number of design iterations or a large number of objects that comply with certain standardized rules must be created. The goal is modelling automation and the overall quality of the grammatical description is reflected in the quality and number of details generated by the models. Unique objects (such as buildings with landmarks) are best modelled by hand, and usually do not need a procedural approach, since it is often not possible to automate any modelling tasks on this object.

2.2 City Engine

One of the software for modelling of 3D objects using procedural modelling is ESRI CityEngine. It is a modelling software that is suitable for modelling cities, as it works closely with data from geographic information systems. Among other things, it allows you to maintain (edit and update) 3D city data, save changes directly to a geodatabase, share created model via the web interface. It relies on three key topics: feature geometry, attributes, and procedurally defined rules. The program uses the CGA Shape Grammar programming language to define rules for generating a 3D model. Instead of a classic user intervention that manually interacts with 3D geometry models and models, the task is described in an abstract set of rules.

Commands listed in the CGA CityEngine form grammar, such as "extrude", "split", or "texture", are widely known commands in most 3D applications, so every user can easily customize and create complex architectural forms in a short time.

The procedure for creating a 3D object is shown in Figure 2. The starting point is loading the background - a shapefile layer that contains the object's position with the attached attribute table. Subsequently, rules were applied to the object, which was gradually extended to other commands.

Figure 2 To create a 3D object model (Source: CityEngine Online Help)

For users who want to control repetitive tasks, create formatted messages in file format, or automate other specific actions, Python Scripting is available to further streamline workflow in CityEngine.

2.3 3D objects presentation

The existence of different formats and scripting languages push web application creators to find and use data presentations that are clearly interpreted by users. Different types of formats exist for 3D data representation and exchange. Some of these are open formats (VRML, IFC, CityGML, Java3D or GeoJSON), formats supported by specific companies (ESRI Shapefile, KML / KMZ, COLLADA, ...), or CAD formats (DXF, DWG, DGN).

COLLADA (Collaborative Design Activity) is a file exchange format for interactive 3D applications. It is defined as an open standard XML schema for the exchange of digital assets between various graphics software applications with .dae (digital asset Exchange) file extensions. It allows you to describe geometry, materials, textures, or animations but does not contain semantics (Zlatanova *et al.* 2012).

KML is the file format used to display geographic data in Google Earth and Google Maps, which has been recognized as the official OGC standard since April 2008 (https://www.opengeospatial.org/standards/kml). KML features use a full-scale coordinate system to locate. Altitudes are not mandatory and use EGM96 when listed. The basic usage of the format is to display geographic data in map applications such as Google Earth, Google Maps and Google Maps for mobile devices.

Multipatch - for storing 3D objects, this geometric type can also be used to represent the surface of a three-dimensional object, including textures (eg buildings or trees). Multipatch geometry can be created by importing an existing 3D model in a different format or using geoprocessing tools (http://desktop.arcgis.com/ en/arcmap/latest/extensions/3d-analyst/multipatches.htm).

X3D (EXtensible 3D Graphics) is a successor of VRML and is an ISO standard (ISO / IEC 19775-1: 2013). It is based on VRML format and corrects its deficiencies and what is important in addition to the original syntax is to use XML-based notation. This allows the programmer to more easily process the document through a number of existing libraries and program APIs to work with XML, easier conversion between formats and so on.

3 Results

Part of the city of Košice was chosen as an area of interest for the solution and one type of apartment building was chosen to create a detailed model.
The basis for creating models is the definition of the input layer - a floor plan that enters as a polygon type. Data on building layouts can be obtained from various sources and ways. Figure 3 describes how to obtain basic spatial data for building locations.

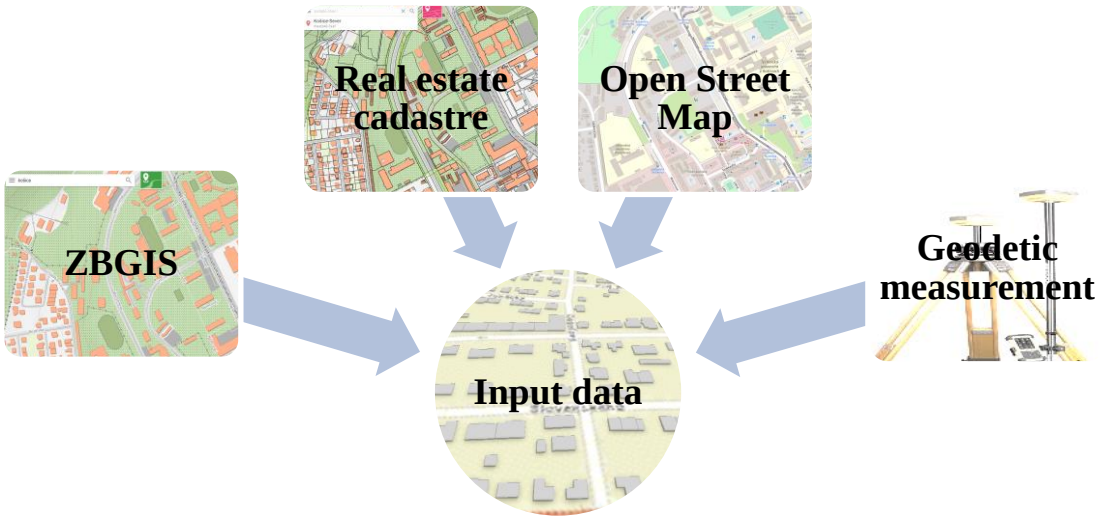

Figure 3 Data sources for creating an input layer into modelling software

The input layer was in the shapefile format, which also contains a table of attributes for the descriptive properties of objects. For each LOD, the attribute table may differ. Figure 4 is an illustration of an attribute table design for LOD 1, and after completing the basic characteristics of individual building roofs in the attribute table, we get an object at LOD 2.

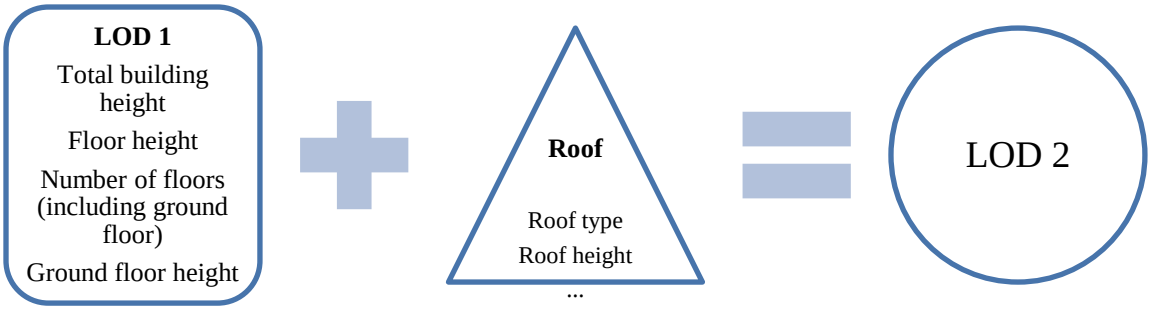

Figure 4 Design an attribute table with object properties

Due to the possibility of connecting the CityEngine environment directly with the attribute table created in the geographic information system, we will be able to quickly generate the basic model of the city, which is also suitable for further use and basic spatial analysis. Based on the input table with the attribute table populated for LOD 1, it is possible to generate models either individually (object designation and rule creation rule), or multiple object designation. all objects in a given layer and assign a created rule and then generate a city model (Figure 5).

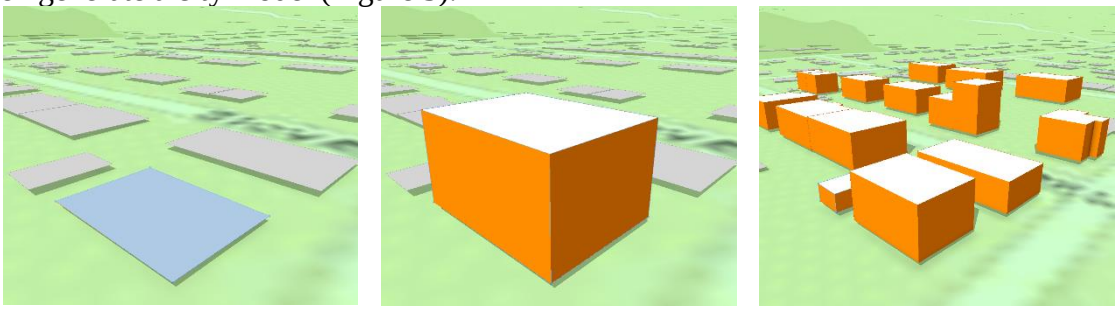

Figure 5 Generating Objects at LOD 1

Figure 6 shows selected possible roof types on buildings. For individual roof types, the table of additional attributes may vary. For the gable, the angle α overhang X and Y are also included between the additional attributes and an angle α overhang is required for the Hip roof type. When these attributes are added, the model created is identical to reality. The offer of roofs is indeed extensive and covers the types of roofs actually used.

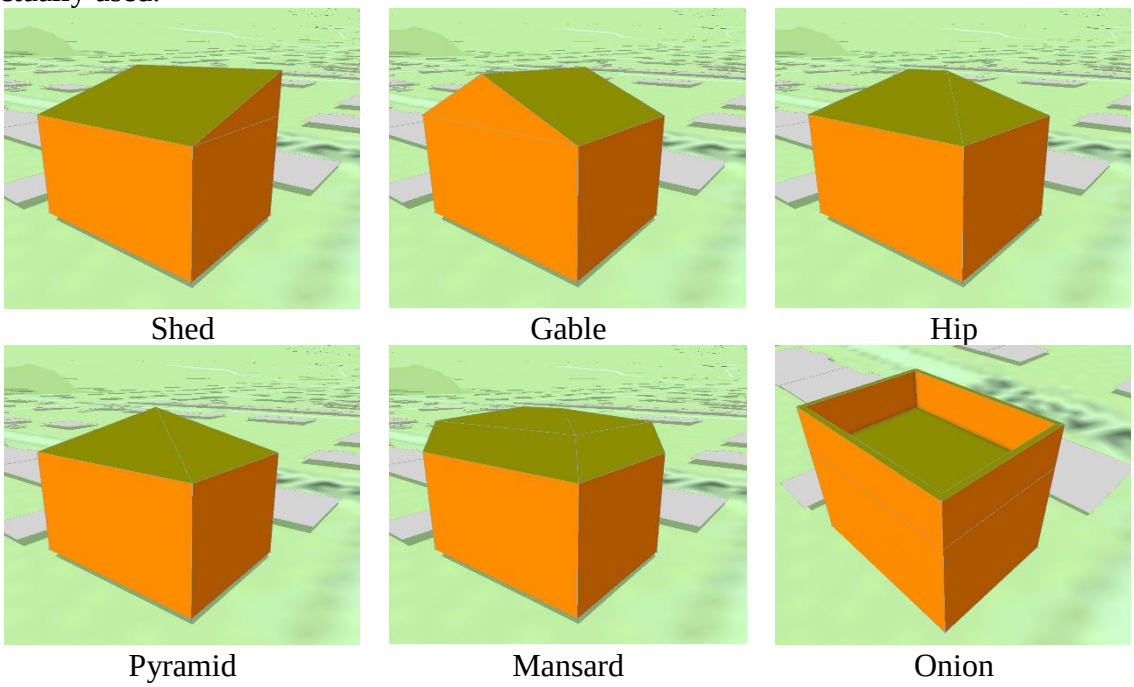

Figure 6 Generating objects at LOD 2 with selected roof type

Level LOD 3 is already more complicated, but on the other hand, it allows a real display of the building. The resulting model can also be supplemented by photo-textures of real construction. It is based on segments that are subsequently used and edited. The created segment (Figure 7) of the balcony can be reused in a given model or in another building model. The foundation is to create one floor and the other floors are basically a copy of the previous one. Separately, the ground floor (if different from the other floors), the last floor and the roof are used. For windows, doors, balconies, the actual measurements taken on the object are used.

After adding the code about the photo texture we get a realistic looking 3D model of the city. Since the building's properties as floor height, the number of floors enter the code as a parameter, it is possible to change interactively and thus change the properties of the building eg. its height, which is useful to analyze for construction planning (hillshade analysis), planting green and so on.

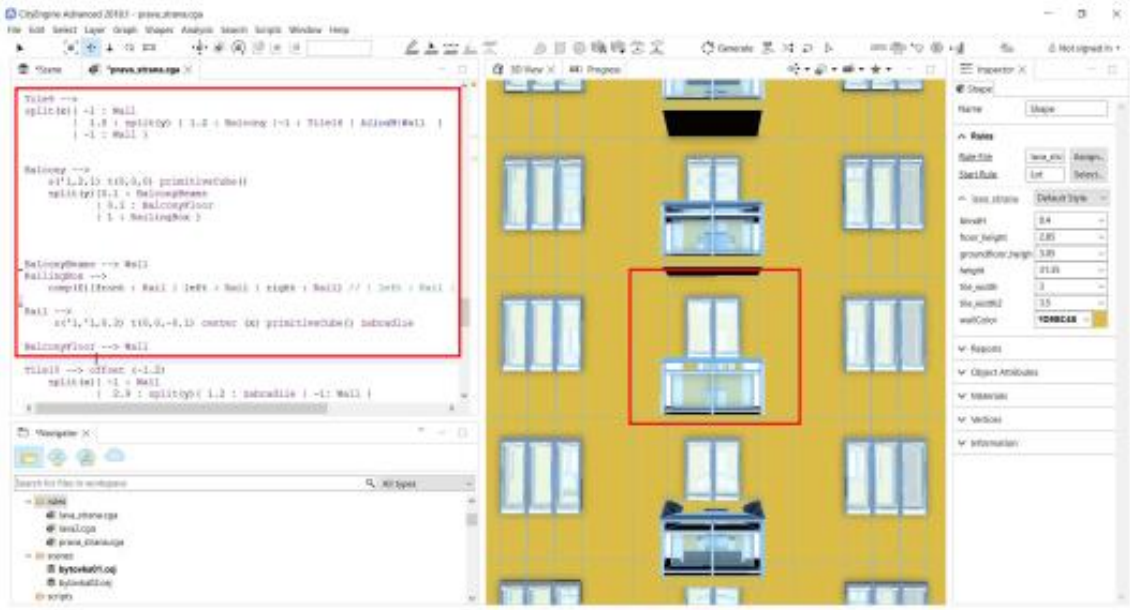

Figure 7 Generating objects at LOD 3; source: (Regecová 2019)

4 Discussion

Currently, 3D models are mainly used for visualization and promotional purposes. This concerns, in particular, the development of tourism as well as the making available of monuments for people with specific needs. Use 3D models to reconstruct damaged or extinct objects and sites for land change analysis. For example, within the potential of tourism development, visibility analyzes are used to estimate the visibility of a particular location - a lookout tower.

Linking 3D object models (creating a spatial model of a city) with geographic information systems brings with it a great deal of usability in practice. Building geometry, along with more detailed information on the properties of building wall materials, population, statics, engineering networks, brings the possibility of extended spatial analysis and thus makes the data more detailed and accurate, thus allowing for better quality assessments and decisions. Applications that use building volume data, number of floors, building type, and other characteristics (such as material information, weather data, energy consumption, and renewable energy sources) that model energy consumption or determine thermal bridges and building envelope losses. The created models can become the basis for informing the public about the upcoming construction with the possibility of interactive demonstration through a website embedded in a real-life situation in urban areas.

The problem today is also increased traffic noise and light smog. The models already developed at LOD 1 are a good entry into simulation programs for noise distribution analysis in urban areas. The challenge for the near future is also the interconnection of 3D models of cities with the land register and the creation of a 3D real estate cadastre. The whole concept of creating a 3d model should be directed towards creating smart cities and smart territorial self-government.

Acknowledgements

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References

Biljecki, F., Ledoux, H., Stoter, J., Zhao, J. (2014) "Formalisation of the level of detail in 3D city modelling", *Computers, Environment and Urban Systems.* Vol. 48, No. 1, pp. 1–15.

Catita, C., Redweik, P., Pereira, J., Brito, M.C. (2014) "Extending solar potential analysis in buildings to vertical facades", *Computers & Geosciences.* Vol. 66, pp. 1–12.

Deng, Y., Cheng, J.C.P., Anumba, C. (2016) "A framework for 3D traffic noise mapping using data from BIM and GIS integration", *Structure and Infrastructure Engineering,* Vol. 12, No. 10, pp. 1267–1280.

Deussen, O., Hanrahan, P., Lintermann, B., Měch, R., Pharr, M., Prusinkiewicz, P. (1998) "Realistic Modeling and Rendering of Plant Ecosystems", In: *Proceedings of the 25th Annual Conference on Computer Graphics and Interactive Techniques*. ACM, New York, NY, USA.

Dimopoulou, E., Tsiliakou, E., Kosti, V., Floros, G., Labropoulos, T. (2014) "Investigating integration possibilities between 3D modeling techniques", In: *Proceedings of the 9th 3DGeoInfo Conference*.

Dobraja, I. (2015) "Procedural 3D modeling and visualization of geotypical Bavarian rural buildings in Esri CityEngine software", In: *Unpublished MA dissertation, Technische Universität München, Faculty of Civil, Geo and Environmental Engineering, Department of Cartography*.

Eicker, U., Nouvel, R., Duminil, E., Coors, V. (2014) "Assessing passive and active solar energy resources in cities using 3D city models", *Energy Procedia,* Vol. 57, pp. 896–905.

Gergel'ová, M., Kuzevičová, Ž., Kuzevič, Š., Sabolová, J. (2013) "Hydrodynamic modeling and GIS tools applied in urban areas", *Acta Montanistica Slovaca.* Vol. 18, No. 4, pp. 91–100.

Kurakula, V.K., Kuffer, M. (2008), "3D noise modeling for urban environmental planning and management", In: *RealCorp 008 : mobility nodes as innovation hubs : proceedings of 13th international conference on urban planning, regional development and information society*, pp. 517–523.

Liang, J., Gong, J., Zhou, J., Ibrahim, A.N., Li, M. (2015) "An open-source 3D solar radiation model integrated with a 3D Geographic Information System", *Environmental Modelling & Software*. Vol. 64, pp. 94–101.

Luo, Y., He, J., He, Y. (2017) "A rule-based city modeling method for supporting district protective planning", *Sustainable cities and society.* Vol. 28, pp. 277–286.

Parish, Y.I.H., Müller, P. (2001) "Procedural Modeling of Cities", In: *Proceedings of the 28th Annual Conference on Computer Graphics and Interactive Techniques*. ACM, New York, NY, USA.

Regecová, S. (2019) *"Hodnotenie Vlastností Objektov Sídelnej Zástavby",* Diplomová práca, Technická Univerzita v Košiciach, Slovakia.

Rybar, P., Taus, P., Rybar, R., Kuzevicova, Z., Rybárová, P., Kuzevic, S., Cehlar, M. (2002) "Utilisation of Flat Solar Collectors in Urban Built-up Area", *Metalurgija-Sisak then Zagreb.* Vol. 41, No. 2, pp. 117–120.

Stoter, J., De Kluijver, H., Kurakula, V. (2008) "3D noise mapping in urban areas", *International Journal of Geographical Information Science.* Vol. 22, No. 8, pp. 907–924.

Tavares, G., Zsigraiova, Z., Semiao, V., Carvalho, M. da G. (2009) "Optimisation of MSW collection routes for minimum fuel consumption using 3D GIS modelling", *Waste Management.* Vol. 29, No. 3, pp. 1176–1185.

Xiong, C., Lu, X., Hori, M., Guan, H., Xu, Z. (2015) "Building seismic response and visualization using 3D urban polygonal modeling", *Automation in Construction.* Vol. 55, pp. 25–34.

Xu, Z., Lu, X., Guan, H., Han, B., Ren, A. (2014) "Seismic damage simulation in urban areas based on a high-fidelity structural model and a physics engine", *Natural hazards.* Vol. 71, No. 3, pp. 1679–1693.

Zahran, E.-S.M., Smith, M.J., Bennett, L.D. (2012) "3D visualization of traffic-induced air pollution impacts of urban transport schemes", *Journal of Computing in Civil Engineering.* Vol. 27, No. 5, pp. 452–465.

Zlatanova, S., Stoter, J., Isikdag, U. (2012) "Standards for exchange and storage of 3D information: Challenges and opportunities for emergency response", In: *Proceedings of the 4th International Conference on Cartography & GIS, Volume 2, Albena, June 2012, Pp. 17-28.* International Cartographic Association.

CityGML | OGC.CityGML. Available at: http://www.opengeospatial.org/standards/citygml

Film-Induced Tourism as a Support of a Tourist Region's Competitive Ability

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Abstract

The list of relatively new forms of tourism also includes film-induced tourism, which developed as a reaction to the popularity of film and television. Film and television can influence both the tourist traffic of a specific place as well as its image, perception, value, and, ultimately, the behaviour of visitors at the specific destination. The aim of this work is to identify the positive and negative impacts of film-induced tourism on a destination. The thesis characterises this new global phenomenon and focuses on selected activities of film-induced tourism, including the positive and negative impacts on the destination's environment. One of the primary results of this thesis is gaining an understanding of the uses of film-induced tourism in the Liberec region and a comparison of the tourist areas of the Liberec region.

Keywords: film-induced tourism; utilising film; positive and negative impacts of film-induced tourism.

JEL Classification: M31, Z32

Article Classification: Case study

1 Introduction

Tourism today is a highly dynamic branch, which means that it deserves due development and care. It is recognised as a separate branch of economics due to its financial impact on economic growth.

Film-induced tourism is categorised among specific forms of tourism. It involves cases in which tourists utilise films for their travel. Occasionally, locations in films are

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attractive to viewers to such a degree that they want to see the specific site themselves or would like to compare the cinematic "pseudo-reality" with the real thing.
Abroad, film-induced tourism has been recognised since roughly the 1990s, when the first study on this topic came out in 1986, authored by J. Cohen. Later, the term was defined by a number of other foreign authors, such as R. Riley, N. Tooke M. Baker, S. Beeton, and J. Connell (Beeton, 2016).

In the last several decades, one can see the growing phenomenon worldwide in which tourists visit destinations that they have seen in films. Tourism literature unequivocally agrees that the target image influences the selection of tourists to a large degree (see, for example, Iwashita, 2006; Hudson & Ritchie, 2006b; Vagionis & Loumioti, 2011

Iwashita (2006) points out that film can increase knowledge about certain aspects of the country, such as it character, culture, and people, which all leads to a positive attitude toward the country. Today, films help people decrease stress and enjoy life. They are also a source of knowledge that teach viewers how to behave in society. A positive attitude toward a country could ultimately lead to a decision to visit that country in person.

Carl, Kindon and Smith (2007) emphasise that leisure time activities such as travel or watching films are highly similar because they offer a temporary reprieve from daily life in the real world. Film-induced tourism attracts throngs of tourists who would like to see the architecture, scenery, or landscapes linked with specific films or who would like to experience the stories and themes linked with the places shown in films in the effort to understand the immeasurable genius loci or consume the intangible cultural heritage of cities or rural landscapes. Tourism is an essential component of a region with a high natural value. (Sakellari, 2014).

This thesis presents a case study of film-induced tourism, its characteristics, and its benefits and impacts on a destination.

2 Material and Methods

Film-induced tourism - visiting places that are or were used in films or are linked to a film (Buchmann et al., 2010) is an international growing phenomenon that is supported by the growth of the entertainment industry as well as the increase in international travel. (Hudson and Ritchie, 2006). Film-induced tourism increases the number of visitors and subsequently the growth of income and employment (Tooke and Baker, 1996; Hudson and Ritchie, 2006) and reduces problems of seasonality (Beeton, 2016). Popular films and places that have supported film-induced tourism include: New Zealand, The Lord of the Rings trilogy – 2001, 2002, 2003) and The Hobbit films – 2012, 2013, 2014) (Beeton, 2016) beaches in Thailand, Notting Hill in London, Ned Kelly in Australia (Beeton, 2016, Frost 2006), Ballykissangel in Northern Ireland, Captain Corelli's Mandolin in Cephallonia (Hudson and Ritchie, 2006).

A number of authors have focused on defining film-induced tourism. A simplified model is shown in figure 1.

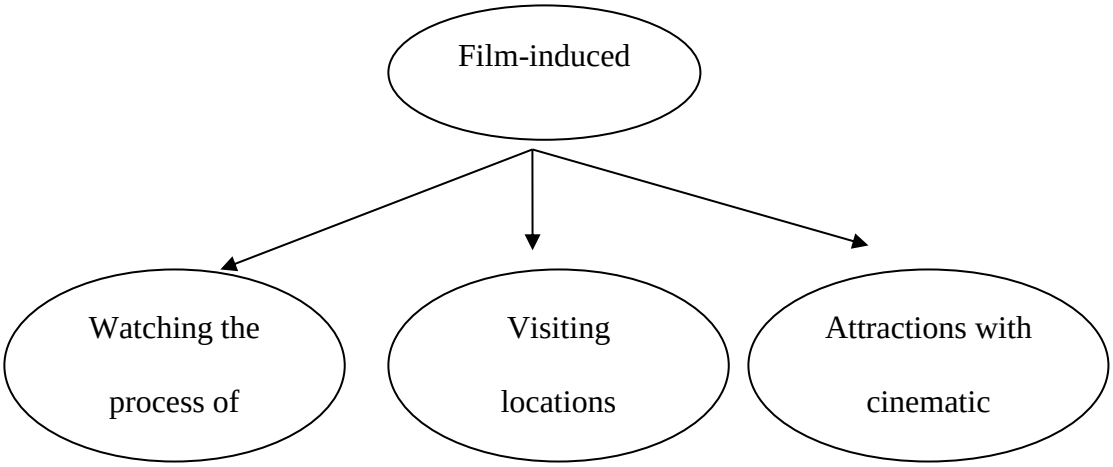

Figure 1 Basic definition of film-induced tourism, source: modified by (Connell, 2012)

Other activities of film-induced tourism include film festivals, film premières, following film celebrities, using film-themed attractions.
Other categories of film-induced tourism are offered by Beeton (2016) and are depicted in Table 1.

Table 1 Forms of film-induced tourism source: Beeton (2016), processed by the author

On-Location	Visitation of filming locations
Commercial On-Location	Guided excursions and tours
Off-Location	Visitation of artificially created locations—film studios
Commercial Off-Location	Thematic amusement parks
Special events	Film premières, festivals
Travel from the home	Television travel programmes, culinary programmes, documentaries

On-Location is the conventional form of travel to actual filming locations that are directly linked to the film. Prior viewing of the film is either the primary motivator of travel or the visit is a part of a holiday. This form also includes following film celebrities, where the tourist visits locations that bear so-called "celebrity status" and seeks out homes where famous figures reside (Hollywood homes).
Some forms of on-location travel also carry the label "commercial." These include, for example, excursions or guided tours of filming locations organised by a specific agency. Commercial or one-time events are organised at a specific location after filming for the purpose of attracting tourists (Beeton, 2016).

2.1 Utilising Film

Film contains properties such as realism, special effects for creating realistic images, photographs, and audio, thanks to which films can transmit events, emotions, understanding, and facts better than other media. Additionally, film can be used as a mode of interaction between societies as a tool for sharing language, traditions, perspectives, beliefs, values, and culture from one culture to another, both at a personal and a public level. Additionally, films work as a socialising agent that represents and tells members of society to become aware of society's goals and values. Television viewers then learn these things unconsciously. (Phomsiri, 2015)

Films become the main tool of awareness of the wonders of the world and excitement about various far-off natural environments that they bring to millions of people (Coates, 1991). After repeated exposure to these things, the desire to see and experience them becomes stronger (Kaufman, 1983). In this regard, films play a key role in influencing the perception of target locations prior to arrival (O'Connor et al., 2010). Films incline to be more successful at attracting film-induced tourists if the story and location are mutually interconnected and if the film reflects an authentic image and captures the essence of a place, whether this is scenery or cultural content (Tooke and Baker, 1996, Grihault, 2003).

Films or television shows can show a wide range of places in a region and increase viewer/potential tourist awareness of them. Through the use of relevant campaigns, it is possible to bring in to a significant amount of money spent by visiting tourists to a region. Linking tourism support campaigns with audiovisual works is an effective manner of promotion for many destinations. Foreign examples (such as Great Britain, New Zealand, Austria's Tirol, or the city of New York, etc.) show that the effects of these links help to significantly decrease the costs of such campaigns and, more importantly, increase their effectiveness.

It was tourism that helped New Zealand rank among economically developed countries in 2014 with an annual increase in the economy by 3.2%. An important factor for this was the cooperation of film productions and tourism organisation in which New Zealand, for instance, published maps identifying the country as "the home of Middle-Earth" and spent additional funds promoting the region so that the impact of the films was maximised (Wolf, 2015, Nunes and Mata. 2018, Strielkowski, 2017)

2.2 Methodology

The methodology of this study was subordinated to the primary aim of the thesis, in which the primary aim is to identify the positive and negative impact on a destination. It was founded on secondary research, in which with the aid of researching domestic and foreign literature, scientific articles from the ProQuest, Scopus, and Web of Science, an information basis was set up for the particular problem. The most important results of secondary research are presented in the introduction and literary overview. Original primary research using the methods of observation and electronic surveys was also used in the processing of this work.

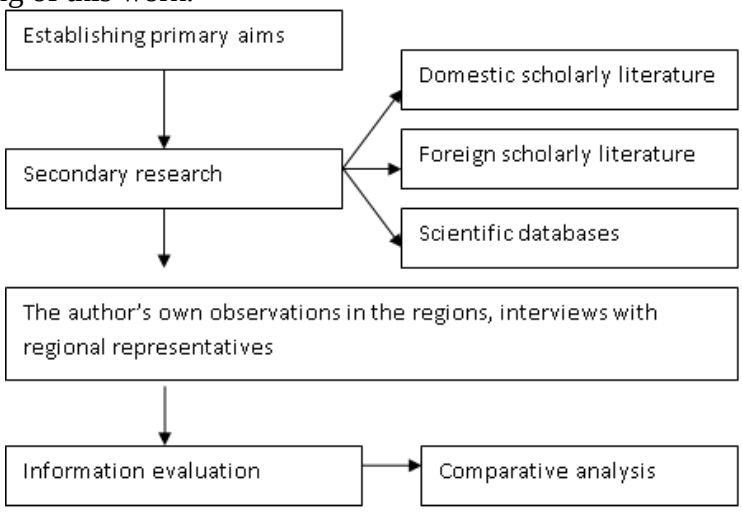

Figure 2 Methodology of this article, source: own processing

For the author's own surveys, representatives of the public administrations of municipalities and cities of the individual tourist areas of the Liberec region were contacted electronically, and, based on the survey, it was determined if they work with film topics, and if so, which materials they offer tourists for promotional purposes. After the above-mentioned data was collected, the information about the regions were examined through comparative analysis.

3 Results

Despite the growing awareness about the relationship between film and tourism, as an unofficial application of film-induced tourism in targeted marketing as well, it seems that the impact of film-induced tourism continues to be undervalued. Film-induced tourism offers locations many advantages and disadvantages. There are three primary benefits of film-induced tourism: **An increase in the awareness of tourism, the increased attraction of individual locations**, and the related **contribution to the viability of tourism** in the form of economic development (residents are presented with new opportunities in the form of new jobs, etc.).

3.1 Positive impacts of film-induced tourism

If film-induced tourism is properly employed, it can provide countries and regions with large financial profits. For instance, in Great Britain, approximately one out of every ten foreign visitors is there as a result of the fact that he/she has seen the country depicted in film.

Economic benefits are in the form of significant sums of money that go to state and municipal budgets. Film crews stay in hotels, eat, hire transport, local crews, actors, and extras, rent locations, etc. Additionally, the economic benefits of the film industry are not limited solely to funds that are spent directly on the production of a film project, but have many indirect impacts on other economic branches in the country where the project is being implemented. These impacts are in the form of increased demand in a range of supplier services as well as services that do not directly relate to the production of the project (the so-called secondary effect).

An increase in the local employment rate Film productions support employment in ancillary services. Jobs that are generated by the productions are further reflected in increase in consumption, and, ultimately, through tax levies as well as in terms of the income of municipal budgets.

Increases in the attractiveness of the region to tourists are evidenced by the above-mentioned popular films that attract an endless number of tourists, for instance, to New Zealand, and have a significant share in the country's economy. Hobbiton alone is visited by approximately 2,050 tourists every day. The government invested roughly 18.6 million dollars into projects for the support of New Zealand as a result of the film. Activities planned around the shooting of a film have moved beyond the scenery in order to support branches such as trades, food, wine, music, and fashion. (O'Connor & Kim, 2014) The given destination in the film then takes on the nature of product placement, or location placement, as it were.

Images presented in film or television productions have the ability to strengthen the brand image, awareness of the destination brand, as well as motivate tourists and the purpose of their visit.

The majority of visitors are attracted by places linked to events described in books or depicted in films and television.

The interest in **seeing the actual shooting of a film itself** continues to grow among film viewers. This provides additional opportunities for destinations to participate in marketing and collaborate with film-makers. Other active phases in terms of marketing are, for instance, guided tours around filming locations, and the support of hotels, boarding-houses, museums, and other structures depicted in films. Last but not least, promotion through websites that provide links to filming locations and/or provide tourist film routes as well (Hudson and Ritchie, 2006).

3.2 Negative impacts of film-induced tourism

The aforementioned benefits also bring a large number of negatives. The growth of tourism at destinations has a negative impact on the environment as a result of increased traffic that can bring about a worsening of air quality and a higher noise level. (Phomsiri, 2015).

The transportation infrastructure is overloaded, accommodation establishments do not have sufficient capacity, and prices at the location increase. The destination is over-commercialised through the film, permanent residents are forced to deal with insufficient numbers of parking spaces and a loss of privacy. Additionally, locations are often not prepared in advance for the volume of new tourists and the market is thus not able to react quickly to increased demand. Or, the destination is, conversely, too dependent on film-induced tourism and has problems maintaining tourist demand in the long term, i.e. during the off season. The destination thus has a difficult task to undertake: maximise economic benefit while minimising damage to the cultural and natural environment, disturbing the peace, disturbing the long-term activities and markets of the destination and good living conditions for the residents (Connell, 2012). In some cases, the depiction of a place in a film can create a negative image.

4 Discussion

This sub-chapter will present a case study of film-induced tourism in the Czech Republic and subsequently in the Liberec region.

Examples from the Czech Republic

A good example of film-induced tourism in the Czech Republic is the product linked to the film Alois Nebel, which was created by the CzechTourism agency in collaboration with the Jeseníky association in 2013 (Kotíková, 2013). The product in question is the mobile application "Průvodce Aloise Nebela" ("The Alois Nebel Guide"), referencing the successful comic and film. The application is a highly original concept, guiding visitors through the Jeseníky area in the footprints of the famous train conductor and the development of his plot through short comics. In each location, there is a prepared route ranging from 3 to 10 kilometres. The locations are highly interesting, and include the spot where gold once used to be mined, a forgotten forest railroad, or places where the witch trials began. A comic book story is tied to each of them. The creators of the original film participated in the creation of the comic. The application contains a map, information about the specific location, its history, etc. Another interesting feature is the option to compare shots from the film with reality. The application is available free of charge in Czech and German versions (Wiglasz, Kubaš, 2013).

An example of effective destination marketing in the Czech Republic includes the films Bobule and 2Bobule, in which filming and the film's release were accompanied by a targeted media campaign. This included such things as news from the filming of the

movie—how filming takes place in a vineyard and interviews with actors. The première itself then took place directly in the region where it was filmed, in Moravia's Mikulov. These films were ultimately a literal invitation to visit South Moravia (Kotíková, 2013).

The director of the information centre in the city of Humpole - famous for the line "Hliník moved to Humpolec" from the film Marečku, podejte mi pero!- also attempted a similar product. The character never appeared in the film, however, he now has a memorial in his city and acts as a mobile guide around Humpolec for tourists. The route is 5 km long, and, via a mobile phone app, Hliník takes visitors to important places around the city- the Hliníkárium, the lookout tower of St Nicholas Church, the Zichpil open air museum, the Bernard brewery store, the Dr Aleš Hrdlický Museum, and Stromovka Park. As a reward after completion, tourists discover in the park what the famous character looks like (Koubová, 2015).

The Liberec region and its tourist areas

The Liberec region includes four tourist areas: Bohemian Paradise, Českolipsko, the Krkonoše Mountains and the Jizera Mountains. Natural formations and noteworthy sites, historical monuments and cultural institutions, and sport complexes and facilities make this territory an important area for recreation and tourism. In terms of tourism, the Liberec region has a rich variety of natural and cultural potential. It offers a large number of cultural-historical structures and expands into five protected landscape areas.

Table 2 A comparison of results source: own elaboration

Region	Region activity	Materials	Filming activity	Utilisation of films
Jizera Mountains	The City of Liberec, Liberec Film Office	www.visitliberec.eu information brochures	The Genius Film Trail, guided tours of city hall "along the footsteps of film"	Film as supplementary communication
Českolipsko	Active	Summer newspapers	Tips for film excursions	Film as supplementary communication
Bohemian Paradise	Active	www.ceskyrajdetem.cz www.cesky-raj.info. Extensive offer of film excursions with a map, all for download at www	Tips for film excursions	Film as primary communication
Krkonoše Mountains	inactive	Map of filming locations created by the CzechTourism agency, available at TICs	-	-

The quality of life of residents of the Liberec region is relatively high, and, in terms of capacity, accommodations and dining options are sufficient for tourists. The Liberec region thus has great potential for tourism development. (Liberec region, 2018)

A total of 250 movies were filmed in the Liberec region. It is therefore difficult to assess which films and which filming locations are key and which should be supported in

the region. Table no. 2 shows the results of observation and electronic surveys from all of the tourist areas in the Liberec region.

Jizera Mountains

The Jizera Mountains tourism region is not active in the support of film-induced tourism. Opened in 2015, the Liberec Film Office collaborates closely with the City of Liberec's department of tourism, culture, and sports. It functions under the city information centre.

The film office boosts the city's image as a sought-after tourist destination, and helps film-makers with filming organisation. (Syrovátková, 2017) Foreign productions in this area are a large boon for the local economy and secondary revenues are significantly higher than, for instance, direct payments for the rental of spaces and buildings. (Langer, 2019). Liberec has created a web presentation that promotes the Liberec region as the ideal filming location. The new presentation allows film-makers to have a better conception of the options that Liberec and the surrounding area offer. "The project presents 40 virtual tours of structures, two time-lapse videos, and two spots produced using a drone," (Pastva, 2019).

In 2015, the film office helped implement three projects, in 2016 eleven projects, and in 2017 six. In 2018, the film office collaborated on seven projects.

In recent years, movies filmed in Liberec include Spider-Man, a series about Albert Einstein, scenes from a film about Milada Horáková, as well as one episode from the Czech detective series, Svět pod hlavou.

The film office helps film-makers choose appropriate locations and coordinates communication with authorities and institutions that are involved in the filming. Activities also include the coordination of filming and regular city activities so that the film has the smallest possible negative impact on residents. (Sacherová, 2019) Furthermore, the office also helps with accommodations and the arrangement of local human resources, such as casting calls and auxiliary work around the film. It also organises press days and works with journalists. The services of the Liberec Film Office are provided free of charge. Thanks to the close collaboration of the film office with the implementation team, the city gains an overview of the individual phases, can help film-makers in getting their bearings in the city, eliminate possible crisis situations, and, most importantly, can negotiate benefits with the production team for additional promotion of the city through film—positive PR, photograph from filing pre-screenings, etc.

City hall states that the most financially successful shooting of a film occurred with Spider-Man—film-makers stayed in Liberec for 21 days in September. "The estimated revenue to the city's economy is approximately 30 million Czech crowns. This includes not only the revenue for city hall, but for other entities as well, for accommodation, service hire, and extras," (Kodymová, 2019).

"Total revenues for the Statutory City of Liberec from filming in 2018 amounted to CZK 2,354,755. This amount includes CZK 1,277,180 for the use of public grounds, CZK 436,575 for car park rental, CZK 141,000 for car park rental, and a CZK 500,000 donation" (Kodymová, 2019).

The city's website, www.visitliberec.eu, contains information for interested parties about which movies were filmed in the city. Additionally, the city of Liberec - in collaboration with the Liberec Film Office and the Liberec region - created the "Genius Film Trail" in 2017 as a support for film-induced tourism, which maps the shooting of the series, Genius, the first live-action National Geographic series in Liberec. The trail guides film fanatics through the city centre and, in addition to film gems, also teaches those interested about Albert Einstein's relationship with the city as well about Liberec's

history. Additionally, the city of Liberec and Liberec Film Office organises "In the Footsteps of Film" guided tours of city hall, and provides information brochures and guided tours of the above-mentioned "Genius" trail. The assessment of activity and support of film-induced tourism can therefore only be highly positive, however, as mentioned previously, the Jizera Mountains tourist region itself does not provide any of its own materials.

Furthermore, the Liberec region's website also offers film excursions titled "Liberec in Film," "In the Footsteps of Princes and Spa Dandies," "Along the Railroad," and "With Krakonoš and the Skiers." The excursions also include many other films that were shot in the region, among other things.

Českolipsko

Českolipsko presents films shot in its region is its Summer Newspaper. The newspaper is provided free of charge, and its three introductory pages are dedicated to film excursions that describe some of the films from the region and their shooting locations. The newspaper contains photographs of some of the places, and can motivate tourists to visit them. Českolipsko earns a positive assessment regardless because its materials for tourists are very well done, it works with the topic of film, and utilises film as good supplementary communication.

For Českolipsko, the Liberec region offers the excursion tips: "On Bike to Krasomila," "Innocence or Temptation?" "On Holiday with an Angel," and "With a Fairy Tale to Českolipsko."

These excursion are inspirations for places where films such as The Proud Princess, Summer With a Cowboy, the fairy tale The Immortal Aunt, and the comedy Holiday with an Angel with Jaroslav Marvan in the main role.

Bohemian Paradise

The extraordinary ruggedness of the the landscape with its characteristic rock formation cities and fauna was the the primary motive for **declaring it a protect landscape area** in the then-republic. In terms landscape diversity, important features include not just the deep forests, but also the systems of ponds along rivers and streams.

Bohemian Paradise contains so many fairy tale filming locations that there are virtually limitless possibilities for film excursions. Excursions with titles such as "Maloskalsko in Film," "Fairy Tale Hruboskalsko," "A Water Goblin! And He Calls Me Fanda," and "To Goldilocks and Máchal" take tourists to almost all of the shooting locations mentioned above, and to many, many more.

Bohemian Paradise promotes its filming locations very well. A large number of films were shot in this region, chiefly fairy tales, which is why tips for film excursions contain primarily excursions for children. On the website, www.ceskyrajdetem.cz, interested parties will find countless film excursions that always offer some sort of trail linked to a specific fairy tale with a description of the places, trail distances, etc. Excursions and maps are available for download. These include such things as excursions with the titles, "To the Bandit's Hideaway to Lotrando," "On Bike Through Hruboskalsko to Prince Bajaja," "With the Devils from Sobotka to Máchal's Mill," and many more. Additionally, Bohemian Paradise also has its own maps for filming locations that are very well done.

Other Bohemian Paradise materials include the "Film Excursions" newspaper, "A Holiday in Bohemian Paradise," and "Fairy Tale Bohemian Paradise," all available for download at www.cesky-raj.info. Bohemian Paradise thus offers an entire range of materials and tips for film excursions and utilises its filming locations as primary

communication. It has a huge advantage in the number of films shot, primarily in the aforementioned fairy tales.

Krkonoše Mountains

The final Liberec region area, the Krkonoše Mountains, is not active in film-induced tourism at all. Although its information centre does offer a well-done map of filming locations, this map was created by the CzechTourism organisation, which provided it to the Krkonoše region. The region itself does not work with film-induced tourism.

On its website, the Liberec region provides inspiration for film excursions with the titles, "Dřepkins!" "In Krakonoš's Footsteps," "Foxes, Mice and Gallows Hill," and "Špindl Film Loop."

The comparison of film-induced tourism support showed that there were two regions with insufficient support: the Jizera Mountains region (with the exception of the city of Liberec), and the Krkonoše Mountains region, where they do not deal with film-induced tourism at all. It would be beneficial for the development of tourism through film-induced tourism to create a catalogue with structures suitable for filming for the Jizera Mountains region, and create a informational tourist leaflet for the Krkonoše Mountains region that could serve as a supplement for marketing communication and inform tourists about filming locations and interesting facts about the best films in the specific area.

5 Conclusion

From the literature review conducted, it can be concluded that if a tourist destination is competitive, it can become a strong brand; however, if this brand does not have a brand, the consumer is not aware of its identity. This absence may lead to a significant loss in potential visitors. One of the ways in which to achieve this strong brand is to utilise film as a support for tourism.

Film-induced tourism is considered an interesting topic that should continue to be studied as a growing item of popularity and expanded worldwide. In many countries, film-induced tourism is utilised as a springboard for generating a large amount of revenue for the country. Film marketing has become a popular tool for promoting tourist destinations around the world.

Popular films can send viewers on a trip with the aim of experiencing the properties depicted in a film (such as scenery, film settings, or landscapes) or share the emotions and views linked to an actor or a story. Film experiences are etched into the memory when tourists link them with settings and events (Iwashita, 2006; Hudson & Ritchie, 2006).

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References

Beeton, S. (2016) *"Film-induced tourism. 2nd ed."*, Channel View Publications.

Carl, D., Kindon, S., Smith, K. (2007) "Tourists' experiences of film locations: New Zealand as 'Middle-Earth'", *Tourism Geographies*. Vol. 9, No. 1, pp. 49–63.

Conell, J. (2012) "Film tourism-Evolution, progress and prospects", Tourism management. Vol. 33, No. 5, pp. 1007–1029.

Frost, W. (2009) "From backlot to runaway production: exploring location and authenticity in film-induced tourism", *Tourism International Review.* Vol. 13, No. 2, pp. 285–192.

Grihault, N. (2003) "Film tourism - the global picture", *Travel and Tourism Analyst.* Vol. 2003, No. 5 pp. 1–21.

Hudson, S., Ritchie, J. B. (2006) "Promoting destinations via film tourism: An empirical identification of supporting marketing initiatives", *Journal of Travel Research.* Vol. 44, No. 4, pp. 387–396.

Iwashita, C. (2006) "Media representation of the UK as a destination for Japanese tourists. Popular culture and tourism", *Tourist Studies.* Vol. 6, No. 1, pp. 59–77.

Kodymová, P. (2019) *"Mysteriózní viktoriánské město s Orlandem Bloomem, Spiderman, Paříž v roce 1940, to vše je pro filmaře Liberec",* Available at: https://www.krajske listy.cz/liberecky-kraj/21433-mysteriozni-viktorianske-mesto-s-orlandem-bloomem-spiderman-na-cestach-pariz-v-roce-1940-to-vse-je-pro-filmare-liberec.htm

Kotíková, H. (2013) *"Nové trendy v nabídce cestovního ruchu. 1. vyd.",* Grada Publishing, Praha, Czech Republic.

Koubová, M. (2015) *"Hliník se odstěhoval do Humpolce, dnes tam dělá turistům průvodce",* Available at: https://jihlava. idnes.cz/hlinik-dela-pru vodce-turistum-v-humpolci-f1e-/jihlavazpravy.aspx?c=A150714_2177050 jihlava-zpravy_mv

Langer, J. (2019) *"Mysteriózní viktoriánské město s Orlandem Bloomem, Spiderman, Paříž v roce 1940, to vše je pro filmaře Liberec",* Available at: https://www.krajskelisty.cz/libe recky-kraj/21433-mysteriozni-viktorianske-mesto-s-orlandem-bloomem-spiderman -na-cestach-pariz-v-roce-1940-to-vse-je-pro-filmare-liberec.htm

Liberecký kraj (2018) *"Liberecký kraj - Krajský úřad Libereckého kraje",* Available at: http:// www.liberecky-kraj.cz/

Nunes, S. A., Soares da Mata (2018) *"Tourist destinations displayed on film and television. influence on their reputation, brand image and consumer choice", European Journal of Tourism Research.* Vol. 20, pp. 129–133. Available at: https://search.proquest.com/ docview/2132561354?accountid=17116,

O'Connor, N., Kim, S. (2014) "Pictures and prose: exploring the impact of literary and fi lm-induced tourism", *Journal of Tourism and Cultural Change.* Vol. 12, No. 1, pp. 1–17.

Pastva, D. (2019) *"Mysteriózní viktoriánské město s Orlandem Bloomem, Spiderman, Paříž v roce 1940, to vše je pro filmaře Liberec",* Available at: https://www.krajskelisty.cz /liberecky-kraj/21433-mysteriozni-viktorianske-mesto-s-orlandem-bloomem-spider man-na-cestach-pariz-v-roce-1940-to-vse-je-pro-filmare-liberec.htm

Phomsiri, S. (2015) "Film tourism and destination marketing: Case studies of in-bound and out-bound in Thailand", *Review of Integrative Business and Economics Research.* Vol. 4, No. 3, pp. 241–249.

Sacherová, P. (2019) *"Mysteriózní viktoriánské město s Orlandem Bloomem, Spiderman, Paříž v roce 1940, to vše je pro filmaře Liberec",* Available at: https://www.krajskelisty. cz/liberecky-kraj/21433-mysteriozni-viktorianske-mesto-s-orlandem-bloomem-spi derman-na-cestach-pariz-v-roce-1940-to-vse-je-pro-filmare-liberec.htm

Sakellari, M. (2014) "Film tourism and ecotourism: Mutually exclusive or compatible?", *International Journal of Culture, Tourism and Hospitality Research.* Vol. 8, No. 2, pp. 194–202.

Strielkowski, W. (2017) "Promoting Tourism destination Through film-induced Tourism: The case of Japan", *Trziste = Market.* Vol. 29, No. 2, pp. 193–203.

Syrovátková, J. (2017) "New Trend sof cooperation in tourism between the private and public sector in the Liberec region", In: *The Poprad Economic and Management Forum 2017*, Poprad, Slovakia.

Tooke, N., Baker, M. (1996) "Seeing is believing: the effect of film on visitor numbers to screened locations", *Tourism Management.* Vol. 17, No. 2, pp. 87–94.

Vagionis, N., Loumioti, M. (2011) "Movies as a tool of modern tourist marketing. Tourism os", *International Multidisciplinary Journal of Tourism.* Vol. 6, No. 2, pp. 353–362.

Wiglasz, R., Kubaš, M. (2013) *"Hlavní zpravodajská relace České televize",* Available at: http://www.ceskatelevize.cz/ivysilani/1097181328-udalosti/213411000100406/obsah /252167-stle-astji-cestuj-lid-do-mst-naten-slavnch-eskchfilm/

Wolf, V. (2015) "Tolkien zachraňuje Zéland. Denně přijedou do Hobitína 2 tisíce lidí", Available at: https://byznys.lidovky.cz/tolkien-zachranuje-zeland-do-hobitina-prijedou-2-tisice-lididenne- p9t-/statni-pokladna. aspx?c=A150109_125217_statni-pokladna_ pave

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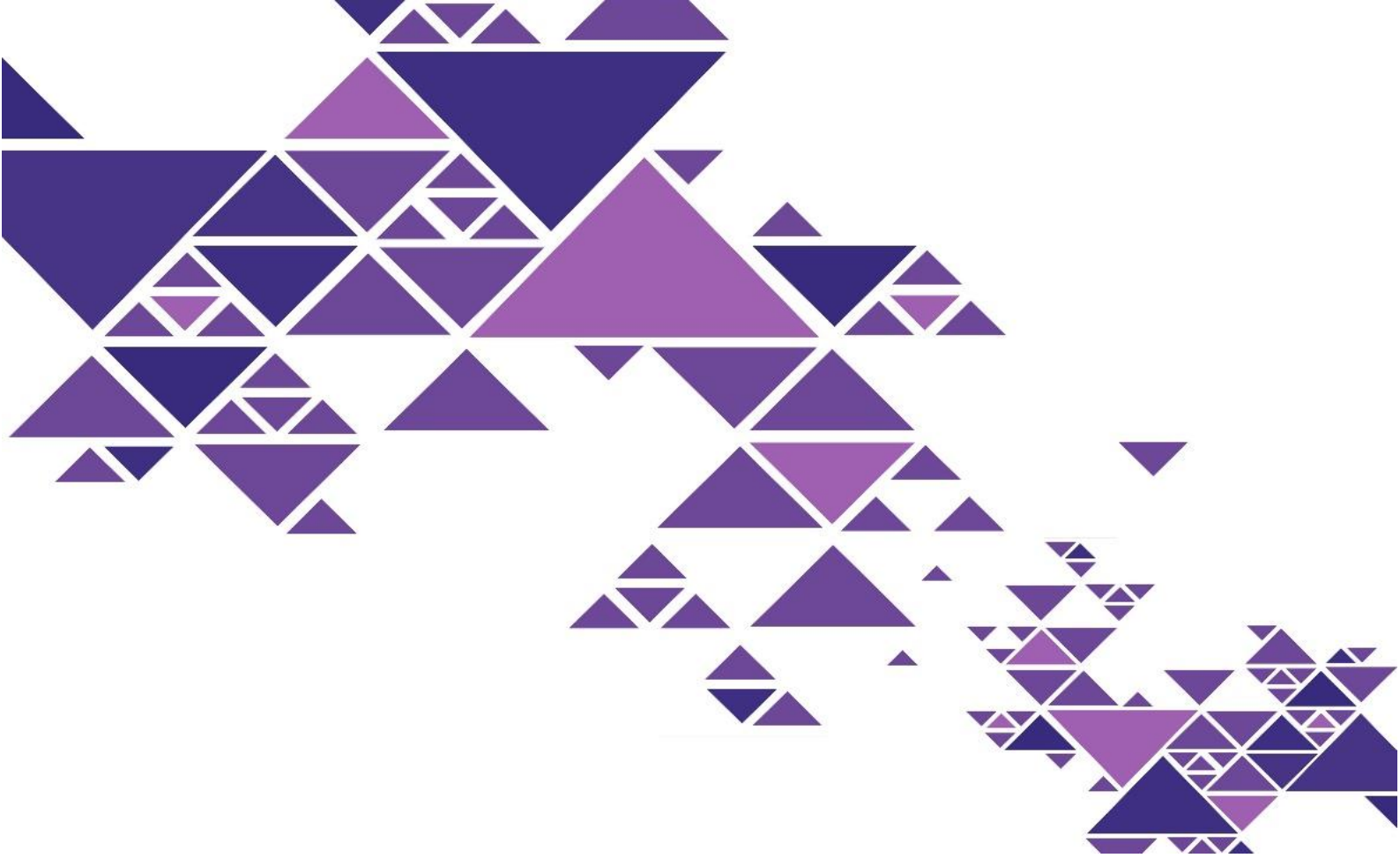

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