



TECHNICKÁ UNIVERZITA VO ZVOLENE



Global Scientific Conference

**MANAGEMENT AND ECONOMICS IN
MANUFACTURING**

**5th – 6th October 2017
Zvolen, Slovakia**

PROCEEDINGS OF SCIENTIFIC PAPERS



ISBN 978-80-228-2993-9



FACULTY OF WOOD SCIENCES AND TECHNOLOGY
TECHNICAL UNIVERSITY IN ZVOLEN
Department of Business Economics

MANAGEMENT AND ECONOMICS IN MANUFACTURING

Proceedings of Scientific Papers

Zvolen, Slovakia

October 5 – 6, 2017

MANAGEMENT AND ECONOMICS IN MANUFACTURING

Proceedings of Scientific Papers

Published by: Technical University in Zvolen
T. G. Masaryka 24, 960 53 Zvolen, Slovakia

Editor in chief: assoc. prof. Andrea Sujová, PhD.

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Edition: 1st, 100 copies

Publishing date: October 2017

Number of pages: 380

ISBN 978-80-228-2993-9

Editorial

The proceedings include selected papers presented at the Global Scientific Conference „Management and Economics in Manufacturing“ as the 10th conference within the series „Business Economics and Management“ which was held in October 5 – 6, 2017 at Technical University in Zvolen, Slovakia. The conference was organized by the organization Wood Congress, a member of the Association of Slovak Scientific and Technological Societies and by the Department of Business Economics at the Technical University in Zvolen.

Global scientific conference „Management and Economics in Manufacturing“ is a platform for presentation of the latest scientific knowledge regarding management and economic aspects of manufacturing. It is addressed to a wide range of academics and researchers from universities and experts from industrial practice. The aim of the conference was the exchange of knowledge and research findings among academic researchers and industry managers, as well as searching possibilities for preparation and solution of common research projects and for innovations and development of university study programmes.

The conference has unfolded within an important framework where new ideas in economics and management have met and developed. I believe that participants have found valuable ideas and inspirations, which can be put into next scientific research and practice. The papers forming the main body of this book demonstrate the most current topics present in our research community.

Editors

CONTENTS

WHAT ARE THE CRITICAL SUCCESS FACTORS OF BUSINESS PROCESS STANDARDIZATION?	1
Jana Ladányi Púchovská, Ján Závadský and Lucia Bartková	
COMPETENCIES OF CONSTRUCTION MANAGERS' PERSONAL DEVELOPMENT	8
Radka Vaníčková	
EMPLOYEE ACQUISITION AND POSSIBILITIES OF SUPPORTING EXTERNAL HR MARKETING IN MANUFACTURING	17
Hana Urbancová and Martina Vlková	
CONSUMER PERCEPTION OF ACTIVE AND INTELLIGENT PACKAGING IN SLOVAKIA.....	25
Martina Kalamárová, Ján Parobek and Erika Loučanová	
CORRELATION OF SELECTED IMS TOOLS WITH SELECTED CORPORATE CHARACTERISTICS IN THE CONTEXT OF CSR.....	31
Jana Jaďuďová, Iveta Marková, Jana Hroncová Vicianová	
THE QUALITY AS A COMPETITIVE FACTOR OF THE SPA DESTINATION.....	38
Katerina Ryglová, Ida Rašovská, Andrea Králíková	
BEST EMPLOYER SURVEYS IN SLOVAKIA: THEIR ROLE IN EMPLOYER BRANDING	44
Jana Fratričová and Zuzana Kirchmayer	
DIFFERENCES IN THE ORGANIZATIONAL STRUCTURE OF FAMILY BUSINESSES IN THE SLOVAK REPUBLIC	52
Mária Moresová, Mariana Sedliačiková and Dana Benčíková	
HOW THE INTERNAL STAKEHOLDERS OF LARGE CORPORATIONS PERCEIVE THE IMPLEMENTATION OF CONTROLLING	60
Mariana Sedliačiková, Mária Moresová and Denisa Malá	
AVAILABILITY OF QUALIFIED LABOUR FORCE AS A LIMITING FACTOR FOR COMPETITIVENESS OF SLOVAK ENTERPRISES	68
Jana Plchová and Martina Kuperová	
DIFFERENCES OF APPLICATION PART-TIME IN EU COUNTRIES, PROS AND CONS.	74
Emil Wojčák and Matúš Baráth	
THE CURRENT SITUATION IN THE SLOVAK MARKET IN THE WOODEN HOUSE SECTOR	82
Marek Debnár, Marek Potkány and Lucia Krajčírová	

IMPORTANCE OF THE E-GOVERNMENT ACT AND ITS IMPACT ON THE MANAGEMENT AND ECONOMY OF THE ENTERPRISE IN THE SLOVAKIA	90
Tomáš Peráček, Lucia Kočíšová and Boris Mucha	
EXPLORING PERSONALITY OF THE BRAND NIVEA: A COMPARATIVE RESEARCH BETWEEN TWO COUNTRIES	97
Lucia Vilčeková	
PSYCHOLOGICAL ASPECTS OF CONTROLLING IN MICRO AND SMALL ENTERPRISE.....	102
Jarmila Klementová, Dana Benčíková and Mariana Sedliačiková	
MOBILE BANKING APPLICATIONS AND SLOVAK CONSUMERS	110
Natália Stalmašeková, Lucia Gašperová and Jana Štofková	
THE GROCERY E-COMMERCE IN SLOVAK REPUBLIC.....	118
Petra Holla Bachanova and Miriam Garbarova	
WOMEN ON BOARDS OF THE TOP 50 NON-FINANCIAL COMPANIES IN SLOVAKIA	125
Mitkova Ludmila and Kottulova Janka	
BENEFITS VERSUS BARRIERS OF CONTROLLING IN MEDIUM ENTERPRISES	131
Slavomira Blahutova and Mariana Sedliacikova	
THE MARKET ORIENTATION AND BUSINESS PERFORMANCE RELATIONSHIP: STUDY OF FOODSTUFF BUSINESSES AWARDED BY QUALITY MARK.....	139
Simona Šályová, Janka Tábovecká-Petrovičová and Alena Kaščáková	
UTILIZATION OF LIFE CYCLE COSTING IN WOOD INDUSTRY	147
Jana Kajanova	
IMPACT OF GENDER AND PERSONALITY TRAITS (BFI-10) ON OPINION LEADERSHIP	154
Frantisek Sudzina and Antonin Pavlicek	
PURCHASING BEHAVIOUR OF E-COMMERCE CUSTOMERS	160
Miriam Garbarova, Petra Holla Bachanova and Lukas Vartiak	
CLOUD TECHNOLOGIES IN EDUCATION	166
Aigul Sadvakassova, Jaroslav Kultan, and Peter Schmidt	
CHANGES OF SELECTED ANTHROPOMETRIC DIMENSIONS OF THE ADULT SLOVAK POPULATION IN THE CONTEXT OF PRODUCTION MANAGEMENT	174
Miloš Hitka, Silvia Blašková, Róbert Sedmák, Silvia Lorincová	
APPLICATION OF MODERN QUALITY MANAGEMENT METHODS IN SELECTED COMPANIES IN SLOVAKIA.....	182
Helena Čierna, Erika Sujová, Ľubica Simanová and Pavol Gejdoš	

THE CHANGE MANAGEMENT OF THE MANUFACTURING PROCESSES IN THE WOODWORKING COMPANY	192
Ľubica Simanová	
APPLYING THE SIX SIGMA METHOD TO IMPROVE THE QUALITY OF PRODUCTION	199
Pavol Gejdoš	
STRATEGIC CONCEPT FOR SELECTED TRANSPORT COMPANY BASED ON FORECASTING PERFORMED BY MOVING AVERAGES MODELS.....	207
Lukáš Falát, Juraj Dubovec and Jana Makyšová	
SOCIALLY RESPONSIBLE BEHAVIOR OF THE CONSUMER FOR ACHIEVEMENT OF THE GOALS OF SUSTAINABLE DEVELOPMENT.....	214
Guzel Tokareva and Olga Shalina, Irina Degtjareva	
THE IMPACT OF AIRLINE AUXILLIARY SERVICES ON THEIR REVENUE MANAGEMENT AND ECONOMIC RESULTS	220
Soňa Hurná, Katarína Teplická and Jaroslava Kádarová	
THE POSSIBILITIES OF ELIMINATION THE INTERFERENCE IN THE LOGISTICS CHAIN.....	225
Žofková, M. and Rašner, J.	
CURRENT APPROACHES TO EMPLOYEE TRAINING AND THEIR APPLICATIONS IN BUSINESS.....	230
Zuzana Joniaková, Jana Blštáková, Ildikó Némethová, Katarína Stachová and Zdenko Stacho	
STABILITY OF THE FOREST AND WOOD PROCESSING SECTOR IN THE CZECH REPUBLIC	238
Dalibor Šafařík, Petra Hlaváčková, David Březina	
PERCEPTION OF CERTIFIED WOOD PRODUCTS BY CONSUMERS IN CZECH REPUBLIC	244
Jakub Michal, Andrea Sujová and David Březina	
NONPARAMETRIC STATISTICAL PROCESS CONTROL	252
Tereza Smajdorová	
KEY DIFFERENCES IN PERCEIVING INNOVATION BETWEEN BUSINESSES WHICH SEE THE STRATEGIC IMPORTANCE OF INNOVATION AND THOSE WHICH ONLY CLAIM TO BE INNOVATIVE	258
Lucia Kohnová and Ján Papula	
IDENTIFICATION OF PERSONNEL CHANGES BASED ON PERSONNEL AUDIT.....	266
Andrea Sujová	
PERFORMANCE AND INVESTMENT EFFECTIVENESS RELATED TO BIOMASS IN MANUFACTURING COMPANY.....	271
Josef Drábek and Martina Kánová	

LEVEL OF INFORMATION SUPPORT FOR MANAGEMENT IN FORESTRY AND WOOD PROCESSING SMALL AND MEDIUM ENTERPRISES	278
Patrik Aláč, Blanka Giertliová, Zuzana Vyhnáliková	
GENERAL PROCESS OF IMPLEMENTATION OF HUMAN RESOURCE OUTSOURCING IN SME'S COMPANIES	286
Marek Potkány, Róbert Kováč, Eva Hvizdová, Katarína Gubíniová	
SELECTED ASPECTS OF CORPORATE SUSTAINABILITY FROM THE INVESTING AND REPORTING POINT OF VIEW	294
Lesníková Petra and Schmidtová Jarmila	
UTILIZATION OF SELECTED SMART DEVICES IN MANUFACTURING PROCESSES	302
Zuzana Závadská, Marek Syč, Veronika Korenková, Ján Závadský	
PREDICTIVE ANALYTICS IN MANUFACTURING	309
Bastian Ringsdorf and Jana Kajanová	
ONLINE PR OF SMALL AND MEDIUM WINE COMPANIES IN SLOVAK REPUBLIC, CZECH REPUBLIC AND GERMANY	314
Lucia Coskun, Branislav Mišota and Jozef Chajdiak	
NEW TRENDS IN QUALITY MANAGEMENT	322
Renata Nováková	
CRISIS COMMUNICATION CONTROLLING	329
Kádárová, Jaroslava, Hurná, Soňa and Teplická, Katarína	
ENERGY SITUATION IN NIGERIA AND ITS INFLUENCE ON SUSTAINABLE DEVELOPMENT DRIVE	337
Donatus A. Okpara, Anna I. Kurbatova and Kapralova Daria O.	
ANALYSIS OF BUSINESS PROCESSES AND PROCESS MAPS	347
Jana Benešová and Jana Kleinová	
INNOVATION OF EMPLOYMENT PROCESS	354
Viktória Hořánek and Michal Šimon	
ANALYSIS OF THE HOUSEHOLD ELECTRICITY CONSUMPTION AS THE ELEMENT OF THE ENERGY CONSUMPTION REDUCTION	361
Marta Piątek and Renata Stasiak - Betlejewska	
HORIZONTAL PRICE TRANSMISSION OF THE MILK MARKET IN THE CENTRAL EUROPEAN UNION COUNTRIES.....	367
Lucia Vargová and Miroslava Rajčániová	
IMPLEMENTATION OF ENTERPRISE SOCIAL NETWORKING SYSTEM IN HIGHER EDUCATION BASED ON OFFICE	365
Martin Krajčík and Michal Greguš	

WHAT ARE THE CRITICAL SUCCESS FACTORS OF BUSINESS PROCESS STANDARDIZATION?

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ABSTRACT

Consistency in operations is necessary for an organization's growth. But it is very difficult to achieve consistency, when employees perform the same task in different ways. As a result, an active Business process standardization community has developed. The aim of Business process standardization is improving the design of business processes - important strategic assets of companies, and then generating standards that reduce costs, improve quality of products and services, collaboration and ease decision making for managers. The purpose of this paper is to enhance the understanding of standardization for inter-organizational business processes. The article introduces Business process standardization – offers the various definitions of process standardization, and formulates a set of research questions to be answered. The paper uncovers factors that influence the Business process standardization, i.e. antecedents of business process standardization, and determine critical success factors of business process standardization. It is the first step towards uncovering the characteristics of successful standardization efforts. The paper findings are based on primary sources analysis of data collected via questionnaire survey.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: Business processes, Business process standardization, Business process management, Standard.

1. INTRODUCTION

“Retail internationalization is not a new topic. Rather, it is one of the most discussed topics in retailing in the last ten to 20 years”, claim U. Johansson and A. Thelander (2009, p. 199). A. Schuh (2000, p. 136) thinks, the opening of economies, the abolition of the foreign trade monopolies and privatization of state-owned companies created a new situation and new opportunities for foreign companies to enter the market. Moreover, J. J. Loyka, T. L. Powers (2003, p. 64) add „the need to maximize long-term profits is causing companies to globalize markets for their products “.

On the other hand, the competitive business environment is characterized with turbulent changes. To remain competitive in current economic climate, any organization needs to focus on cost-cutting and operational excellence through innovation and improvements. If organizations miss a market trend, they lose customers. Therefore, organizations everywhere, of all types and sizes, are under constant pressure to achieve operational excellence by improving their business performance through business processes, measuring themselves against world class standards, and improving their ability to deliver high-quality products and services to customers (Z. Hajdu, M. Andrejkovič, L. Mura, 2014; Z. Tučková, D. Tuček, 2011). Naturally, researchers and practitioners turn management initiatives to business process standardization – BPS.

In the past few years' researchers' interest in business process optimization and standardization have increased enormous, what has resulted in a number of publications in this field. On the practitioners' side – for the upcoming years – business process optimization and standardization is one of the top priorities. Different business process standardization programs have been conducted with a focus on large multinational organizations allowing them to significantly improve the performance of the processes standardized.

Business process standardization aims to make similar business processes in an organization uniform (H. Romero et. al., 2013) and describes the activity of standardizing a business process and it

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means producing goods and services on a consistent basis of rules, policies and procedures, which ensures consistent quality and more customers. In other words, it is aligning of the given business process variants against standard process. BPS is a key ingredient for success for many companies, because it focuses on creating value in organization, and so leads to operational excellence. Also, the authors H. Romero et al. recognize process standardization “as a driver of performance improvements in terms of cost, time, efficiency, effectiveness, quality and responsiveness”. Having standardized processes as the basis for improving organizational efficiency, improves performance, quality of products and services through time-, cost-, and quality- optimal business processes, collaboration, achieves cost savings and eases decision making for managers (D. Tuček, M. Hájková, Z. Tučková, 2013). Some researchers think, only by setting standards it becomes possible to effectively manage a large company and reduce cost. This financial effect of standardization is the one that attracted the most attention. As M. C. Ungan (2006, p. 1) pointed out: “companies in all over the world are spending significant amount of time and money to register with them to improve their operations and increase their business opportunities”. Among the best examples of such companies belongs one of the world’s largest fast food restaurant chain McDonald’s and world’s largest furniture retailer IKEA.

McDonald’s is serving approximately 68 million customers daily in 120 countries across approximately 36,899 outlets. B. Manrodt and K. Vitasek (2004) claim that McDonald’s seek to serve its customers with the same quality product and experience, whether that restaurant is located in Moscow, Idaho or Moscow, Russia” (2004, p. 1). S. Samiee and K. Roth (1992, p. 1) add, “the firm maintains standardised specifications for its equipment technology, product offerings, customer service, cleanliness, value, and operational systems. Though its menus vary somewhat from country to country, its core product offering is consistent on a global basis.”

Next good example of standardization effort is IKEA, which is seen as a model of standardization among retailers. U. Johansson and A. Thelander (2009, p. 214) write, that “company implements a standardized concept of home furnishing retailing around the world with the same type of stores, which are located in similar places, and the same assortment of products with a focus on price and DIY.”

On the other hand, business process standardization is not possible everywhere. As M. Schäfermeyer, D. Grgecic and Ch. Rosenkranz (2010, p. 2) said “a process is successfully standardized if it is processed each time in a predefined optimal way by doing the same activities in the same order producing previously specified output”. However, not every business process is standardisable. There exist some antecedents or drivers, which make the standardization effort successful. According to B. Münstermann (2014) drivers are factors that have an influence on the BPS value creation.

Although, nowadays, several online communities and journals and special issues exist where practitioners can share ideas and collaborate in standardization, there is a lack of issues focusing on antecedents of business process standardization in a literature.

Therefore, in our paper we do a research focused on finding critical success factors or drivers of business process standardization. We ask how it is possible that some companies are successful in standardization efforts and some none. After then, we find out which success factors of BPS are critical for successful implementation BPS.

2. MATERIAL AND METHODS

The presented work is characterized as a theoretical study in which the bibliographical review was the technique used in the search. The searches were performed by combining business processes, business process standardization, business process management and standard. We used textbooks and databases, such as EBSCO, Web of Science, ScienceDirect, IEEE Electronic Library and Scopus, and journals such as Business Process Management Journal, Information systems, The journal of systems and software, Systémová integrace, European Management Journal and System Sciences.

The empirical study was performed by our survey, that took place in two different phases. As a consequence, as preparation for the start of the data collection of the multiple case study approach we conducted a pilot case study - in March 2017 to ensure consistency and reliability. We pre-tested our questionnaire with representants of fifty medium and large companies. In this pilot

phase the survey questions were checked to ensure consistency and reliability. The final quantitative survey was carried out on the 720 companies from Slovakia in April 2017. The overall response rate was almost 5 %, rendering 36 completed evaluable questionnaires.

The questionnaire was distributed via form of Google Docs together with introducing email with aim to invite and encourage companies to participate in the survey. In order to convince companies to participate in our survey we sent an additional reminder. We have seen the using the Google Docs form as a distribution channel of our questionnaire was a right choice. This electronic survey provided many benefits, including simple distribution, simple orientation, flexible questionnaire design, support of different question types, automatic data collection, analysis and evaluation as well.

Subject of the survey were medium and large companies in Slovakia, which belong to secondary a tertiary economic sector. The target population reached 3 067 companies in Slovakia. The database of companies was supplied by Infostat – the Institute of Informatics and Statistics. The survey was conducted on selective sample of 720 companies. The representativeness of selective sample was checked by Pearson's chi-squared test, what is a statistical hypothesis test. The companies were chosen at random. The number of selective sample was chosen by quota sampling of Slovak regions and legal form. The Table 1 and Table 2 show the composition of basic and selective sample and the number of accepted questionnaires according to legal entity.

Table 1 The composition of basic and selective sample

Regions	Basic sample	%	Selective sample	%
Banskobystrický kraj	240	7,83%	55	7,67%
Bratislavský kraj	982	32,02%	230	32,00%
Košický kraj	246	8,02%	58	8,00%
Nitriansky kraj	332	10,82%	79	11,00%
Prešovský kraj	281	9,16%	65	9,00%
Trenčiansky kraj	341	11,12%	79	11,00%
Trnavský kraj	274	8,93%	65	9,00%
Žilinský kraj	371	12,10%	89	12,33%
Sum	3067	100,00%	720	100,00%

Source: Elaborated by the author on the base of the own research.

Table 2 The composition of basic sample and number of accepted questionnaires according to legal entity

Legal entity	Basic sample	%	Selective sample	%	Accepted questionnaires	%
Other partnerships	26	0,9%	7	1,0%	0	0 %
Public Limited Company	695	22,7%	163	22,7 %	13	30%
Limited Liability Company	2235	72,8%	524	72,8 %	31	70%
Cooperative	49	1,6%	12	1,6 %	0	0 %
State-owned enterprise	6	0,2%	1	0,1 %	0	0 %
Other	56	1,8%	13	1,8 %	0	0 %
Sum	3067	100%	720	100%	44	100 %

Source: Elaborated by the author on the base of the own research.

We ask each respondent to identify his or her company by writing the name of company. We have generally assumed that each respondent represents a different company.

The questionnaire was divided into three main parts: questions regarding the process approach, questions regarding topic of survey and identifying questions. It included 16 closed and 8 open format questions to allow the participants flexibility in their responses. In questionnaire we asked a number of questions concerning process approach, several questions about standardization and formulation of standards, success factors and risks link to standardization, and some questions focused on using of software's in BPS activities. The survey finished by establishing background

information - identifying questions about each company, including the determining the economic sector, size of company, its location, property, business entity, annual turnover, and age of company.

From the questionnaire survey our ambition in the paper was to find answers to our research questions, that are written in Table 3 below.

Table 3

No.	Research questions
1.	How many companies from the selective sample are business process oriented and standardize their processes?
2.	What are the dominant success drivers in BPS? Managerial or economic drivers?
3.	What are the critical success factors of BPS?

Source: Elaborated by the author on the base of the own research.

3. RESULTS AND DISCUSSION

This section interprets the results of our survey. The aim of this paper was to explore the antecedents of business process standardization. In addition, this paper provides empirical substantiation and answers to our research questions.

The first question was aimed to find out how many companies from selective sample are business process oriented and standardize their processes. According to survey, only 11,1 % of companies do not standardize their business processes, the rest of companies standardize their business processes (Figure 1).

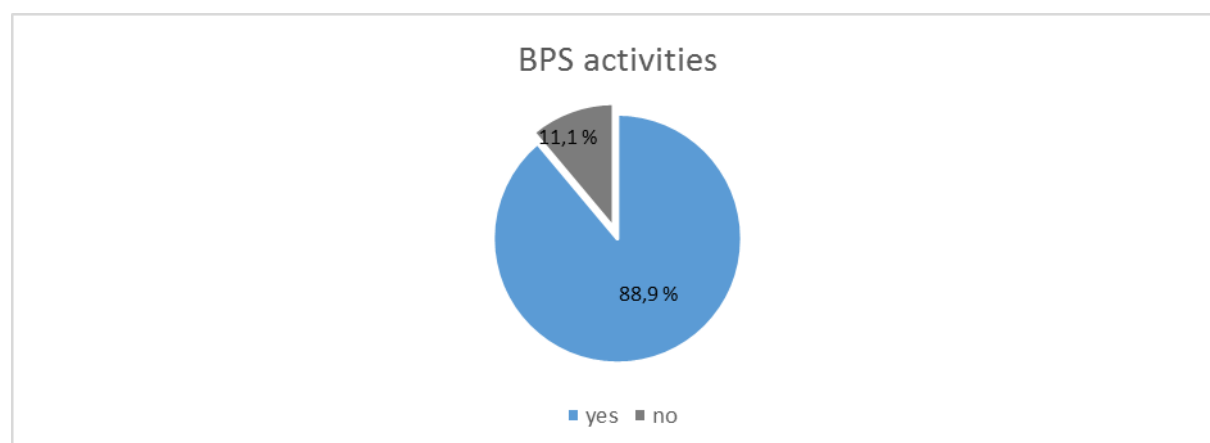


Figure 1 BPS activities in companies

Source: Elaborated by the author on the base of the own research.

Our goal in second question was to find out dominant group of success factors for BPS. It is undoubted that there exist mandatory and unavoidable variations that come from differences e.g. in regulations or involvement of departments, therefore, this situation has definitely an influence on the actual BPS value creation and the level of standardization that can be achieved.

We have divided the success factors to two group – economic and managerial success factors. We chose financial regulations, taxation regimes, import / export regulations, partners financial, economic conditions and other economic success factors as economic success factors, and department involvement, managerial practise, management systems, top management support, communication, organizational structure, employee's involvement, knowledge and qualification of employees, BPM capabilities, involvement of sales and IT department, project management capabilities, senior management governance and other economic success factors as managerial success factors.

While in publications H. Romero et al. (2013) demonstrated mainly economic success factors as the most dominant success drivers, on the contrary other authors such as B. Muenstermann and A. Eckhardt (2009), B. Münstermann (2014), J. Kettenbohrer and D. Beimborn (2014), J. Kettenbohrer, A. Eckhardt, D. Beimborn (2015), M. Schafermeyer, Ch. Rosenkranz and R. Holten (2012) and A. Richen with A. Steinhorst (2005) considered managerial success factors as the most dominant group of success factors of business process standardization.

According to our survey (Figure 2), the managerial success factors reached higher rate than economic success factors. Actually, the average value of economic factors was 102 and average value of managerial success factors was 130.

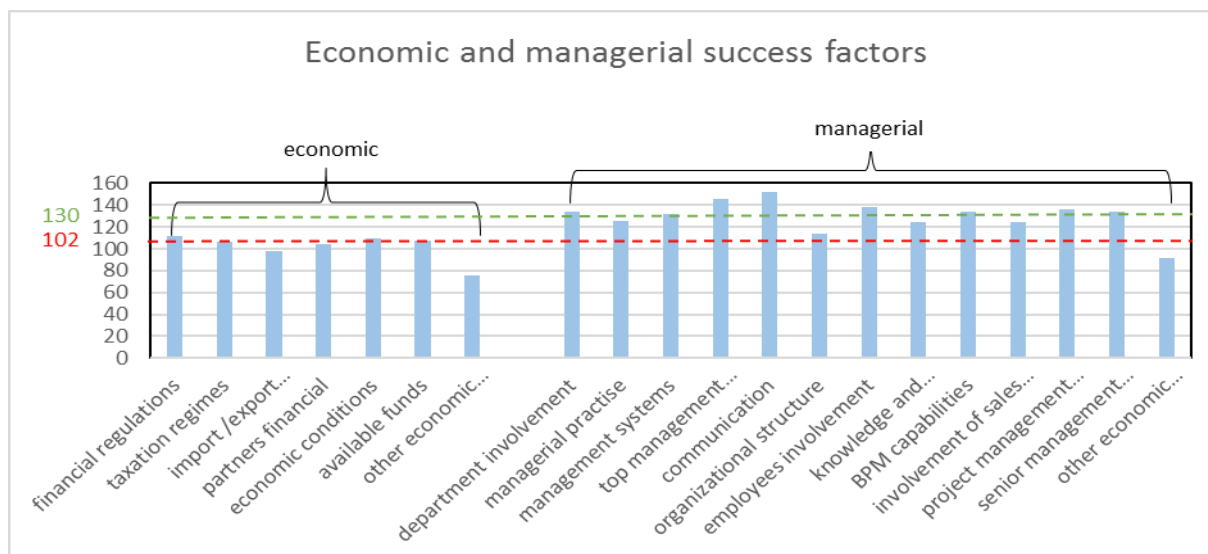


Figure 2 The valuation of critical success factors of BPS

Source: Elaborated by the author on the base of the own research

The third research question, that we were interested in, concerned with critical success factors of BPS. In 2009 B. Muenstermann and A. Eckhardt (2009) described top management support, the early involvement of all departments and the centralized organizational topology as the success factors of standardization. In 2014, according to literature preview, B. Münstermann (2014) found out organizational culture, input, output, sequential variety, BPS initiative execution excellence, software/system introduction and industry/market imperatives as the most mentioned drivers of business process standardization in 119 research publications, which he studied. Next, J. Kettenbohrer and D. Beimborn (2014) outlined factors that inhibit BPS, they were:

- unclear and asymmetric allocation of costs and benefits,
- unclear accountabilities and responsibilities,
- lead of the BPS project by an unexperienced manager who is not involved in the particular business process, insufficient BPM skills,
- missing top management support, conflictive strategic directives,
- and insufficient project budget.

And one year later, J. Kettenbohrer, A. Eckhardt, D. Beimborn (2015) highlighted people oriented success factors e.g. top management support, communication, and involvement of employees.

On the other hand, according to our survey results (Figure 3), the most critical success factors for standardization are communication, top management support, employee's involvement and project management capabilities. Communication is inevitable part of every change in company. Without it, none change is possible. If employees are not informed enough, they do not know what to do and why. According questionnaires, it is the biggest success factor that influences BPS. Next important success factor is employee's involvement. It is linked together with communication. The more and the earlier employees are involved in the BPS initiative the best practices will be taken into consideration when developing the archetype processes. And also, only top management can synthesize internal knowledge and thereby spanning the boundaries between different departments within company and to integrate external knowledge. And the last the most critical success factor is project management capabilities, what refers to an organization's project management practices, experiences, skills and competencies as well as infrastructure, sources and support tools.

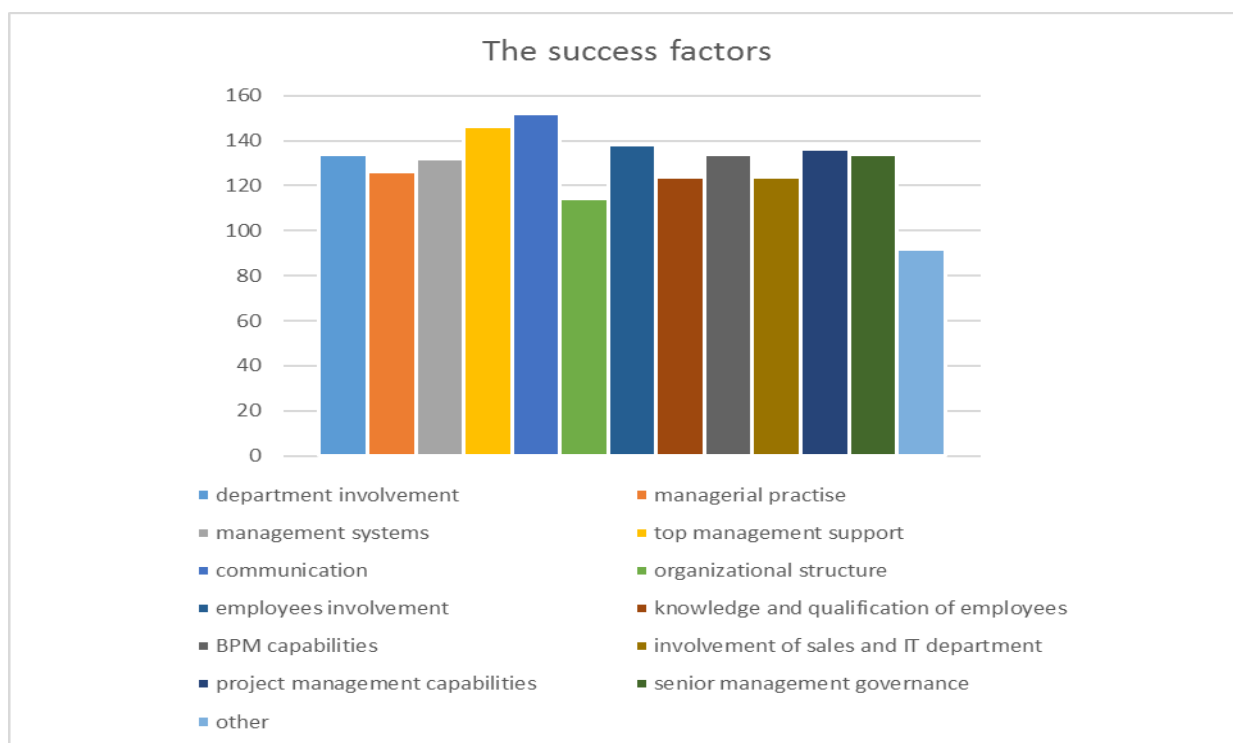


Figure 3 The valuation of critical managerial success factors of BPS

Source: Elaborated by the author on the base of the own research

4. CONCLUSION

A growing body of academic and practitioner literature has researched business process standardization, but there are only few studies that explore antecedents of business process standardization specifically. Drawing on findings from a literature review, we find out the most critical success factors of BPS, which in most BPS initiatives seems to a large extent to determine the level of the process performance improvements achievable. Therefore, we check the compatibility of our drivers with the existing knowledge of prior research approaches.

With this study, we support previous findings of J. Kettenbohrer, A. Eckhardt, and D. Beimbom (2015), which highlighted people oriented success factors as most important factors that have an influence on the BPS value creation. They were communication, top management support and employee's involvement. And also, J. Kettenbohrer and D. Beimbom (2014) outlined factors that inhibit BPS, which we can link with our project management capabilities, that we determined as critical success factor of BPS in our survey.

This research is a first step towards uncovering the characteristics of successful process standardization efforts. On the other hand, there are certain limitations, because our research was made only in middle-sized and large organizations, not in small organizations. This encourages further studies to address questionnaire to small organizations, as well.

As K. B. Manrodt and K. Vitasek (2004, p. 3) said, "standardization become one of the main future research directions".

References

- Hajdu, Z., Andrejkovič, M., Mura, L. 2017. Utilizing experiments designed results during error identification and improvement of business processes. In Acta Polytechnica Hungarica 11(2): 149-166.
- Johansson, U., Thelander, A. 2009. A standardised approach to the world? IKEA in China. International Journal of Quality and Service Sciences 1: 199 – 219.
- Kettenbohrer, J., Beimbom, D. 2014. What You Can Do to Inhibit Business Process Standardization, In Twentieth Americas Conference on Information Systems. Savannah, p. 1-11.
- Kettenbohrer, J., Eckhardt, A., Beimbom, D. 2015. A Theoretical Perspective on Meaningfulness of Work and the Success of Business Process Standardization Initiatives, In 12th International Conference on Wirtschaftsinformatik. Osnabrück, p. 542-556.

- Loyka, J. J., POWERS, T. L. 2003. A Model of Factors that Influence Global Product Standardization. *Journal of Leadership and Organizational Studies* 10(2): 64 – 72.
- Manrodt, K. B., Vitasek, K., 2004. Global Process Standardization : A Case Study. *Journal of Business Logistics* 25(1): 1-23.
- Münstermann, B., et al. 2014. *Business Process Standardization : A Multi – Methodological Analysis of Drivers and Consequences*. University of Bamberg : IGI Global. pp. 448.
- Muenstermann, B., Eckhardt, A. 2009. What drive business process standardization? A case study approach. *International Conference on Information Resources Management* (38): 1 – 12.
- Richen, A., Steinhorst, A. 2005. Standardization or Harmonization? *BPT Trends*: p. 1-5.
- Romero, H., et al. 2013. The development of measures of process harmonization. Beta Working Paper series 415. Academic Press, Eindhoven, pp. 35.
- Samiee, S., & Roth, K. 1992. The influence of Global Marketing Standardization on Performance. *Journal of Marketing* 56(2): 1-17.
- Schäfermeyer, M., Grgecic, D., Rosenkranz, Ch., 2010. Factors Influencing Business Process Standardization: A Multiple Case Study. In *Proceedings of the 43rd Hawaii International Conference on System Sciences*. Hawaii, p. 1-9.
- Schaefermeyer, M., Rosenkranz, C., Holten, R. (2012). The impact of business process complexity on business process standardization: An empirical study. *Business & Information Systems Engineering* 4(5): 261–270.
- Schuh, A. 2000. Global Standardization as a Success Formula for Marketing in Central Eastern Europe? *Journal of World Business* 35(2): 133 – 148.
- Tuček, D., Hájková, M., Tučková, Z. 2013. Utilization level of Business Process Management in Czech enterprises - Objectives and factors. In *E a M: Ekonomie a Management* 16(2): 81-98.
- Tučková, Z., Tuček D., 2011. Necessity of it and sw support for business process management. In *International Journal of Mathematics and Computers in Simulation* 5(1): 45-52.
- Ungan, M., 2006. Standardization Through Process Documentation. *Business Process Management Journal* 12(2): 135 – 148.

COMPETENCIES OF CONSTRUCTION MANAGERS' PERSONAL DEVELOPMENT

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ABSTRACT

The aim of this paper is to propose a competency model that is useful in the management of construction projects. The author suggests development and educational activities characterized by the competencies to promote the development of executive positions of building projects within the meaning of adequate response to the needs and requirements of domestic and foreign markets in the field of construction. Proposed measures is to ensure the effectiveness of the work as the manager of construction projects in the optimal use of competency levels of a manager of construction projects to support the competitiveness of the organization. Description of developmental and educational activities is based on the real exchange rate publicly available in an online database of educational programs at EduCity. A unified evaluation of the optimal level of competence development of the managers of construction projects was approved based on open communication, argumentation and cooperation with managers of construction projects.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Keywords: Project manager, managerial competencies, emotional intelligence, soft and hard skills, construction projects.

1. INTRODUCTION

Modern publications on control management and development of human resources indicate the exceptional resources of the company human resources as a decisive factor in the success and competitiveness of businesses with the potential for human capital development and career growth with the support and use of educational programs and development activities. Businesses and corporate organizations fail to implement the concept of managerial thinking and decision-making in everyday practice, which invest financial capital unsystematically as well as to employees who are not productive system entirely beneficial (Vaněk & Vaníčková, 2015). Process management and development of human resources is not a simple process in the company (Bonney, Davis – Sramek & Cadotte, 2016) and (Cleveland & Colella, 2016). High cost in the context of business processes should be viewed as an investment in the future that will generate long-term profit to an entrepreneurial entity (May & Stahl, 2017). Dynamic development of the management and executive positions in the role of leaders in the 21st century appeals to qualified executives in the professional management and conceptual skills as well as interpersonal and personality suitable for all levels of management (Karunasena, Rathnayake & Senarathne, 2016). Personality development of a manager being a leader and a competent personality requires willingness and interest in lifelong learning opportunities for personal development and career growth to a higher level of management control of the company (Frankovský, Lajčín & Sláviková, 2012). Considering the importance of human resources has been supported by the rapid development and human development approaches, especially with regard to the competence of management as discussed by Anuar, Scott-Ladd & Mahmood (2016). Current options for management development are varied, but the trend in management education and development continues in generating new concepts (Saini & Soni, 2016). One of the advanced concepts of the competency-based approach on the belief that human resources are a key factor in the success of the company (organization), where the main tool is a competency model usable in many HR processes (Freeman, Coyle & Baggio, 2016). The primary objective is the creation of a competency model of

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managers' competencies in construction projects and development activities as reported by Golini, Corti & Landoni (2017). Development activities will however be effective only if they correspond to strategic objectives, corporate culture and values of the company as seen by Delannon, Raufflet & Baba (2016). The manager of the 21st century has fundamentally the same functions as the person responsible for the success of the organization. However, the issue of injunctions, which are transformed into teamwork and leadership, has undergone a radical change, (Boyatzis, Rochford & Cavanagh, 2017), (Mičík 2016). Both foreign and Czech authors agree that although the management and expertise of hard skills is important, current trend calls for the development of soft skills such as communication (Jackson, 2014), teamwork, motivation, solutions of conflicts and other interpersonal and personal skills of managers (Cefai & Camilleri, 2015). Truneček (2004), an expert in organizational management says that the trend of competency requirements of a top manager puts emphasis on emotional intelligence and creativity. The manager of the 21st century therefore does not use commands and authoritative style, but they give challenges to follow and try to inspire, motivate and lead the objective (Curcio, Malucelli, Reinehr & Paludo, 2016). Owen noted that traditional manager will need to become the leader, who is focused mainly on human resources – i.e. someone who knows the art to manage people, not the subordinates obeying the orders, but followers who follow them voluntarily to and who are willing carry out the manager's vision. The manager must become the one who is able to create an organic and operational team, sharing the same faith, being the first among equals (Owen 2008, p. 9). Morgan (2004) published a paper called 10 principles of a future manager. In the paper, he says that the manager is a dictator, while the leader is a visionary who is trying to communicate with people. The fundamental function of a leader is to remove obstacles to workers for the successful achievement. It further states that it does not need to be an expert on all the available technology leadership, it is sufficient that sense in which the potential for success of the organization as reported by Schoenberger (2016). Finally, the manager must be the initiator and driving force of the team, whose opinions lead to innovation with the help of members and their ideas, trying to avoid the stereotypes. Bancino (2007) in a technical article on Soft skills: The New Curriculum for Hard-Core Technical Professionals discussed technical staff and developing the soft skills. He says that they have expertise at an excellent level, leadership, however, is placing even greater emphasis on efficiency, which is largely influenced by teamwork, communication skills, time management, inspiration and motivation of employees. About the Senaratne and Rasagopalasingam (2016) is necessary transform a manager in a leading position. It is not difficult to identify the competencies required of project managers and executives of building projects, it has been discussed by scientific literature, professional, scientific papers, case studies and a number of useful publications (e.g. Gemmill, 1974; NSP©2014; PMCC©1998; Hrazdilová Bočková, Škoda, et al., 2015; Čambál et al., 2013; Petráková, 2011; Štefánek, Hrazdilová Bočková et al., 2011; Thamhain and Gemmill, 1974; National Qualifications Framework, 2014; NSP, 2014; Morris & Williams, 2012). They offer information on competency model profiles and project managers in specific sectors of the economy. Hroník (2007) states that there is no other instrument than a competency model that would create a single explanatory framework for the selection, evaluation, development and training, or rewarding employees. Construction sector and civil engineering has several curiosities needed to development and acquisition new, purpose-oriented and socially useful projects in terms of quality not quantity of use (Ramos, Mota & Corrêa, 2016). Support for the restructuring of the construction sector and civil engineering is ongoing a process of transformation, adapting to the market, public contract, requirements and wishes of customers, but also stakeholders (Wu, Wang, Zou & Fang, 2016). Changes in personnel management and leadership are the most important factor in the development of contemporary business management especially in the areas of education (Vnoučková, 2016), even though most managers are not sufficiently aware of their necessity (Galang & Osman, 2016). Similar to chapter manager in the leading position describes trends and managers shows that managers as managers, employees should not only follow but also to lead, challenge to follow, motivate and inspire (Tabassi, Roufehaei, Ramli, Ismail & Pakir, 2016). Director Competence model construction companies corresponds with the information, and is formed with an emphasis on balance and complexity manager in the field of interpersonal, managerial, professional and personal skills as a manager to describe the 21st century and respond to trends in area requirements manager in the leadership position, see (Dobrovič, 2012) and (Naik & Bisht, 2016).

2. METHODOLOGY AND OBJECTIVES

The aim of the paper is to describe optimal and realistic levels of competence of manager of construction projects. The main research question is: "Is it possible to streamline the work of managers of construction projects?"

The research question was further developed into several sub-questions in order to design further specifications in the construction industry. Individual research questions were as follows: What competencies should the managers of construction projects have? What is the optimum level of development of interpersonal, managerial, technical and personal skills for a manager of construction projects? What measures are appropriate to develop interpersonal, managerial, technical and personal skills for a manager of construction projects? We analysed a survey of 51 construction enterprises, based on the data analysis of case studies, which were the output of the survey (in KEGA 003DTI-4/2014 project, implemented in 2014 and 2015). We considered the possibility of using the HPI and the MBTI questionnaire as possible tools for the analysis of competencies of project managers in the building industry. The optimum level of development of skills and the real level of competency development manager of construction projects was analysed by HPI and MBTI questionnaires. Based on open communication, argumentation and cooperation with managers of construction projects, it was agreed on a unified evaluation of the optimal level of competence, see table no. 1.

3. RESULTS AND DISCUSSION

A manager is personality that manages and operates on behalf and in the interest of one or more owners of an organization. A person working as a manager is responsible for decision making in managing the project. It is important to find out what the person actually does. The above requirements indicate that the job of the project manager is not narrowly profiled. Knowledge of project management processes, the ability of timely effective detection, correction of risks (Sundararajan & Tseng, 2017) and uncertainties and methods of management and leadership are necessary in during the working life particularly with emphases on continually educate. The project manager should be a strong personality (Wang, Arditi & Damci, 2017). They should be able to integrate the team and be the initial mover of the project towards a specified destination. Properties, crucial for a successful project manager, are the logical derivation of general management characteristics, with special attention to those important due to the specific agenda. Overall, a successful project manager should be charismatic and be able to attract and convince the audience by their opinions and statements. They should be a visionary, able to think conceptually, use controlled techniques of strategic management and think in an open way about change and innovation. The main role of a project manager is to ensure the preparation and implementation of the project by specified demands as discussed in Petráková (2011) and Huňát (2010). Considering the high volatility of the projects, it is clear that there are really high demands for the personality of a project manager. They are based on the developed competences (in terms of qualification) that are required for the performance of the job (Karimi, Taylor & Goodrum, 2017). There are four components of competencies as described in Hrazdilová Bočková, Škoda et al. (2015). Prof. Ali Ja'afari (2003) defined the ideal proportion of individual competencies of project manager in his research as follows: technical skills (26 %), managerial competence (43 %) and soft skills (31 %), (Jaafari and Charband, 2016). Discovering their personality type may cause diversified feelings of a manager, but this finding is necessary for further improvement of their management style. Self-knowledge "me" can predict the behaviour and appearance on the public during working meetings, key consultations and strategic decisions while applying managerial competences and soft techniques.

The aim of this paper is to propose a competency model that is useful in the management of construction projects. The author suggests development and educational activities characterized by the competencies to promote the development of executive positions of building projects within the meaning of adequate response to the needs and requirements of domestic and foreign markets in the field of construction. The aim of the proposed measures is to ensure the effectiveness of the work of the manager of construction projects in the optimal use of competency levels manager of construction projects to support the competitiveness of the organization. Description of developmental and educational activities is based on the real exchange rate publicly available in an online database of educational programs at EduCity.

Table 1 Optimal and realistic levels of competence of construction managers' personal development

Identified competencies	The realistic level of competence	The optimal level of competence
Communication skills	3	4
Empathy	4	3
Teamwork	2	4
Planning and organizing	3	4
Controlling	4	3
Leadership	3	4
Using a PC	4	3
Technical knowledge	4	4
Marketing and business knowledge	3	3
Maturity and self-control	2	3
Flexibility and Performance	4	3
Dealing with problems	4	4

Source: Author

Table 1 shows levels of competence development of managers of construction projects on a scale ranging from 0 (poor) to 4 (excellent level). Categories of interpersonal competencies are characterized by communication skills, empathy and teamwork. Managerial skills include planning and organizing, controlling and leadership. Vocational skills are divided into three sub-competencies including using a PC, technical expertise, marketing and business knowledge. Personality competence reflect maturity and self-control, flexibility, performance and dealing with problems. Competencies that are below optimal levels of development, should be paid more attention, as suggested by the author of the paper. It is important to choose an appropriate method of training and development, as shown by the competency model.

Communication skills are seen as the responsibility that managers of construction projects use in daily communication with their employees, customers, and also investors. For the project managers, the communication skills should be the most important at an optimal level of competence, therefore, author of this paper recommend completing four educational and developing courses on: rhetoric, study Czech, body language and etiquette, the participant will learn the art and culture of the spoken words, working with voice detect body language (e.g. halo effect, facial expressions, gestures, haptics) and remove the negative factors in nonverbal communication. Training and development course offers an interactive way through a workshop taking eight hours. The course costs 207,5 Euro.

An effective communication course is suitable for participants who learn to verbally express in a positive context and adapt to communicate with subordinates. The course takes 4 hours. It costs 83 Euro.

The course of argument is based on a case study including participant's feedback to be acquainted with the principles of open communication, learn how to choose a suitable argument and how to respond to it adequately. It takes 8 hours, and it costs 132 Euro.

Another course is the course focused on negotiation. It helps reveal the mechanisms and communication strategy for negotiation. Project manager familiar with practical techniques and best practices to detect manipulation in a timely and effective way to prevent it. The course takes the form of neuro-linguistic programming taking 8 hours. The course fee costs 170 Euro.

The course, which focuses on communication skills, negotiation and persuasion, is offered to participants through a workshop to learn how to convince the communication partner orientate themselves in negotiation processes and procedures. It takes 15 hours at the course price is 340 Euro.

The course of assertive behaviour is recommended for applicants who are interested in assertiveness techniques and skills, to be able to receive and give criticism and appreciation and to recognize the source of conflict. The course takes the form of simulation exercises taking 8 hours. It costs 124,50 Euro.

Lecture on dealing with conflict situations is aimed at constructive approach to the solution of conflicts, choosing the optimal communication strategies in conflict, finding the causes of conflict and the impact on staff efficiency. It takes 15 hours and the fee is 223 Euro.

To achieve an optimum level of development competency, the author of this paper suggest taking a course of empathic communication, where the participant can improve their empathic skills, learn the rules of effective listening usable in the premises of the employer's workplace in the context of interpersonal relationships. The course takes the form of discussions and e-learning taking 7 hours. It costs 109 Euro.

The course of presentation and behaviour is aimed at training participants to act self-confidently and self-assuredly in public, such as before the employees of the organization. The course takes three hours . It costs 72 Euro.

The course of awareness of the importance of teamwork, assumptions, effective teamwork, tasks of a manager in team management and ways to use the potential of employees. The course takes the form of outdoor-training taking 2 days. It costs 223 Euro.

The optimum level of managerial functions of planning and organization necessary for a manager of construction projects shows the effective organization of staff and resources, appropriate formulation of strategic plans and prioritization of tasks. The course is recommended for effective decision-making participants who are interested to learn how to recognize the particular problems of the building project and how it is evaluated. Training course contributes to clarify the situation easily and to transparently identify the priorities. The form of the course is interactive, length and structure can be adapted to the needs of the project manager. The course fee is 238 Euro.

The course of planning and organization acquaint participants with the various phases of the planning process, learn to coordinate human resources and human potential through achieving corporate goals, prioritize individual tasks and optimize critical path to the success of the organization. It takes 15 hours. It costs 211 Euro.

The course of effective management of meetings is offered to participants who want to learn to prepare a working meeting according to a senior position in the organization's management, how to overcome the routine ways of conducting meetings and conceptual thinking how to exploit the potential of participating employees as a way to monitor the flow of ideas and how evaluate the working meeting. It takes 3 hours, the course price is 57 Euro.

Within the course of strategic management participant should be familiar with the basic concepts, methods and techniques of strategic management, learn to analyze the state of management processes in the organization and design expected of strategic conceptual changes. Finally, attention will be paid to the creation and implementation of new strategies in the organization. It takes 24 hours and it costs 283 Euro.

The aim of the training course of time-management is to diagnose weaknesses in time management, planning and postponing tasks. Course participant will improve prioritization in the work process, use biorhythms and energy cycles as a planning tool and a method of short-term and long-term planning. It takes 7 hours at the course fee is 76 Euro.

Mind mapping leads to efficient planning of project activities and operations, faster memorization and decision making in construction designing. It takes 14 hours and it costs 219 Euro.

The lecture on rational decision making and dealing with problems should teach the participant to prioritize each task, to formulate clear and measurable objectives, to choose the right decisions with acceptable risk, to find the cause of the problem and to prevent potential failure. It takes 12 hours and the course fee is 272 Euro. In the context of competitiveness and sustainability of effective employee motivation the author of the parer recommend completing the following courses. Lecture on leadership and inspirational thinking. During the lecture, the participant clarify the differences between management and leadership, identifying their own potential as a leader and detecting when being a manager and when a leader. The participants of the lecture learn to communicate, collaborate and lead the team as a leader. It takes 21 hours, the course price is 324,5 Euro.

Lecture on management economics and marketing is also useful. The aim of the course is to explain the structure of financial statements (balance sheet, income statement, cash flow) and their use in the management of the company. Participants will learn the basic principles of investment decision, risk and profitability. Practical knowledge will be used in marketing and management of the company

on the market. The course uses the method of brainstorming and group discussions. It takes 14 hours, the course price is 241, 5 Euro.

Lecture on a brainchild teaches a participant how to work with information in managerial practice how to use visual thinking and techniques to develop creativity and what impact has the creativity, work and personal prosperity. The aim of the course is to enhance personal productivity and streamline workflow. It takes 14 hours, the course price is 219 Euro.

The Mind maps course is described within the competencies of planning and organizing.

Anti-stress program course is aimed at discovering the causes of stress, phases and useful levels of stress. The participant will be guided to self-knowledge and to find out what are the positive and negative stress triggers and could prevent stressful situations. It takes 14 hours, the course price is 143 Euro.

Part of the job performance of the project manager include using a PC, such a design of the documentation and drawings, MS Office and budget programs. The course of MS Excel Advanced is focused on computing, database creation, graphs and data protection and linking tables. It takes 16 hours and the course costs 124,5 Euro.

The MS Word course for advanced teaches skills which will enable the participants to use the professional formatting of the text, work with styles, use multilevel numbering, creating footnotes, graphs and hyperlinks. It takes 16 hours and it costs 124,5 Euro.

MS PowerPoint course for beginners gets the participants acquainted with the syllabus and text, layout, design and moving images, annotations, clip art and graphs. It takes 8 hours and it costs 75 Euro.

The prerequisite of a competent management company is an overview of financial management, implementation of new technologies and finding new orders and business opportunities. Interviewee's project managers control the marketing and sales knowledge to the optimum level, however, the issue of budgeting and performance evaluation of the firm is convenient to supplement and broaden the scope of at least seven hours for the course fee of 128 Euro. The optimal level of competence maturity and self-control should be based on a positive approach, motivation, coping with stress and behaviour in accordance with ethics. The author of the paper recommend completing the following development activities focused on self-knowledge and self-management, i.e. an analysis of their own skills, assertiveness, identifying strengths and weaknesses of their personality, setting personal and professional priorities, controlling emotions, coping with irrational thoughts and positive thinking. The course takes the form of coaching and group discussions. It takes 24 hours and the price is 313 Euro.

The course of motivation and confidence will teach the participants the basic techniques and principles of motivation. It will help delete a foster personal barriers and internal blocks that lead to the inability to achieve our goals. Participants will learn to appropriately set goals and meet them. It takes 7 hours at the course price is 132 Euro.

The level of competence and performance flexibility is reflected in the level of development of creative thinking, motivation, prioritization and time-management. Analyzing project managers achieve an optimum level, handle unexpected tasks, evaluate their successes and failures in order to improve and complete the planned activities. Interviewees project managers have the competence to control the level of superior or excellent, located at an optimum level of development and manage to identify problems in achieving the objectives, check the organization's activities and adhere to deadlines without significant problems. Lecture on rational decision making and dealing with problems is designed for participants who learn to prioritize each task to formulate clear and measurable objectives, to prevent the potential failure to diagnose problems and take appropriate decisions with acceptable risks. The course takes 12 hours and its price is 272 Euro.

4. CONCLUSION

In current environment, a profession of a project manager is becoming increasingly important. Each project, like any other business type, has its own organizational structure and defined rules of decision making, seniority and subordination, collective bargaining and ways task management. Quality level of project management include detailed methodology and rules that fully depend on people who desing the sub-organizational structure of the individual project. Although a detailed look

and everyday routine assignment of tasks is necessary, the performance of the project manager, is vitally important for the success of the project and success of the project depends on the work of the whole project team, which is the result of the work of individuals and small workgroups. The uniqueness of the project, as the original process without repetition, also places emphasis on a clear allocation of management authority and the decision-making ability.

In view of the enterprise as a whole, it is necessary to discuss the question which competence is important for the managers in terms of achieving the objectives of the company? Managerial competencies, like the managerial role are modified depending on the level of management. They also often also depend on the focus of the organizational unit. It is useful for an enterprise to define core competencies of managers. The key managerial competencies are defined as the competencies that are common to all enterprise's managers as reported by Čambál (2013). Petráková (2011) specifies the specific competencies of project manager of the construction project. Interest in the role of project manager and aspects of his competency is not a new topic. The roots of this problem go back to the turn of the 50s and 60s of the 20th century. At that time, the first scientific papers were published in Harvard Business Review in 1959 and in 1967 discussing the issue. Since that time, a huge number of papers has been written in journals about project management and about what is necessary to become an effective project manager (Turner, 1993, Turner & Muller, 2010). Initial reports about the project management based on scientific research began to appear in the early seventies (Kentoš & Sláviková, 2013). They were mainly based on the results of research of Thamhain and Gemmill (1974), who dealt with the skills and performance of project managers.

The project manager is still confronted with other people, mostly the members of the project team, who are influenced by the attitude and approach in communication to them. Experience with the ideal type of project manager suggests that purely technically oriented expert as project manager performs worse than a manager with good skills in organizing, negotiating and communicating. Only a small group of people have a natural aptitude for understanding of mental feelings of other people and can adequately respond to them. This character trait provides an advantage in negotiation with people. Although no one is perfect, a possible solution to improve the skill of the project manager is to study psychology and psycho-diagnostics. The results show the state when the interviewed project managers realize the importance of a professional competence, but also an interpersonal competence, management and personality. An optimal level of communication skills, teamwork, problem solving and leadership deemed the highest priority competence in senior management positions in project management. Created competency model is a user-friendly, efficient and useful tool that suggests appropriate developmental activities and contributes to the development of the competencies of managers of construction projects.

Acknowledgement

The contribution is a partial output of KEGA 036UKF- 04/2014 - 2015.

References

- Anuar, A. M., Scott-Ladd, B. & Mahmood, A. (2016). An exploration of organizational learning perceptions and understandings in Malaysia. *International Business Management*. 10 (4).
- Bancino, R. (2007). *Soft skills: The new curriculum for hard-core technical professionals*. *Techniques*, 82(5), 20-22. Available at: <http://search.proquest.com/docview/216119257?Accounted=14965>.
- Bonney, L., Davis-Sramek, B. & Cadotte, E. R. (2016). "Thinking" about business markets: A cognitive assessment of market awareness. *Journal of Business Research*. 69 (8), 2641-2648.
- Boyatzis, R. E. (1982). *The competent manager*. New York: Wiley.
- Boyatzis, R., Rochford, K. & Cavanagh, K. V. (2017). Emotional intelligence competencies in engineer's effectiveness and engagement. *Career Development International*. 22 (1), 70-86.
- Cefai, C. & Camilleri, L. (2015). A Healthy Start: Promoting mental health and wellbeing in the early primary school years. *Emotional and Behaviour Difficulties*. 20 (2), 133-152.
- Cleveland, J. N. & Colella, A. (2016). Criterion validity and criterion deficiency what we measure well and what we ignore. *Corporate Ownership and Control*. 13 (2), 473-477.
- Curcio, K., Malucelli, A., Reinehr, S. & Paludo, M. A. (2016). An analysis of the factors determining software product quality: A comparative study. *Computer Standards and Interfaces*. 48.
- Čakrt, M. (2012). *Personality typology for managers*. Prague: Management Press.
- Čambál, M. et al. (2013). *Management of the company. Key managerial competencies*. Bratislava: Slovak University of Technology.

- Delannon, N., Raufflet, E. & Baba, S. (2016). Corporate community engagement strategies and organizational arrangements: A multiple case study in Canada. *Journal of Cleaner Production*. 129.
- Dobrovič, J. (2012). Management Trends in Slovakia's Tax Revenue Administration and Its Process Model for Slovakia's Economic Performance. *Conference on Management 2012: Research in Management and Business in the Light of Practical Needs*. Prešov: University of Prešov. 266-271.
- Duncan, W. R. (2014). *Project Manager Competence and Competencies*. 2014. [Online]. Available at: http://www.pmpartners.com/resources/comp_proj.html.
- Edwards, A. & Harris, C. J. (2016). To tweet or 'subtweet'? Impacts of social networking post directness and valence on interpersonal impressions. *Computers in Human Behavior*. 63.
- Frankovský, M., Lajčín, D. & Sláviková, G. (2012). Social Intelligence as a Predictor of Managers Behaviour in Demanding Situations of Managerial Work. *Conference on Management 2012: Research in Management and Business in the Light of Practical Needs*. Prešov: University of Prešov.
- Freeman, J., Coyle, T. R. & Baggio, J. A. (2016). The functional intelligences proposition. *Personality and Individual Differences*. 99.
- Galang, M. C. & Osman, I. (2016). HR managers in five countries: what do they do and why does it matter? *International Journal of Human Resource Management*. 27 (13), 134-1372.
- Gemmill, G. R. (1974). *The effectiveness of different power styles of project managers in gaining project support*. [Online]. Available at: <http://ieeexplore.ieee.org/xpl/abstractAuthors.jsp?reload=true&arnumber=644842>.
- Golini, R., Corti, B. & Landoni, P. (2017). More efficient project execution and evaluation with logical framework and project cycle management: evidence from international development projects. *Impact Assessment and Project Appraisal*. 35 (2), 128-138.
- Hew, T. S. & Kadir, S. L. S. A. (2016). Predicting the acceptance of cloud-based virtual learning environment: The roles of Self Determination and Channel Expansion Theory. *Telematics and Informatics*. 33 (4).
- Hrazdilová Bočková, K., Škoda, et al. (2015). *Competence of managers of national and international educational projects*. Dubnica n. Váhom: Dubnica Institute of Technology in Dubnica.
- Hronik, F. (2007). *Development and training of employees*. Prague: Grada.
- Hronik, F. et al. (2008). *Competency models*. Brno: Theme Press.
- Huňát, A. (2010). *Neuralgic points of management*. 1st ed. Prague: Alfa Publishing.
- Jaafari, A. (2003). *Knowledge Based Economy and POS*. [online]. Available at: <http://www.pmtage.at/cd02>.
- Jaafari, N., N. & Charband, Y. (2016). Knowledge sharing mechanisms and techniques in project teams: Literature review, classification and current trends. *Computers in Human Behaviour*. 62, 730 – 742.
- Jackson, D. (2014). Business graduate performance in oral communication skills and strategies for improvement. *International Journal of Management Education*. 12 (1), 22-34.
- Karimi, H., Taylor, T. R. B., Goodrum, P. M. 2017. Analysis of the impact of craft labour availability on North American construction project productivity and schedule performance. *Construction Management and Economics*. 35 (6), 368-380.
- Karunasena, G., Rathnayake, R. M. N. U. & Senarathne, D. (2016). Integrating sustainability concepts and value planning for sustainable construction. *Built Environment Project and Asset Management*. 6 (2).
- Kentoš, M. & Sláviková, G. (2013). *Get things stress manager*. Brno: Radix.
- Kovács, J. (2009). *Competent manager process*. Prague: Wolters Kluwer.
- Kubeš, M., Spillerová, D. & Kurnický, R. (2004). *Managerial competence: competence exceptional managers*. Prague: Grada.
- May, G. & Stahl, B. (2017). The significance of organizational change management for sustainable competitiveness in manufacturing: exploring the firm archetypes. *International Journal of Production Research*. 55 (15), 4450-4465.
- Mičík, M. (2016). Leadership styles in project management. *Proceedings of the 28th International Business Information Management Association Conference - Vision 2020: Innovation Management, Development Sustainability and Competitive Economic Growth*. 1540-1548.
- Morris, L. E. & Williams, C. R. (2012). A behavioral framework for highly effective technical executives. *Team Performance Management*. 18 (3), 210-230.
- Morgan, J. (2004). *10 principles of the future manager*. The Future Organization [online]. 20. November 2014 [cit. 2016-3-27]. Available at: <https://thefutureorganization.com/10-principles-future-manager>.
- Naik, Y. N. & Bisht, M. (2016). Measuring direct and indirect effects of key competencies on effectiveness of technical managers using structural equation model. *International Journal of Productivity and Quality Management*. 18 (1), 34-52.
- Liu, J., Zhao, X. & Yan, P. (2016). Risk paths in international construction projects: Case study from Chinese contractors. *Journal of Construction Engineering and Management*. *Journal of Construction Engineering and Management*. 142 (6), 050-16002.
- Lu, W., Zhang, L. & Zhang, L. (2016). Effect of contract completeness on contractors' opportunistic behavior and the moderating role of interdependence. *Journal of Construction Engineering and Management*. 142 (6), 04016004.
- National Qualifications Framework. (2014). Project Manager (Code: 63-007-R). [Online]. Available at: http://narodnikvalifikace.cz/kvalifikace-570-Manazer_projektu/kvalifikacni-standard.

- NSP. (2014). [Online]. Available at: <http://info.nsp.cz/>.
- Newton, R. (2008). *The successful project manager: how to master project management*. Prague: Grada.
- Owen, J. (2008). *Three pillars of successful manager*. Prague: Grada.
- Petráková, Z. (2011). *Project Management: management of building projects*. Bratislava: STU.
- Project Management Core Competencies. (1998). [Online]. Available at: <http://www.tbs-sct.gc.ca/emf-cag/project-projet/documentation-documentation/pmcc-cbgp/pmcc-cbgp-eng.pdf>.
- Prokopenko, J., Kubr, M. et al. (1996). *Training and development managers*. Prague: Grada.
- Ramos, P., Mota, C. & Corrêa, L. (2016). Exploring the management style of Brazilians project managers. *International Journal of Project Management*. 34 (6), 902-913.
- Saini, A. & Soni, N. (2016). Role of Emotional Intelligence in Construction industry: A review. *International Journal of Civil Engineering and Technology*. 7 (4), 339-344.
- Senaratne, S. & Rasagopalasingam, V. (2016). The causes and effects of work stress in construction project managers: the case in Sri Lanka. *International Journal of Construction Management*. 1-11.
- Schoenberger, E. (2016). Environmentally sustainable mining: The case of tailings storage facilities. *Resources Policy*. 49.
- Sundararajan, S. K. & Tseng, C. L. 2017. Managing Project Performance Risks under Uncertainty: Using a Dynamic Capital Structure Approach in Infrastructure Project Financing. *Journal of Construction Engineering and Management*. 143 (8), 04017046.
- Štefánek, R., Hrazdilová Bočková, K. et al. (2011). *Project management for beginners*. Brno: Computer press.
- Švecová, V. & Pavlovicová, G. (2016). Screening the Personal Need for the Structure and solving word problems with fractions. *Springer Plus*. 5 (1). 1-9.
- Tabassi, A. A., Roufehaei, K. M., Ramli, M., Ismail, R. & Pakir A. H. K. (2016). Leadership competences of sustainable construction project managers. *Journal of Cleaner Production*. 124.
- Thamhain, H. J. & Gemmill, G. R. (1974). *Influence styles of project managers: some project performance correlates*. [Online]. Available at: <http://www.jstor.org/discover/10.2307/254975?uid=3737856&uid=2129&uid=2&uid=70&uid=4&sid=21105345444223>.
- Truneček, J. (2004). *Knowledge Enterprise in the knowledge society*. Prague: Professional Publishing.
- Turner, J. R. (1993). *The handbook of project – based management*. [Online]. Available at: <http://213.55.83.214:8181/Management/02949.pdf>.
- Turner, J. R. & Müller, R. (2010). Leadership competency profiles of successful project managers. *International Journal of Project Management*. 437-448.
- Veteška, J. (2010). *Competence in adult education*. Prague: University of Jan Amos Comenius.
- Vaněk, J. & Vaničková, R. (2015). Management of the innovation in the company: knowledge sharing or autonomy? *Human Resource Management & Ergonomics*, Žilina: University of Žilina, Faculty of Management Science and Informatics. 9 (1), 97-107.
- Vnoučková, L. (2016). Personality attitudes affecting employee learning and development: Prerequisites of behaviour leading to learning and development. *Quality Innovation Prosperity*. 20 (2), 22-38.
- Vodáková, J. (2013). *Tools for economic governance in the public sector*. 1st Ed. Prague: Wolters Kluwer.
- Wagnerová, I. et al. (2011). *Work and organizational psychology. New knowledge*. Prague: Grada.
- Wang, D., Arditi, D. & Damci, A. 2017. Construction Project Managers' Motivators and Human Values. *Journal of Construction Engineering and Management*. 143 (4), 04016115.
- Wu, C., Wang, F., Zou, P. X. W. & Fang, D. (2016). How safety leadership works among owners, contractors and subcontractors in construction projects. *International Journal of Project Management*. 34 (5).

EMPLOYEE ACQUISITION AND POSSIBILITIES OF SUPPORTING EXTERNAL HR MARKETING IN MANUFACTURING

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ABSTRACT

The company is fully dependent on the activities of people who work in it, since employees constitute a very significant element of the company. However, it is necessary to effectively address them with current vacancies. Every company uses a variety of recruitment methods in order to acquire the most suitable potential candidates. Therefore, the paper aims to identify individual recruitment methods and evaluate their use in the selected companies from the Czech and Slovak Republics in manufacturing. To obtain the results a quantitative research (questionnaire technique of collecting data) was used ($n_{CR}=402$; $n_{SR}=339$). The results have shown that the companies in the both countries use modern recruitment and selection methods and Czech selected companies actively used the personal information system in recruitment of the employees.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: human resource management, HR marketing, manufacturing, potential employees, survey

1. INTRODUCTION

In today's world, every company is entirely dependent on activities of people who work for it. Hence, the success of every company and its competitiveness depend on the working behaviour and results of human labour. Companies know that without human potential they are unable to fulfil their long-term goals. The key source is manpower that cooperates and communicates well within the company. However, every company must be able to retain its current employees and at the same time to acquire talented candidates from the external environment.

Recruiting suitable employees is one of the main factors influencing the subsequent staff turnover (Shipp et al., 2014). It is necessary to put more emphasis on the fact whether the job candidate is the right fit in terms of job description and team culture prevailing in the workplace (Lievens et al., 2007; Van Hoy et al., 2016). Attention must be paid to the recruitment system so that newly hired employees have realistic ideas which are in line with their values (Van Hoyer, Lievens, 2005; Wilding, 2010). Only then they stay for as long as possible. They become a valuable asset with deep knowledge of the company, working processes and contribute to sharing company's mission, vision and strategy, which helps build a strong employer brand (Love, Singh, 2011).

At the beginning of their growth, companies must realize that recruiting new employees is not free of charge. The right selection of employees was, is and will always be difficult. Currently, there are more recruitment methods than in previous years. The most important recruitment methods include job advertisements, employee referral programs, bulletin boards and flyers, cooperation with agencies and other companies (schools), online recruitment (Nikolaou, 2014), advertising in the media and on the Internet, and addressing individuals directly (Breaugh, 2013; Howardson, Behrend, 2014). The fact who selects employees, whether the personnel department or an external recruitment agency, is also important. In practice, both of these methods can be combined effectively.

The most common and popular methods include advertising in the media and on the Internet. The present era is called "the age of unprecedented technological progress". This progress increasingly rapidly changes our view of technology. Many of the best authors deal with these issues, one can highlight the research of Dahling et al. (2013), Zhu et al. (2013) or Nikolai (2014).

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This article aims to identify individual recruitment methods and evaluate their use in the selected companies from the Czech and Slovak Republics in manufacturing. The first part of the article focuses on the theoretical background and comparison of the authors' opinions on the given issues. The next part presents the methodical procedure used to draw up the article. The chapter of "Results" deals with the evaluation of research results. Discussion and Conclusion then summarize the findings of performed studies and connect them with the obtained theoretical knowledge.

1.1 Theoretical Background of the Paper

According to Cocchiara et al. (2016), external HR marketing includes the individual steps of recruitment process, i.e. addressing and acquiring new employees and their selection. These activities are intended to create and promote a good reputation of the company as an employer and to establish a relationship with job applicants mainly through high quality communication (Deprez-Sims, Morris, 2010). Thus, the intention is not only to offer potential employees the same or higher financial remuneration and more benefits, but also to create an acceptable working environment, to sell this information and store it in the public's mind. The target group may include both active and passive candidates (people who are not actively looking for a job).

According to Poeppelman, Blacksmith (2015), the company's reputation as an employer is a set of certain, mostly ungraspable, features and qualities that distinguish the company from its competitors. In most cases, the reputation is co-created by three elements - vision (company's long-term orientation), image (impression from the company) and company culture, which is also confirmed by the research of Van Hove (2013) and Chuang et al. (2013).

One can state that external HR marketing focuses on areas, such as, (1) labour market surveys, (2) discovering potential sources of employees, (3) using a range of public relations tools to strengthen the employer brand, or (4) evaluating the effectiveness of applied procedures and techniques (Deprez-Sims, Morris, 2010). Establishing communication between two parties - the employer and potential job applicants - is described as the essence of employee recruitment (Šikýř, 2012). Such communication aims to inform the job applicants about vacancies and their basic attributes.

An HR strategy must always respond to changes relating to the company's strategy, it must meet the company's internal conditions, but at the same time it must respect the external conditions in which the company operates. HR marketing, employee planning and recruitment must be important parts of the HR strategy. According to Sozen et al (2016), planning of personnel activities constitutes a decision about what activities will be carried out in the future or what changes in the implemented activities will be made within the goals set by the company. The main plan for securing human resources deals with the approach of recruiting employees both from internal and external sources of the company.

Employers should remember that by their employee recruitment process they must meet not only the current need for labour, but mainly the future needs. If employee recruitment is effective, the analysis of jobs and their products (i.e. job specifications and descriptions) must precede its implementation. According to Osoian and Zaharie (2014), the employee recruitment plan contains sources of employee recruitment - schools, advertising, types and numbers of employees to meet the needs, including the time period necessary to implement the employee recruitment programme and plans of how to use the employees (e.g. part-time workers). Such plans include remuneration, development, career plans, opportunities for better education, relocation allowance, and recruitment bonus. Šikýř (2014) states that when the company starts recruiting employees, it sends a signal about its need to fill a vacancy. Then the company expects a feedback from potential job applicants. The employee recruitment methods used in practice include, for example, advertising in the media, advertising on the Internet, use of external services - consultancy agencies, cooperation with educational institutions, labour offices (job centres), trade unions, scientific companies, use of bulletin boards, flyers, employee referral programmes, participation in job fairs, use of models specifying requirements on employees, and selection of potential candidates. According to Howardson and Behrend (2014) or Urbancová et al. (2015), the methods mostly used to recruit employees from internal sources include advertising on the Internet or local bulletin boards, sending out job offers by e-mail, employee referrals, and addressing employees directly in the company.

The methods most widely used to recruit employees from external sources include advertising in the press, on the Internet, on the radio or television, cooperation with schools, labour offices (job centres), recruitment agencies, and addressing individuals outside the company, which is confirmed by Bauer et al. (2004) or Urbancová et al. (2015).

Thanks to the war for talents, which is currently in progress, the company's approach and its attractiveness both internally and externally are absolutely crucial. As a matter of fact, employees do not want to identify only with the job itself, but also with their employer. To sum up, the effective external HR marketing includes much more than just the ability to make the employer more attractive externally or to create a pleasant working environment. Optimally, the HR marketing strategy (both internal and external) should be included in and respected by all other activities of human resource management in the company while using the effective personal system. The chapter of Results evaluates the current situation of external HR marketing implementation in selected companies in the Czech and Slovak Republics.

2. MATERIAL AND METHODS

The theoretical background of the work is based on studies of professional literature and scientific articles. Induction, deduction, analysis and synthesis were used from the theoretical methods of knowledge. Primary data from the selected Czech and Slovak companies that deal with the external HR marketing and operate in manufacturing were obtained using the quantitative research. The questionnaire survey was conducted by electronic means. The questionnaire was completed by mid-level and top managers of these companies. The questions employed specialist terms generally known to the mid-level and top management. For potentially ambiguous questions, terms were explicitly defined. The results are focused on managerial aspects and marginally on economic aspects. The formulation of questions has arisen from the co-operation with the School of Economics and Management in Public Administration in Bratislava.

Of the Czech companies, in total $n = 402$ subjects participated (774 companies were approached, the rate of return on questionnaires was 51.90%). In the Slovak Republic $n = 339$ companies took part in the survey (540 companies were approached, the rate of return on questionnaires was 62.78%). The companies were chosen only for the given research and their composition is random, it does not respect the precise division ratio in the national economy. The questionnaire respected the ethical aspect and the anonymity of respondents.

The composition of companies participating in the survey in the Czech Republic was as follows:

- The business sector: 70.65% private one, 14.43% public one, and 14.93% state one.
- The market in which the company operates: 12.19% local one, 23.63% regional one, 26.37% national one, and 37.81% international one.
- The company is a part of a multinational: 50.00% yes and 50.00% no.
- Company's size: 65.92% in the category of 50-249 employees, 34.08% in the category of 250 employees and more. The survey involved companies in which the HR department is assumed to have already been established, hence the category of 50 employees and more is significant for the survey.

The composition of companies that participated in the survey in the Slovak Republic was as follows:

- The business sector: 77.06% private one, 17.65% public one, and 5.29% state one.
- The market in which the company operates: 8.37% local one, 12.71% regional one, 30.54% national one, and 47.88% international one.
- The company is a part of a multinational: 59.00% yes and 41.00% no.
- Company's size: 67.85% in the category of 50-249 employees, 32.15% in the category of 250 employees and more. The survey involved companies in which the HR department is assumed to have already been established, hence the category of 50 employees and more is significant for the survey.

Given the character of the data, the results were evaluated using descriptive statistics. The research questions regarding the using of the personal information system in employee acquisition and possibilities of supporting external HR marketing were asked. To test the dependence between

qualitative characteristics, 4 null hypotheses associated with the using the personal information system in recruitment in Czech companies were determined.

1. H01: Using of the personal information system in recruitment of the employees is not dependent the area in which the company operates (private, public, state).
2. H02: Using of the personal information system in recruitment of the employees is not dependent on the market in which the company operates (local, regional, national, international).
3. H03: Using of the personal information system in recruitment of the employees is not dependent on the size of the company (number of employees).
4. H04: Using of the personal information system in recruitment of the employees is not dependent on the existence of the HR department.

For the evaluation results, descriptive statistic tools were used, namely absolute and relative frequencies, dependence tests (χ^2 test) and tests of strength dependence (Cramer's V). If the p-value was lower than $\alpha = 0.05$, the null hypothesis was rejected. The scale according to De Vause (2002) was used to interpret the strength of Cramer's V dependence. To evaluate the outcomes SPSS 24 statistical software was used.

3. RESULTS AND DISCUSSION

The chapter presents the results of the survey conducted in the selected company as well as the results of the survey conducted in the selected Czech and Slovak companies. The results are then compared with the theoretical bases and in the discussion they are also compared with the international research results.

3.1 Evaluation of Employee Recruitment Methods Used in the Selected Czech and Slovak Companies in Manufacturing

The selected Czech and Slovak companies in manufacturing use a wide variety of talent acquisition and employee recruitment methods, which more or less contribute to building external HR marketing. The results have clearly shown that companies support the HR strategy, they primarily fill managerial positions from internal sources (76.87% in the Czech Republic and 74.00% in Slovakia) and the same situation is in the category of specialists and administration employees. The only exception is the category of "workers", in which there is a shortage of manual workers in the Czech Republic and Slovakia, and these are often hired from the East.

Of the external recruitment methods, in which employer branding and external HR marketing play a more important role, the method of posting vacancies in the "Careers" section on the company's website is most often used in the Czech Republic. This concerns vacancies of managers, specialists and administration staff. However, the website must be constantly updated, the number of incoming visitors must be analysed and the company must promptly respond to questions from external job applicants. The same situation is in the category of specialists and administration staff in the Slovak Republic. However, more managers are recruited through employee referrals or recruitment agencies. With respect to the results, one can conclude that recruitment agencies in the CR and SR are mostly used for recruiting managers due to the demanding selection process. It is often carried out in selection rounds, and more complex selection techniques are used. Larger companies in the Czech Republic and Slovakia primarily outsource recruitment of managers.

On the other hand, recruitment in schools and personnel leasing are the least used methods for selecting managers. This is linked to the fact that graduates mostly lack experience; firstly, they must obtain enough experience and knowledge at lower positions. It can be concluded that the most widely used methods to inform the public about vacancies of managers and specialists do not fundamentally differ in the Czech Republic and Slovakia. Advertising in the media (50.75% in the CR and 53.00% in the SR) is preferred for administration vacancies, followed by advertising on the company's website (49.25% in the CR and 43.00% in the SR), advertising on job boards (jobs.cz, prace.cz, profesia.sk, and monster.com), or at labour offices (35.57% in the CR and 27.00% in the SR). The detailed research results are presented in Table 1.

Table 1 Results of employee recruitment, focusing on external HR marketing, from the Czech and Slovak Republics

Recruitment	Employee category in CR (n=402)				Employee category in SR (n=339)			
	M %	S %	A %	W %	M %	S %	A %	W %
Internal sources	76.87	62.69	60.95	29.60	74.00	71.00	54.00	20.00
Keeping records of former employees	9.20	13.68	15.67	17.66	8.00	11.00	13.00	15.00
Keeping records of occasional applicants	16.17	25.37	37.06	33.08	14.00	30.00	46.00	54.00
Advertising in the media	37.31	46.27	50.75	36.57	31.00	43.00	53.00	50.00
Bulletin boards	13.43	15.17	22.39	23.38	6.00	9.00	12.00	17.00
Personnel leasing	1.99	3.48	2.24	3.48	7.00	7.00	7.00	8.00
Company's website	41.79	47.01	49.25	29.10	29.00	40.00	43.00	28.00
Directly at schools and apprenticeship institutions	3.48	17.66	11.69	11.69	6.00	13.00	9.00	8.00
Employment agency	30.6	25.12	19.40	12.44	30.00	30.00	19.00	15.00
By word of mouth (oral offer)	18.91	21.90	22.39	22.14	10.00	14.00	17.00	20.00
Employee referral programme	45.27	55.97	61.44	47.01	36.00	45.00	50.00	51.00
Labour offices	16.17	22.14	35.57	38.81	6.00	13.00	27.00	50.00

Source: authors' own survey in the CR, Stachová and Stacho (2016) in the SR

With respect to the constantly debated cooperation between universities and companies, one can conclude that this level of cooperation is good thanks to the possibilities of creating and supporting innovation incubators, start-ups, SMART universities of individual companies, etc. (De Winne and Sels, 2010). On the contrary, the research in the SR (Tučeková and Geist, 2013) has shown that cooperation between universities and companies in Slovakia is still considerably neglected. Companies must realize that they can promote their employer brand to graduates and school students at job fairs. This way companies apply their external HR marketing to find talents with the growth potential. However, job fairs are, to a greater extent, currently attended by only large international companies that usually have a high staff turnover. Unfortunately, representatives of small and medium-sized companies, representing 99% of all companies in the CR, SR and EU, do not participate for various reasons. Recruitment of talents for small and medium-sized enterprises in the CR, which form the majority of companies in the Czech Republic and Slovakia, must be supported. The support in these companies must be oriented to external marketing, which is also confirmed by the research of Urbancová et al. (2015).

On the basis of the results, it can be summarised the situation in the selected Czech company with using personal system in area of recruitment of the employee. It can be stated that:

1. Using of the personal information system in recruitment of the employees is not dependent the area in which the company operates (private, public, state). P-value is 0.053.
2. Using of the personal information system in recruitment of the employees is dependent on the market in which the company operates (local, regional, national, international). P-value is 0.000, Cramer's V is 0.198, it means low dependence.
3. Using of the personal information system in recruitment of the employees is not dependent on the size of the company (number of employees). P-value is 0.000, Cramer's V is 0.322, it means moderate dependence.
4. Using of the personal information system in recruitment of the employees is not dependent on the existence of the HR department. P-value is 0.000, Cramer's V is 0.298, it means moderate dependence.

Majority of the presented authors agree that manpower is the company's very important element; therefore to deal with the issues of employee acquisition and recruitment is according to Breugh (2013) and Dahling et al. (2013) nowadays very important. Based on the research results, the most expensive methods of employee recruitment include the use of recruitment agencies, headhunting or personnel leasing. Cooperation with educational institutions has been labelled as time-consuming what confirmed by results of Hitka et al. (2015). On the contrary, the time-adequate methods include posting vacancies on bulletin boards in the company, employee referral programmes or cases where candidates themselves apply for the jobs. Personnel leasing means an excess of administrative burden, as opposed to the use of bulletin boards, employee referrals, or cooperation with labour offices that are completely problem-free methods. Overall, employee referrals and leasing were presented as the most effective methods.

As well as the internal HR marketing, the external one can use a range of tools, or the media. This is a very important choice dependent on the intended sources of candidates and expectations of the company. The standard elements of recruitment include press advertising or the use of professional agencies. However, in today's world the face of the entire recruitment process is shaped by the social media that make it possible to address even those candidates who do not actively seek a job at a given time (Poeppelman and Blacksmith, 2015).

The labour market of the Czech Republic and abroad is very different, especially in the minimum monthly wage rate. If people in foreign countries continuously improve their knowledge and skills (e.g. various courses and trainings), their salary is rising. Abroad a lot of people are more than satisfied with jobs through employment agencies because they ensure not only jobs, but also accommodation for employees. In the Czech Republic there is a clear difference in pays between agency and permanent employees, which is not the case in foreign countries. Even less qualified jobs abroad require the knowledge of foreign languages, but the knowledge of the Czech language is not a prerequisite for foreigners to work in the Czech Republic. Only their willingness to work shifts and overtime is enough.

Based on the aforementioned issues, one can conclude that employee recruitment ranks among the HR activities aiming to ensure that available jobs attract sufficient number of suitable candidates at reasonable costs and in the desired time. The entire process of employee recruitment consists of twelve basic steps. However, this concept can, of course, slightly vary with different professional authors.

Nevertheless, the factors influencing employee recruitment, such as internal conditions relating to the job or the company and general external conditions (e.g. the aforementioned situation in the labour market), must be taken into consideration. It must also be emphasized that companies still lack experts because the current ones will retire soon and there are not enough talented successors. Companies not only in the Czech Republic but also in the Slovak Republic continue in their activities of supporting and raising the interest in technical fields, for example, by promotions at primary and secondary schools and universities. Hence, it may be concluded that building the employee brand outwards through the support of external marketing is currently crucial for companies. Also their involvement in prestigious competitions, such as the Employer of the Year, is one of the ways how to build a positive image of the company.

4. CONCLUSION

The results from the selected Czech and Slovak companies in manufacturing have shown that in both countries the most frequently used recruitment methods are media advertising (43.00% - 50.75% for all employee categories in the Czech Republic and Slovakia) and the company's website (28.00% - 49.25% for all employee categories in the Czech Republic and Slovakia). Unfortunately, there is less recruitment in schools and personnel leasing, which should be a priority in today's competitive labour market. Although the world research presents a large variety of methods to recruit employees from external environment (e.g. Osoian, Zaharia (2014) and Zhu et al. (2013)), the existing research in the Czech Republic and Slovakia shows that Czech and Slovak companies still use the most proven methods and companies do not want much experimenting in the external HR marketing, with the exceptions of companies with foreign capital, where changes are established by the foreign owner.

In the context of the foregoing, it may be concluded that the right selection of employees was, is and will always be difficult. The practical contribution of the paper is to present results of the conducted research in the selected companies in the Czech and Slovak Republics and to identify employee recruitment methods used in practice. The theoretical contribution of the paper is to compare the opinions of foreign authors on the topic and draw conclusions. Due to the fact that this is a constantly topical subject, it would be useful in the future research to determine the effectiveness of various methods used to attract and recruit new employees in the labour market, and to improve the employer brand through improving external HR marketing.

Acknowledgements

This contribution is a follow-up to the project of University of Economics and Management, grant number GCES0415.

References

- Bauer, T. N., Truxillo, D. M., Paronto, M. E., Weekley, J. A., Campion, M. A. 2004. Applicant reactions to different selection technology: Face-to-face, interactive voice response, and computer-assisted telephone screening interviews. *International Journal of Selection and Assessment* 12(1-2): 135-148.
- Breaugh, J. 2013. A. Employee recruitment. *Annual Review of Psychology* 64: 389-416.
- Cocchiara, F. K., Bell, M. P., Caseper, W. J. 2016. The Role of Sociolinguistic Cues in Evaluating Job Candidates. *Human Resource Management* 55 (3): 463-477.
- Dahling, J. J., Winik, L., Schoepfer, R. Chau, S. 2013. Evaluating Contingent Workers as a Recruitment Source for Full-time Positions. *International Journal of Selection and Assessment* 21(2):222-225.
- Deprez-Sims, A. S., Morris, S. B. 2010. Accents in the workplace: Their effects during a job interview. *International Journal of Psychology* 45 (6): 417-426.
- De Vaus, D. 2002. *Surveys in Social Research*. London: Routledge/Taylor and Francis.
- De Winne, S., Sels, L. 2010. Interrelationships between human capital, HRM and innovation in Belgian start-ups aiming at an innovation strategy. *International Journal of Human Resource Management* 21(11): 1863-1883.
- Chuang, C. H., Chen, S. J., Chuang, C. W. 2013. Human resource management practices and company social capital: The role of industrial characteristics. *Journal of Business Research* 66 (5): 678-687.
- Hitka, M., Stachová, K., Balážová, Ž., STACHO Z. 2015. Differences in Employee Motivation at Slovak Primary Schools in Rural and Urban Areas. *International Education Studies* 8 (5): 33-42.
- Howardson, G. N., Behrend, T. S. 2014. Using the Internet to recruit employees: Comparing the effects of usability expectations and objective technological characteristics on Internet recruitment outcomes. *Computers in Human Behavior* 31: 334-342.
- Lievens, F., Van Hove, G., Anseel, F. 2007. Company identity and employer image: Towards a unifying framework. *British Journal of Management* 18: S45-S59.
- Love, L. F., Singh, P. 2011. Workplace Branding: Leveraging Human Resources Management Practices for Competitive Advantage Through "Best Employer" Surveys. *Journal of Business and Psychology* 26(2): 175-181.
- Nikolaou, I. 2014. Social Networking Web Sites in Job Search and Employee Recruitment. *International Journal of Selection and Assessment* 22 (2): 179-189.
- Osoian, C., Zaharie, M. 2014. Recruitment for Competencies in Public and Private Sectors. *Transylvanian Review of Administrative Sciences* 41E: 129-145.
- Poeppelman, T., Blacksmith, N. 2015. SIOP visibility: Personal branding in support of our mission. In T. Poeppelman (Chair) *Visibility is Key: Building Your Brand as an I-O*. Symposium presented at the 30th Annual Conference of the Society for Industrial and Company Psychology, Philadelphia, PA.
- Shipp, A. J., Furst-Holloway, S., Harris, T. B., Rosen, B. 2014. Gone today but here tomorrow: extending the unfolding model of turnover to consider boomerang employees. *Personnel Psychology* 67(2): 421-462.
- Sozen, H. C., Varoglu, D., Yeloglu, H. O., Basim, H. N. 2016. Human or Social Resources Management: Which Conditions Force HR Departments to Select the Right Employees for Company Social Capital. *European Management Review* 13 (1): 3-18.
- Šikýř, M. 2014. *The best practice in human resource management (in Czech)*. Prague: Grada Publishing, a. s.
- Tučeková, Z., GEIST, R. 2013. *Inovačný potenciál slovenských MSP*. EuroPolicy o. z. Bratislava: Ministerstvo zahraničných vecí a európskych záležitostí Slovenskej republiky.
- Urbancová, H., Stachová, K., STACHO, Z. 2015. Methods of Recruitment in the Czech and Slovak Companies. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis* 63 (3): 1051-1060.

- Van Hoyer, G. 2013. Recruiting Through Employee Referrals: An Examination of Employees' Motives. *Human Performance* 26 (5): 451-464.
- Van Hoyer, G., Weijters, B., Lievens, F., Stockman, S. 2016. Social Influences in Recruitment: When is word-of-mouth most effective? *International Journal of Selection and Assessment* 24 (1): 42-53.
- Van Hoyer, G., Lievens, F. 2005. Recruitment-related information sources and company attractiveness: Can something be done about negative publicity? *International Journal of Selection and Assessment* 13 (3): 179-187.
- Wilding, Ch. 2010. *Emoční inteligence: Vliv emocí na osobní a profesní úspěch*. Prague: Grada Publishing, a. s.
- Zhu, C. J., Cooper, B. K., Fan, D., De Cieri, H. 2013. HR practices from the perspective of managers and employees in multinational enterprises in China: Alignment issues and implications. *Journal of World Business* 48(2): 241-250.

CONSUMER PERCEPTION OF ACTIVE AND INTELLIGENT PACKAGING IN SLOVAKIA

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ABSTRACT

From the global point of view, the development of new packaging materials with additional active and intelligent features represents the great potential of the market to optimise the supply chain, protect sensitive products effectively and increase shelf life and enhance consumer consciousness of utilisation. The consequence of innovative approach is a creation of packaging with interactive functions. There are actually two different types of packaging – intelligent and active. The innovations focus on the expansion of functions in order to meet current consumer demands as well as increased safety concerns. On the other side, consumers have low information about new developments. The paper deals with the analyses of consumers' perception and attitudes to intelligent and active packaging in Slovakia. The survey results identified low consumer awareness of the concept of intelligent and active packaging on one side, but respondents are very interested in the innovative features of the packaging and their use on the other side.

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Key words: innovation, intelligent and active packaging, consumer attitudes.

1. INTRODUCTION

In recent decades, according to a global advancement, continuous progress, new technologies and innovation the packaging technologies are also changing. Packaging functions are improving in order to increase the shelf life of products, monitor the product and enhance consumer consciousness of utilisation. The consequence of innovative approach is the creation of packaging with interactive functions. The continued quest for innovation in food and beverage packaging is mostly driven by consumer needs and demands influenced by changing global trends, such as increased life expectancy (Lord, 2008, In Brody et al., 2008). Traditional food packages are passive barriers designed to delay the adverse effects of the environment on the food product (Brody et al., 2008). On the other hand, innovative smart packaging systems can generate an enhanced product by utilizing non-traditional packaging functions to provide safer, more nutritious or appealing food products, while being environmentally friendly. In addition, smart packaging technologies can be further optimised by the incorporation of nanotechnology, which can be utilised actively or intelligently, to enhance or extend package function (O' Callaghan & Kerry, 2016). The food industry also has been tremendously changing from passive packaging to innovative packaging to cope with global trends, technological advancements, and consumer preferences (Mlalia et al, 2016, Dainelli et al., 2008). Adoption of suitable packaging technologies by the food industry can be useful to extend the shelf life, improve quality, safety, and provide information about the product (Biji et al, 2015). Besides, innovation systems will improve the quality of consumer life, the product's quality and consequently decrease the number of retailer and consumer complaints (Dobrucka & Cierpiszewski, 2014).

Active packaging is an innovative packaging system in which the product, package and the environment interact in a positive way (Miltz et al. 1995) to extend the product shelf life and/or to ensure its microbial safety while maintaining the quality of the packed food (Ahvenainen, 2003). It contains incorporate components into the packaging material that deliberately alters the condition of the package by releasing or absorbing substances into or from the packaged food or environment (Floros et al, 1997) to either enhance sensorial properties, maintain quality, or to extend the shelf life of the packaged product (O' Callaghan & Kerry, 2016).

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Intelligent packaging is a system that is capable of carrying out intelligent functions (such as detecting, sensing, recording, tracing, communicating) to facilitate decision making to extend shelf life, enhance safety, improve quality, provide information, and warn about possible problems (Yam, Takhistov & Miltz, 2005). An intelligent package contains a device, positioned internally or externally to the package, which can monitor the condition of the product, package or packaging environment. The device can provide information on these aspects but does not alter the condition of the package or product (O'Callaghan & Kerry, 2016).

Innovations in the form of active and intelligent packaging focus on the expansion of functions in order to meet current consumer demands as well as increased safety and quality concerns. On the other hand, consumers have low information about new developments. Management of innovation and the issue of innovation diffusing cannot exist without customer research since innovation acceptance is ultimately an important factor of success. That approach can help to clarify, predict or influence of adaption or rejection of an innovation, regarding willingness to accept the information on innovative characteristics of the product (Trommsdorf & Steinhoff, 2009). Many studies in the field of consumer behaviour examine consumer perception of products (for example authors Paluš & Mat'ová, 2009; Mat'ová & Kaputa, 2010), but also consumers' perceptions of packaging – the product evaluation affects purchase intention and consumers' attitudes (Kauppinen-Räsänen & Luomala, 2010; Wilke et al., 2011, In Prakash & Pathak, 2017; Šmodrková, 2017; Bártková, 2017). Consumer attitudes to active and intelligent packaging vary from country to country. According to Brennan and Crandison (2011), active packaging materials have been generally accepted in the US, Australia, Japan, but much less in European countries. On the other hand, some intelligent packaging materials are more widely used in European countries. The reasons for these different attitudes are not clear, but it may be partly due to cultural differences and a lack of understanding the functions and benefits.

The consumers need to be better informed about the purpose and use of active and intelligent packaging system to achieve their more widely use and acceptance. Even with technological progress aimed at customers, the company must understand the customer's needs and find the right means of communication, which, according to (Triznová, 2014) are the means to achieve quality relationships with customers. Therefore the paper deals with the analyses of consumers' perception and attitudes to intelligent and active packaging in Slovakia.

2. MATERIAL AND METHODS

The primary goal of the research was to identify awareness and perception of the concept of intelligent and active packaging. A survey questionnaire was the primary research tool. It consisted of questions divided into 3 parts as follows:

- I – demographic information on the respondents,
- II – perception of the packaging and its impact on consumer buying behavior,
- III – perception and attitudes to intelligent and active packaging.

The results were analysed by using frequency and contingency analysis. The Chi-Square test of Independence was used to determine if there is a significant relationship between two nominal variables. The CHI-square test is the statistical method used to obtain the P-value and then compares it with the significance level $\alpha = 0.05$. If the null hypothesis is accepted there would be no relationship between the variables. If the null hypotheses is rejected the implication would be that there is a relationship between the variables.

In this case, we examined the statistical dependency between:

- recognition of the concept of intelligent and active packaging by respondents and educational attainment of respondents,
- the willingness of the respondents to pay more for active and intelligent packaging and sex of the respondents,
- the willingness of the respondents to pay more for active and intelligent packaging and their net monthly income.

3. RESULTS AND DISCUSSION

The main purpose of the paper was to identify awareness of intelligent and active packaging. According to the survey results, the awareness of those innovative forms of packaging in Slovakia is very low. The majority of respondents do not know what intelligent and active packaging is and they did not meet such a term. Moreover, even after becoming aware of that term by questionnaire, most of the respondents (88 %) declared that actually they did not buy, use or see products in that kind of packaging.

Lack of knowledge and not knowing the concept of intelligent and active packaging was manifested in all age categories (Fig.1). Most respondents that experienced such packaged products are in age 21-30 years. On the contrary, the lowest awareness of that kind of packaging is among older respondents in the age of 41 years and more.

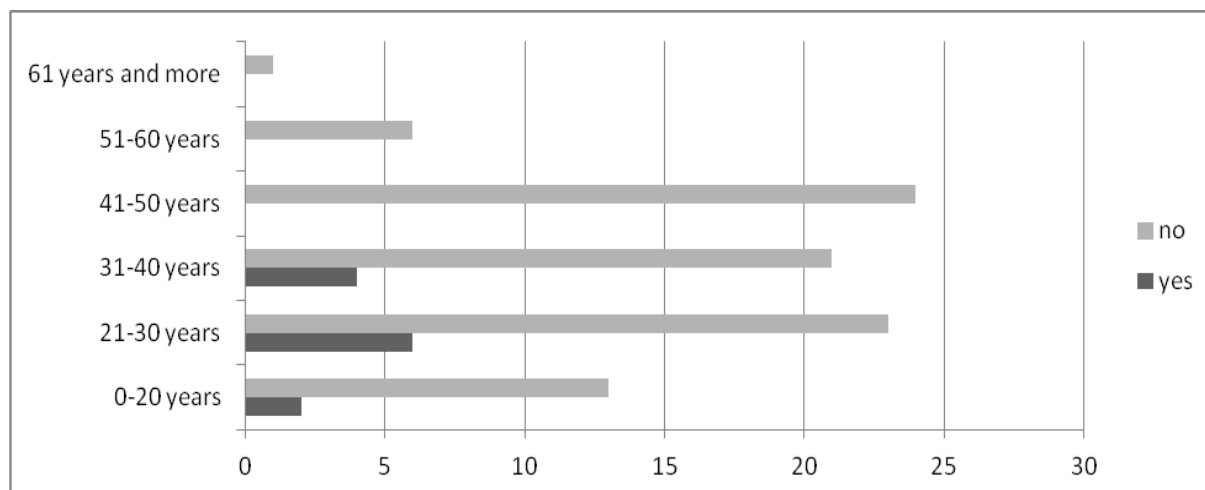


Figure 1 Awareness of intelligent and active packaging

The dependence between the recognition of the concept of intelligent and active packaging by respondents and educational attainment of respondents has not been confirmed. Based on the CHI-Square test (table 1), where P- Value is higher than 0,05, there is no statistically significant dependence between the higher education of respondents and the knowledge and understanding of the concept of intelligent and active packaging, since even some university educated respondents did not know what this term means.

Table 1 CHI - Square test of dependence between the recognition of the concept of intelligent and active packaging and the education of respondents

	CHI -Square	P - Value
the relationship between education and the recognition of the concept	1,086	0,581

Despite low consumer awareness of the concept of intelligent and active packaging, respondents are very interested in the innovative features of the packaging and their use on the other side, Fig. 2. Most of the respondents are interested in information on comparison the innovative forms of packaging to the traditional one and the benefits of intelligent and active packaging (40 %). Thus, we consider this as a positive finding, as respondents do not manifest purely negative approach. Contrariwise they show interest, they are open to new information and we assume that after an understanding of the concept subsequent use of intelligent and active packaging.

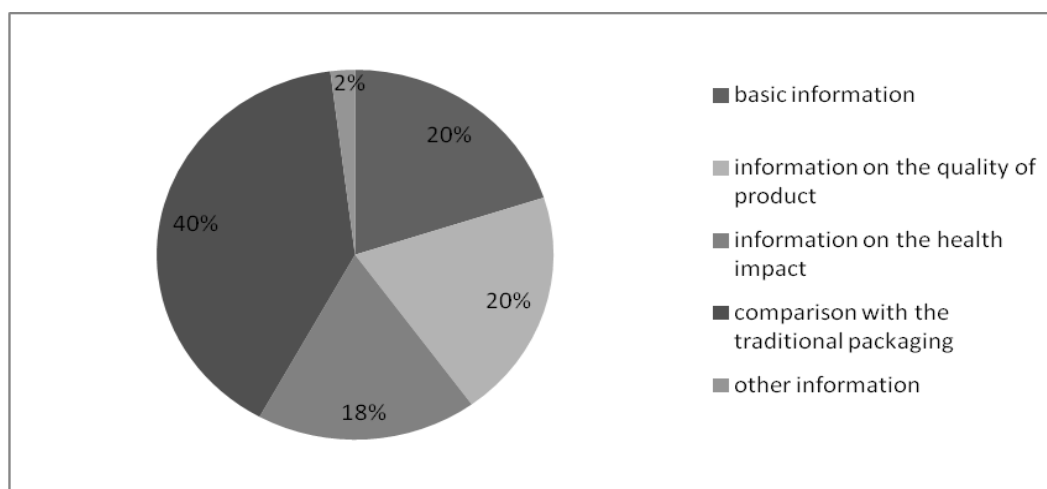


Figure 2 Interest in different additional information on intelligent and active packaging

Whereas intelligent and active packaging is new packaging using innovative materials and technology, they may be associated with higher price. Therefore we investigated also if the respondents are willing to pay more for those packaging (Fig. 3). 16 % of respondents were not willing to pay more, but the majority of respondents would accept a potential increase in the price. The most acceptable price increase is up to 5%.

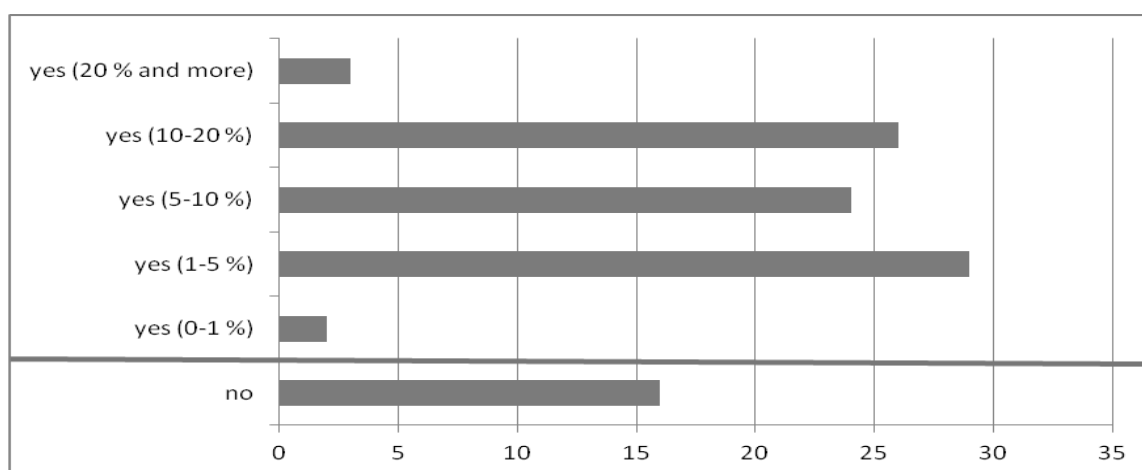


Figure 3 Willingness to pay more for active or intelligent packaging

Willingness to pay more varies statistically significantly depending on net monthly income according to CHI – Square test where the P-value is lower than 0.05 (table 2). Obviously, respondents without income or with low income are less willing to welcome this new type of packaging. The reluctance is caused by the increased price of active and intelligent packaging.

Table 2 CHI - Square test of dependence between net monthly income of respondents and their willingness to pay

	CHI -Square	P - Value
the relationship between monthly income and willingness to pay	22,380	0,002

In terms of gender, there is statistically confirmed dependence between sex of respondents and their willingness to pay more for those products in innovative packaging (table 3). Men are more willing to pay more for products in active or intelligent packaging whether the reason is their higher income or they appreciate the innovative features of these active and intelligent packaging versus the classic packaging.

Table 3 CHI - Square of dependence between sex of respondents and their willingness to pay

CHI -Square	CHI -Square	P - Value
the relationship between sex and willingness to pay	8,606	0,003

4. CONCLUSION

The success of any innovation acceptance, so well intelligent and active packaging, definitely depends on customers understanding, awareness and recognition of the future benefits of the innovation. Overall, it can be stated that there was a general lack of knowledge regarding the terms and concept of intelligent and active packaging, most consumers (88 %) are unaware of these terms and issue. Lack of knowledge and not knowing the concept of intelligent and active packaging was manifested in all age categories. The lowest awareness of that kind of packaging is among older respondents in the age of 41 years and more. Willingness to pay more varies depending on net monthly income but men, in general, are more willing to pay more for products in active or intelligent packaging. These findings are consistent with O' Callaghan and Kerry (2016) and Brook Lyndhurst Ltd. (2009, In Callaghan and Kerry, 2016) according to whom there is lack of knowledge of active packaging (77.6%) as well as intelligent packaging (71.6%) concept; older people and women are more concerned, less-positive and more likely to perceive fewer benefits associated with smart packaging technologies; and additionally, no evident patterns emerged with regard to education levels. With respect to the relevant findings, there still remains space to examine the other factors that influence the packaging decisions, barriers to adapt such packaging as well as a comparison of consumer perception in different countries.

Acknowledgements

The authors would like to thank the European Cooperation in the field of Scientific and Technical Research – COST and to the Scientific Grant Agency of the Ministry of Education, Science, Research and Sport of the Slovak Republic and the Slovak Academy of Sciences. This paper is an output of COST Action FP1405 “Active and Intelligent Fibre-Based Packaging – Innovation and Market Introduction (ACTINPAK)”, the Grant project 1/0756/16 “Identification of consumers' segments according to their affinity for environmental marketing strategies of business entities in Slovakia” and the Grant project 1/0473/16 “Dynamics and Determinants of Wood Based Products Market in the Slovak Republic”.

References

- Ahvenainen, R. 2000. *Novel food packaging techniques*, Woodhead Publishing Limited: 2000.
- Bát'ková, S. 2017. *Prieskum vnímania inovatívnych obalov*. Technická Univerzita vo Zvolene: 2017.
- Biji, K.B., Ravishankar, C.N., Mohan, C.O. et al. 2015. Smart packaging systems for food applications: a review, *Journal of Food Science Technology*. 52: 6125-6135.
- Brennan, J.C., Crandison, A.S. 2011. *Food processing handbook*. Wiley: 2011.
- Brody, A.L., Bugusu, B., Han, J.H., Koelsch Sand, C., Mchugh, T.H. 2008. *Journal of Food Sciences*: 73: 107-116.
- Dainelli D., Gontard N., Spyropoulos D., Zondervan-van den Beuken E., Tobback P. 2008. Active and intelligent food packaging: legal aspects and safety concerns, *Trends Food Science Technology* 19: 103–112.
- Dobrucka, R., Cierpiszewski, R. 2014. Active and Intelligent Packaging Food – Research and Development – A Review, *Polish Journal of Food and Nutrition Sciences* 64: 7-15.
- Floros, J.D., Dock, L.L., Han, J.H. 1997. Active packaging technologies and applications, *Food Chemistry Drug Packaging* 20: 10–17.
- Kauppinen-Räsänen, H., Luomala, H. T. 2010. Exploring consumers' product-specific colour meanings, *Qualitative Market Research: An International Journal* 13: 287-308.
- Maťová, H., Kaputa, V. 2010. Environmentálny marketing a environmentálne označovanie produktov pôdohospodárstva. In Horská, E., Nagyová, L., Rovný, P. a kol. 2010. *Merchandising a event marketing pre produkty pôdohospodárstva*.
- Miltz, J., Passy, N., Mannheim, CH. 1995. Trends and applications of active packaging systems, In Jagerstad, M., Ohlsson, M., Ackerman, P. *Food and packaging materials - Chemical interaction*. The Royal Society of Chemistry, London, England, pp. 201–210.
- Mlalila, N., Kadam, D.M., Swai, H. et al. 2016. Transformation of Food Packaging from Passive to Innovative via Nanotechnology: Concepts and Critiques, *Journal Food Science Technology* 53: 3395-3407.

- O' Callaghan, K. A. M., Kerry, J. P. 2016. Consumer attitudes towards the application of smart packaging technologies to cheese products, *Food Packaging and Shelf Life* 9: 1-9.
- Paluš, H., Maťová, H. 2009. End-users awareness of environmentally appropriate wood products in Slovakia. In *Competitiveness of wood processing and furniture manufacturing: Proceedings*. Zagreb: Woodema, i.a., 111-116.
- Prakash, G., Pathak, P. 2017. Intention to buy eco-friendly packaged products among young consumers of India: A study on developing nation, *Journal of Cleaner Production* 141: 385–393.
- Šmondrková, D. 2017. Vnímanie a správanie spotrebiteľov pri nákupe aktívnych a inteligentných obalov. Technická Univerzita vo Zvolene: 2017.
- Triznová, M. 2014. *Manažment vzťahov so zákazníkom*. Technická Univerzita vo Zvolene: 2014.
- Trommsdorff, V., Steinhoff, F. 2009. *Marketing inovací*. Praha: C. H. Beck, 2009. 291 s.
- Yam, K.L., Takhistov, P. T., Miltz, J. 2005. Intelligent packaging: Concepts and applications, *Journal of Food Science* 70: 1-10.

CORRELATION OF SELECTED IMS TOOLS WITH SELECTED CORPORATE CHARACTERISTICS IN THE CONTEXT OF CSR

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ABSTRACT

Objective of the article is to analyse correlation of selected integrated management tools (QMS, EMS, OHSAS, CSR) of the selected corporate characteristics (size, ownership, legal form of business, profit and region). Subject of the analysis are small, medium and large the paper and pulp companies in Slovakia. The survey was conducted on a selective sample of 126 companies. We evaluated the results using Spearman coefficient and the Chi quadrant in SPSS 2.0. Based on p-value = 0.639 we can confirm, that the selection set is representative in accordance to the company's size. Based on the results we can conclude that in the examined sample the number of implemented IMS systems has impact on the company size (p-value = 0.000) and profit (p-value = 0.000). We not confirmed the correlation between implemented IMS tools and legal form of business (p-value = 0.283) and ownership (p-value = 0.143). Corporate Social Responsibility, as a component of IMS, in the examined sample was represented by only 7.14 %.

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Key words: integrated management tools, paper and pulp companies, Corporate Social Responsibility.

1. INTRODUCTION

As a part of the implementation of the EU Action Plan 2014-2020 (with a strategic outlook until 2050) is assessed the parameter "quality of life (well-being)", which depends directly on the environment (where people live) and safe living conditions. The goal of the European Development Strategy is to ensure that society takes care of the environment by choosing appropriate technologies, security systems, regular monitoring of the environment and informing staff.

Several definition have been proposed for the integrated management system tools (IMS). Bernardo et al. (2017) defined IMS as a set of interconnected processes that share a pool of human, information, material, infrastructure and financial resources in order to achieve a composite of goal. The management integrated system is defined as a merger or combination of minimum two or more management systems into a single system (Chovancová et al. 2010). The implementation and certification the main IMS tools has continuously increased in the last twenty years.

The environmental management system is a basic international technical standard that sets out requirements for an environmental management system based on the ongoing management cycle P-D-C-A (Plan - Do - Control - Apply) according to the international standard 14001. By meeting prescribed requirements, which compliance with the standard will verify a successful certification audit, the organization will obtain a certificate, which is also a proof of the system's effectiveness (Adamkovičová, 2016, Ladomerský et al., 2016). The environmental management and the audit means a systematic approach to environmental protection and the integration of the principles of this scheme into all organization's activities. These voluntary environmental policy's instruments have an increasing tendency (Figure 1) in Slovak companies, paper-pulp's companies included.

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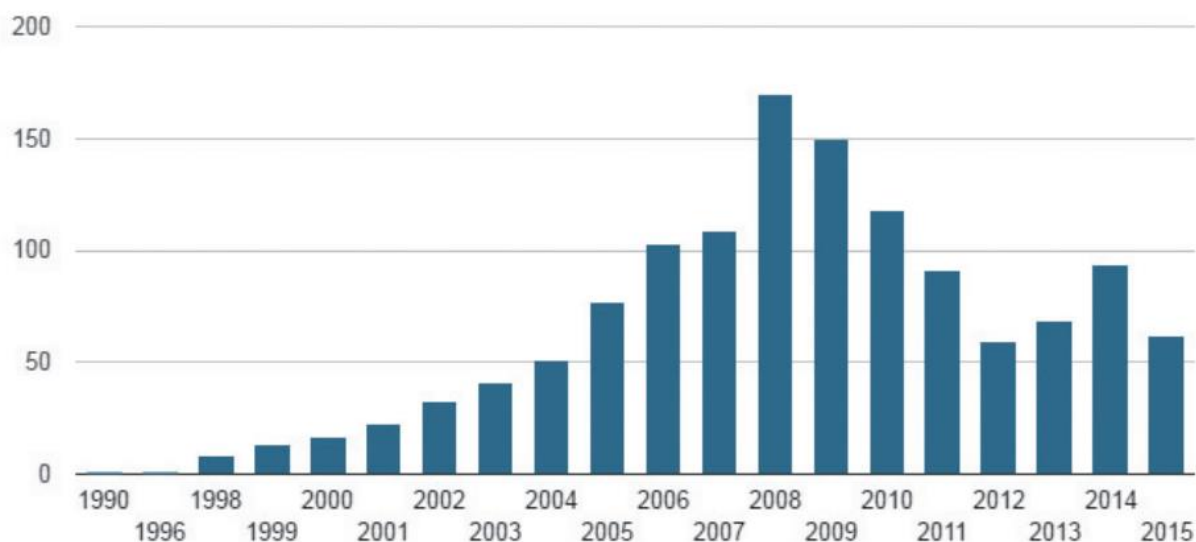


Figure 1 Development of annual growth of EMS-certified organizations according to ISO 14001
Source: SAŽP

In 2015, 62 new companies established and certified the EMS system within their organizations. The total number of registered organizations with certified EMS according to ISO 14001 has increased since 1996 to 1 481. (SAŽP, 2015)

Nowadays, many companies are trying to introduce management systems; the most common management systems are: quality, environment and (or) safety. Some of them see it as a question of prestige or cost savings and some as requirement of this era for sustainable development. The integrated management system (IMS), as perceived by the theory and practice, is based on the generic structure of international standards related to the quality management (STN EN ISO 9001: 2009), the environmental management (ISO 14001: 2004) and the occupational health and safety management (STN OHSAS 18001: 2009) (Majerník, Chovancová, 2007, Kunz, 2017). The Corporate Social Responsibility is specific system focused on three business lines. It is a business approach that contributes to sustainable development by delivering economic, social and environmental benefits for all stakeholders. Assumptions of social responsibility are to maximize the market value of the business provided that companies respect the laws and responsibilities of owners, managers and employees. Benefits of the corporate social responsibility are not only companies and their stakeholders, but also the society. This fact inspires many large enterprises to start up a socially responsible business (Marková et al., 2014, Korimová, Hroncová-Vicianová, 2014, Hronec, Štangfeldová, 2013).

The OHSAS system was transformed into a "safe enterprise" certificate in Slovakia. The certificate is awarded once a year for a certain period of time by the National Labor Inspectorate. Subsequently, the certification is repeated. In 2016, 5 companies received the certification and it was prolonged for 4 enterprises in Slovakia.

2. MATERIAL AND METHODS

Objective of the article is to analyse correlation of selected integrated management tools of the selected corporate characteristics (size, ownership, legal form of business, profit and region). We analyse the Quality Management System (QMS), the Environmental Management System (EMS), the Occupational Health and Safety Assessment Specification (OHSAS) and the Corporate Social Responsibility (CSR). Subjects of the analysis are paper's and pulp's companies (small, medium and large) in Slovakia, selected from company database of Information and Statistics institute – INFOSTAT. The criteria was met by 146 companies until Jun 2017. The survey was conducted on a selective sample of 126 companies (Tab. 1).

Table 1 The distribution of the research sample

	Number of basic sample	Number of research sample
Small companies	120	100
Medium companies	18	19
Large companies	8	7
Total	146	126

Source: Database of Information and Statistics institute – INFOSTAT

As part of the primary research, we draw information from annual reports, policies and other strategic documents available on the survey companies' websites. In addition we used secondary information sources - available results from research within the topic, conducted at home and abroad. We analysed correlation between integrated management tool and selected corporate characteristics (size, ownership, legal form of business, profit and region) through the Spearman coefficient. We used SPSS 2.0 to calculate the Spearman coefficient.

2.1 Characteristic the paper and pulp industry

Wood processing industry (WPI) is a sector based on renewable natural resources of wood raw material. Therefore, it is able of sustainable growth and be competitive on the international markets. (Sujová et al. 2015, Zapletal, Murín 2013)

Timber companies can be classified into three basic categories: wood, furniture, pulp and paper industries. (SARIO, 2012)

In Slovakia, a higher demand for conifer roundwood and broadleaved pulpwood still prevails and must be partially satisfied by import. Historically pulp and papermaking industries belong to the best performing industries of the national economy. The companies (11) are grouped in the Pulp and Paper Industry Federation of the Slovak Republic. This industry covers 100 % of the paper production in Slovakia and the production of the majority of associated products. Pulp is produced in Mondi SCP, a.s., Ružomberok and in Bukóza Holding, a.s., Hencovce. The largest processing facilities for waste paper include Metsa Tissue Slovakia s. r. o. and SHP Harmanec, a.s. by 1990, the processing of broadleaved roundwood was concentrated into a few large-scale facilities in Zvolen, Pezinok, Vranove nad Topľou and Žarnovica, which have either since been closed or transformed into smaller processing units. At present, processing capacity of the operating units is less than 500 000 m³ of broadleaved roundwood. (Green report, 2016)

There is a gap in the market in the production of wood products with high added value, such as sliced veneer, peeled veneer, plywood and fibre wood for the furniture making industry. Slovakia still adequately processes only a small volume of the highest quality log grades produced in Slovak forests. The average production of these grades could be around 40 000 m³ from coniferous species and 260 000 m³ from broadleaved species. Owing to a lower effectiveness of timber processing, domestic processing facilities are often only subcontractors of foreign companies. Trends and current situation in the timber processing industry are shown in Table 2. (Green report, 2016)

Table 2 The selected economic indicators of distribution of pulp and papermaking industry

Indicator	Aktuality/ Milion eur					
	2009	2010	2012	2013	2014	2015
Revenue	1358	1458	1407	1432	1317	1379
Costs	1280	1328	1315	1334	1222	1242
Gross economic results	78	130	92	98	95	137

Employment	6876	6591	6202	5885	5986	6110

Source: Ministry of Economy of the Slovakia 2006-2011, Statistic Organization of the Slovakia (Record prod. 3-04)

Among the various industries, paper and pulp industry is one of the notorious polluters of the environment. It has been categorized as one of the most polluting industries due to discharge of huge volumes of highly colour and toxic waste water (effluent) in the environment causing pollution of land (soil), air and water. (Saadia and Ashfaq 2010, Srivastava et al. 2014) These enterprises need use integrated management tools.

3. RESULTS AND DISCUSSION

We can confirm that the selective sample is representative in accordance to the company's size (p -value = 0.639). The most implemented integrated management tools among the examined companies were QMS, followed by EMS, OHSAS and CSR (Fig. 2).

Number of integrated management tolls in the examined sample expressed in absolute values

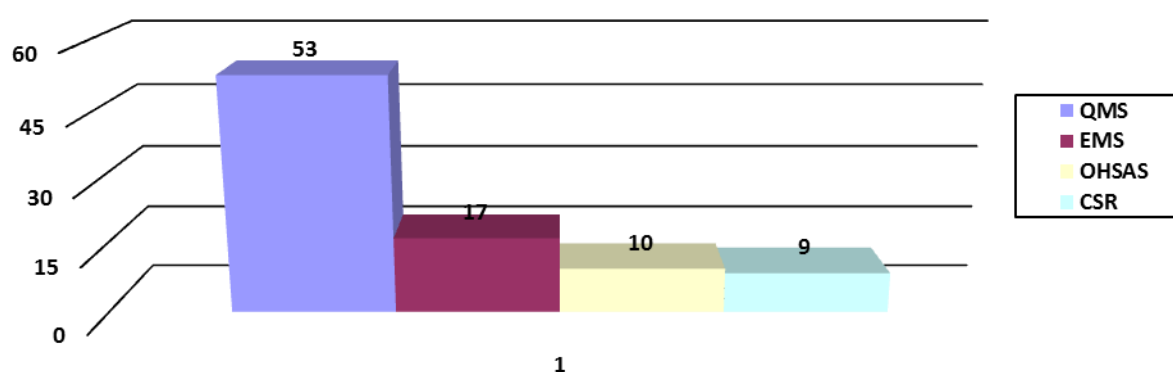


Figure 2 Number of enterprises using integrated management tools studies

Number of companies that have implemented least one integrated management system was low. Of the 126 companies, in which the research was conducted, only 53 companies had implemented at least one of the examined integrated management systems. The four examined integrated management tolls were to be implemented only 4 companies. They were 2 medium and 2 large companies with foreign ownership. The three examined integrated management tools were to be implemented 8 companies. In the examined sample the most frequently implemented tools were QMS, EMS and OHSAS. Only 2 companies implemented CSR instead of OHSAS. In the sample with three integrated management tools were 5 small companies, which implemented QMS, EMS and OHSAS. These companies had home and foreign ownership, legal forms of business was dominated limited liability companies from Žilina region.

CSR was at least implemented integrated management tolls, only 9 companies in the examined sample. While Marková, Lesníková (2015) state, which in their result the big priority is attributed to the CSR of cellulose-paper industry (45 % companies in their examined sample).

Than we examined the dependency between IMS tools implementation and the company size also by statistical testing using Spearman coefficient (p -value = 0.000, r = 0.378). Based on the results we can conclude that in the examined sample the number of implemented IMS tool has impact on the company size. We consider this dependence to the medium strong dependence and we are inclined to the view Zelený and Fabian and Jaďud'ová (2010), that the voluntary management systems implemented mainly large and medium-sized companies.

The result's Gejdoš (2016) point out that there is an extremely high formality in implementation of QMS; the QMS have insignificant effect on achieving better economic results and costs reduction of a company; the reasons for the implementation of QMS is to gain competitive advantage and obtain better contracts.

We also found another dependency between IMS tool and selected corporate characteristics. The correlation analysis confirmed positive medium strong relationship between implemented IMS tools and profit ($p\text{-value} = 0.000$, $r = 0.501$). The implementation of IMS tools requires the finance. The companies must to calculate the increased costs during the first three years. We are inclined towards the opinion presented by Nenadál (2008) that the companies have to look at these costs as a return investment for the future. Smith (2002) published, that the implementation of IMS tools brings the economic and non-economic value to the companies, such as the saving direct costs, external promotion, competitive advantage, employee satisfaction, efficient and transparent management, and others.

The correlations analysis confirmed negative weak relationship between implemented IMS tools and region ($p\text{-value} = 0.033$, $r = -0.190$). The implementation IMS tools do not affect the region, in which the company operates. In examined sample was formed the largest group by companies from Nitra region (30 companies) and the smallest group by companies from Bratislava region (6 companies), fig. 3.

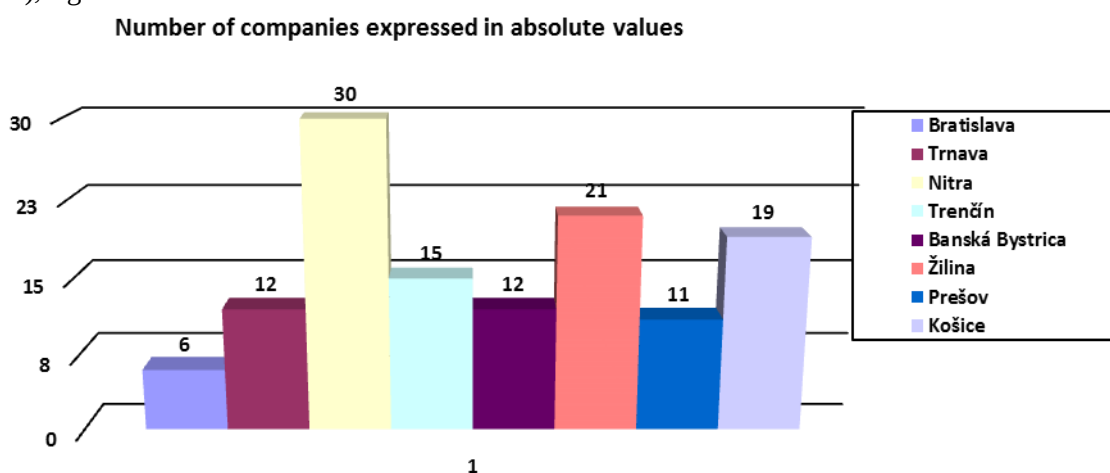


Figure 3 Representation of the companies in examined sample by the region

In our research we not confirmed the correlation between implemented IMT tools and ownership and legal form of business (Tab. 3). The result could be make the dominant representation of companies with home ownership (100 companies from 126 companies in examined sample) and limited liability companies (96 companies). We not confirmed the opinion by Markovič (2007), that the companies with foreign ownership, respectively the companies with the subject of doing business on foreign markets implemented the integrated management tools. We expect that the companies cannot produce quality, if they don't your losses and don't interested about the protection of the environment and safety and health of your employees beyond the legislation.

Table 3 Dependencies between the implemented IMS tools and the selected corporate characteristic

	size	ownership	profit	legal form of business	region
p-values	0.000	0.143	0.000	0.283	0.033
Spearman coefficient	0.378	0.131	0.501	-0.096	-0.190

Source: Own processing according to SPSS 2.0

4. CONCLUSION

The integrated management tools represent the versatile and effective managerial tolls for realizing set goals of production and non-production companies. They support the maximization of market value and growth of the companies (Chovancová et al., 2010, Murin, 2016). Implementation of IMS has an increasing impact on corporate performance, because was published by Jaďud'ová and

Zelený (2015) more than 50 % of value, particularly in large companies, is connected to the name and reputation. We have analysed correlation of selected integrated management tools of the selected corporate characteristics (size, ownership, legal form of business, profit and region). Subject topic of our survey were selected integrated management systems: quality management system ISO 9001, environmental management system ISO 14001 and workplace safety and health protection management system OHSAS 18001. Results of the analysis performed, confirm dependency between the number of implemented IMS systems and the size of the companies and their profit. We didn't confirm dependency between the number of implemented IMS systems and ownership and legal form of business. We confirmed that the implementation IMS tools do not affect the region, in which the company operates. We are inclined towards the opinion presented by Marková et al. (2014), that the system integration has to be revitalizing business, producing, information, technology and other processes with the aim of reducing costs.

Acknowledgements

This work was supported by the Cultural and Educational Grant Agency of the Ministry of Education, Science, Research and Sport of the Slovak Republic project no. KEGA 035UMB-4/2015 "Environmental management in sphere of production" and VEGA 1/0651/17 "Drafting the innovative synergetic Corporate Social Responsibility model as a perspective the implementation of responsible entrepreneurship in small and medium enterprises".

References

- Adamkovičová, A. 2016. Dobrovoľné nástroje environmentálnej politiky. *Journal Enviromagazín* 21(6):9-10.
- Bernardo, M., Gianni, M., Gotzamani, K., Simon, A. 2017. Is there a common pattern to integrate multiple management systems? A comparative analysis between organizations in Greece and Spain. *Journal of Cleaner Production* 151: 121-133.
- Gejdoš, P. 2016. Analysis of performance improvement of wood processing companies in Slovakia and the Czech Republic through the implementation of quality. *ACTA FACULTATIS XYOLOGIAE ZVOLEN*, 58(1): 113–124. DOI: 10.17423/afx.2016.58.1.13
- Giri, J., Srivastava, A., Pachauri, S. P., Srivastava, P.C. 2014. Effluents from Paper and Pulp Industries and their impact on soil properties and chemical composition of plants. *Journal of Environment and Waste Management* Vol. 1(1): 026-030.
- Green report, 2016. Report on Forestry in the Slovak Republic 2015 [online]. Bratislava - Ministry of Agriculture and Rural Development of the Slovak Republic, National Forest Centre Zvolen. 76 p. [cit. 2017-06-15]. Dostupné na: [file:///C:/Users/DELL/Downloads/zelená_správa_2016%20\(1\).pdf](file:///C:/Users/DELL/Downloads/zelená_správa_2016%20(1).pdf)
- Hronec, Š., Štrangfeldová, J. 2013. Socio-economic effect of education in the context of economic return. *The new education review* 32: 172-183.
- Chovancová, J., Majerník, M. & Juríková, J. 2010. Integrated management systems. *Communications* 12(1): 7-74.
- Chovancová, J., Tej, J. 2013. Implementation of quality environment and safety management systems with focus on their mutual integration, In *Proceedings of the 13rd International Conference*. 1st editon. Bratislava, April 18-19, 2013. Žilina - Strix. Edícia ESE-14, 11-15.
- Korimová, G., Hroncová-Vicianová, J. 2014. Tools of state support in selected areas of corporate social responsibility in Slovakia, In *Proceeding of the 19th international conference Theoretical and practical aspects of public finance 2014*. Prague, p. 126-136.
- Kunz, V., 2017. CSR Corporate publishing of enterprises in in the Czech republik. *ACTA UNIVERSITATIS MATTHIAE BELII series Environmental Management* [online]. Banská Bystrica, XIX(1): 6-10 [cit. 2017-06-30]. Dostupné na: <http://dx.doi.org/10.24040/actaem.2017.19.1.6-10>.
- Ladomerský, J., Janotka, I., Hroncová, E., Najdená, I. 2016. One-year properties of concrete with partial substitution of natural aggregate by cupola foundry slag. *Journal of Cleaner Production* 2016, 131, 739-746. (IF2016=5.715).
- Majerník, M., Chovancová, J. 2007. Environmental management – development and trends. In *Environmental engineering and management : Conference proceedings of 4th international conference Elam 2007: 22.-24.10.2007*, Herľany. Košice : Sjf TU, 22-29.
- Majerník, M., Szaryszová, P., Štofová, L. 2013. Environmental Management according to emas and international standards ISO 14001 in european area – status and perspectives. *ACTA UNIVERSITATIS MATTHIAE BELII séria Environmentálne manažérstvo*, Vol. XV.(2): 14-25
- Marková, V. et al 2014. The concept of corporate social responsibility in selected economic sectors. *Radom : Instytut naukowo-wydawniczy "Spatium"*.
- Marková, V., Lesníková, P. 2015. Utilization of Corporate Sustainability at Seleted Enterprises in Slovakia. In *Procedia Economics and Finance*. 34: 630-637.

- Markovič, P. 2007. Zavádzanie integrovaného systému manažérstva v riadení bezpečnosti podniku. In Manažérstvo životného prostredia 2007. Žilina: Strix et VeV. 2007, ISBN 978-80-89281-18-3, p.351-358
- Murín, I. 2016. Generational Transmission in Local Culture: Case Exploration of European Research Priority in Central Slovakia. Anthropological Journal of European Cultures 25(2): 57-72.
- Nenadál, J. et al. 2008. Integration management system. Praha: Verlag Dashöfer, 2008. 2698 p. ISBN 1801-8465.
- Saadia, A., Ashfaq, A. 2010. Environmental management in pulp and paper industry. Journal of Industrial Pollution Control 26 (1): 71-77.
- SAZP, 2015. Správa o stave životného prostredia v SR za rok 2015 [online]. Banská Bystrica - Slovenská agentúra životného prostredia. [cit. 2017-06-15]. Dostupné na: <http://enviroportal.sk/uploads/report/sprava-2015-final-ep.pdf>
- SARIO, 2012. Lesy a drevospracujúci priemysel. [online]. [cit. 2017-06-15]. Dostupné na: www.sario.sk/sites/default/files/content/files/woodprocessing_sk.pdf
- Smith, D. 2002. IMS. Implementing and Operating, British Standard Institution, London 2002, ISBN 0 580 33328.
- Sujová, A., Hlaváčková, P., Šafařík, D. 2015. The analysis of performance in the wood processing industry through ratio indicators. ACTA FACULTATIS XYLOLOGIAE ZVOLEN, 57(2): 165–178. DOI: 10.17423/afx.2015.57.2.17.
- Zapletal, M., Murín, I. 2013. Application of model explanation and indicators to the traditional ecological knowledge and functioning evaluation by way of Malhont (Slovakia) example. ACTA UNIVERSITATIS MATTHIAE BELII séria Environmentálne manažérstvo, Vol. XV.(1): 95-109.
- Zelený, J., Fabian, G., Jaďuďová, J. 2010. Environmental policy and management of organizations Part 6. Environmental policy, management and stakeholder management. Banská Bystrica: Matej Bel University, Faculty of Natural Sciences.

THE QUALITY AS A COMPETITIVE FACTOR OF THE SPA DESTINATION

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ABSTRACT

A tourist destination is a unit of economic competition and in the competitive environment it fights for visitors' favour through the quality of its offer. The paper presents the research aimed at identifying the key factors of a spa destination in Slovakia. Then, the relation between the results is researched, which means the revealed significance of the factors in the context of the gender and the age of the visitors and the linkage to the loyalty towards the destination. The primary data were obtained through a questionnaire survey. The research sample was created by the intentional quota selection with the range of 419 respondents. The importance of only three factors is influenced by the gender of the respondents (the security in the destination, information, communication before arrival, the level of personnel quality in tourism services); concerning the age of the respondents the dependency was proved in case of 5 out of 20 evaluated quality factors of the spa destination. In case of 6 factors the direct impact on loyalty towards the destination was confirmed (for instance, the image and the uniqueness of the destination or the offer of specialized spa services and procedures). The factors of quality can be used as the tools for evaluating the competitiveness of the spa destination, they can support effective quality management and, last but not least, they can enable effective targeting of marketing communication strategy of the destination as well as the service providers in the spa destination.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: spa destination, tourism, destination quality, factors of destination quality, visitors satisfaction, competitiveness.

1. INTRODUCTION

Spa industry is becoming the world's largest and fastest growing leisure industry (Cohen, 2008). Spa tourism is gaining more popularity not only among those who are looking for the improvement of their health condition, but also among people who are seeking an escape from the stress of the daily routine and like to relax by using professional services (Larrubia and Luque, 2002). A visitor to a spa centre is the key element of competitiveness and prosperity of spa tourism; it is crucial to capture all client's preferences. As a result of this, it is essential to add recreational function to the traditional curative and preventive function of spa resorts. To keep up with competition it is necessary to meet the latest trends and quality requirements in spa industry.

Spa industry is a significant part of tourism in Slovakia. Nowadays there are 25 registered spa destinations in the area of the Slovak Republic. The demand for Slovak spas is relatively stable (every year about 120,000 Slovaks stay in domestic spas; and approximately 50% of these stays are with the contribution of their health insurance company) and according to Gúčík et al. (2016) it was not even influenced in a dramatically negative way by the economic recession in 2009. According to SACR (2016) the sector of spa industry participates by approximately 20% on the sales of accommodation services in the area of tourism in Slovakia in the long run. There was a decrease to 17.4% in the year of 2015.

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With increasing globalization (political, economic and social changes) and by combining services and products specific for a particular region (e.g. sport or cultural activities), spa resorts could be the drivers of local/regional development (Antunes, 2012).

The aim of this article is to identify and present the key factors determining the perception of spa destination quality in Slovakia, their significance to visitors and their relation to gender and individual age groups.

2. MATERIAL AND METHODS

Bieger (2008) defines the destination as a space (region) which the visitor chooses as a target of the journey. Buhalis (2003) defines five characteristic components of each destination: Attractions, Accessibility and ancillary services, Amenities, Available packages, Activities.

According to Pásková and Zelenka (2012) a spa destination can be considered to be the complex of accommodation, boarding, therapeutic and rehabilitation procedures using the sources of mineral and thermal springs, medicinal effects of healing muds, caves or even seas.

As Jandová (2009) states, according to the extent of offered services and recommended lengths the spa stays can be divided to:

- Therapeutic stay
- Rehabilitation-therapeutic stay
- Outpatient spa stay
- Reconditioning stay
- Rehabilitation-holiday stay

The Ministry of Health of the Slovak Republic distinguishes outpatient and institutional spa stays only and they differ in the level of the patient's financial participation (complex or contributory care).

In connection with the changing lifestyle that emphasizes health, the spa destinations began offering a whole range of stays for so called self-payers (not entitled to receiving a contributions from their health insurance companies). These are usually rehabilitation-holiday stays and wellness stays that include a variety of procedures and programmes focused on healthy lifestyle, detoxification, relaxation, weight reduction, fitness activities and so on. Puczskó and Smith (2009) define wellness as one of the spa tourism areas that offers complex body care including the care of mental health and appearance as well. The typical feature of a wellness stay is the option to choose any of the destinations arbitrarily and the shorter length of the stay (on average 4 days – while a spa stay is usually 3 weeks long).

The questionnaire survey among Slovak inhabitants was used to obtain the data for evaluating the quality factors of the spa destination and to reveal their significance for the visitor to the spa destination. The sample of 419 respondents was created by the intentional quota selection. The duration of data gathering was from February to April 2017. Five-point scaling was used in the questions, which aimed at revealing the significance of quality factors perceived by the visitors, where number five represents the highest significance of a particular factor. The 20 research destination quality factors used in the survey were chosen on the base of the theoretical and empirical research and models related to quality destination (Buhalis, 2003; Middleton and Clarke, 2001; Woods and Deegan, 2003; Grönroos, 2007) and own previous research (Ryglova et al., 2015).

In order to find out whether the evaluation of the significance of individual quality factors is dependent on gender and age, the Kruskal-Wallis test was used. The null hypothesis for this test is stated as follows, for each group (age or gender) the evaluation of examined factor has the same distribution. The rejection of the null hypothesis means that the dependence of the particular factor on age or gender has been proven, so differences between groups are statistically significant. The impact of the research factors on the loyalty towards the destination was tested by means of the multidimensional regression analysis.

3. RESULTS AND DISCUSSION

The order of factors determining the overall destination quality based on the significance perceived by the visitors to Slovak ($n = 419$) spa destinations is shown in Table 1. The significance was based on the average evaluation values of respondents.

Table 1 The order of quality factors based on the significance perceived by the visitors to the spa destination

Number of factor	Factor	Mean	Median	Std. Dev.	KW-test gender	KW-test age
20	Offer of spa services and procedures	4,33	5	0,89	No	No
4	Food	4,31	4	0,82	No	No
13	Level of personnel quality in tourism services	4,28	4	0,85	Yes	Yes
3	Accommodation	4,26	4	0,90	No	Yes
15	Destination cleanliness	4,24	4	0,88	No	No
14	Sense of security	4,18	4	0,92	Yes	Yes
12	Level of prices of services and goods in the destination	4,16	4	0,89	No	No
1	Natural attractions	4,02	4	1,00	No	No
17	Uniqueness of destination	3,92	4	0,97	No	No
9	Information and communication prior to arrival	3,90	4	0,96	Yes	No
11	Image of the destination	3,87	4	0,94	No	No
5	Social and experiential events	3,74	4	1,00	No	No
8	Availability and quality of information in the destination	3,67	4	1,02	No	No
16	Overcrowding of the destination	3,66	4	0,95	No	No
6	Availability of transportation to the destination	3,65	4	1,04	No	No
2	Cultural attractions	3,62	4	1,09	No	Yes
19	Respecting sustainable development of the destination	3,60	4	0,94	No	No
18	Additional infrastructure	3,52	4	1,00	No	No
10	Friendly acceptance by the locals	3,50	4	1,03	No	No
7	Local transportation	3,10	3	1,18	No	Yes

Source: authors

The special offers of various spa services and procedures, food/gastronomy and the level of personnel quality in tourism services have been found as the most significant factors of destination quality for the domestic visitors to Slovakian spas. On the other hand, additional infrastructure, friendly acceptance by the locals and local transportation show the least significance for the respondents. Taking the median and standard deviation into account, which are also shown in Table 1, all 20 research factors are relevant for the respondents.

The offer of spa services and procedures is not only the most significant quality factor for respondents. The complex offer of spa services and procedures can also strengthen the competitiveness among other spa resorts (Gúčík et al., 2016). According to Kučerová, Marečková (2013) the offer of Slovak spa resorts should reflect the needs of procedures and spa services regarding the target group of visitors.

The research of consumer behaviour in spa services in the Czech Republic (Mlejnková, 2011) brings similar findings, where the most significant factors for selecting spa resorts were the availability and attraction of the destination and the offer of spa services.

Table 1 also shows the results of dependence of the spa destinations quality factors on gender and age of the respondents. The value Yes means that the dependence of the particular factor on gender or age has been proven. The dependence on gender at 5% significance level has been proven in 3 factors out of 20 (15%). At 5% significance level dependence on age has been proven in case of 5 factors out of 20 (25%).

Next Table 2 shows the detail division of the respondents based on gender and age, which provides better orientation among different target groups.

Table 2 Mean value of quality factors for individual age groups and gender

Num. of factor	Factor	Mean male	Mean female	Mean 18-23 years	Mean 24-30 years	Mean 31-40 years	Mean 41-50 years	Mean 51-60 years	Mean 61-70 years	Mean 71 and over
1	Natural attractions	4,07	3,99	3,98	4,00	3,81	4,02	4,10	4,17	3,94
2	Cultural attractions	3,63	3,60	3,61	3,45	3,53	3,35	3,81	3,93	3,81
3	Accommodation	4,29	4,24	3,71	4,16	4,13	4,42	4,40	4,47	4,50
4	Food	4,32	4,31	4,13	4,25	4,32	4,49	4,32	4,34	4,06
5	Social and experiential events	3,71	3,75	3,82	3,66	3,72	3,61	3,95	3,73	3,31
6	Availability of transportation to the destination	3,56	3,71	3,73	3,52	3,74	3,69	3,78	3,41	3,63
7	Local transportation	3,06	3,13	3,23	2,66	3,17	3,04	3,42	3,15	2,63
8	Availability and quality of information in the destination	3,65	3,68	3,59	3,50	3,87	3,71	3,72	3,64	3,56
9	Information and communication prior to arrival	3,78	3,97	3,79	3,83	3,96	4,04	3,84	3,93	3,75
10	Friendly acceptance by the locals	3,54	3,48	3,27	3,31	3,49	3,61	3,53	3,66	3,75
11	Image of the destination	3,85	3,88	3,73	4,03	3,81	3,90	3,86	3,88	3,63
12	Level of prices of services and goods in the destination	4,10	4,20	3,84	4,09	4,09	4,27	4,38	4,14	4,19
13	Level of personnel quality in tourism services	4,20	4,33	3,89	4,27	4,17	4,49	4,38	4,27	4,38
14	Sense of security	4,07	4,25	3,86	4,13	4,15	4,37	4,32	4,05	4,25
15	Destination cleanliness	4,17	4,28	4,04	4,31	4,26	4,35	4,24	4,12	4,38
16	Overcrowding of the destination	3,68	3,65	3,54	3,73	3,66	3,73	3,72	3,56	3,44
17	Uniqueness of destination	3,93	3,91	3,55	3,94	3,79	4,08	3,98	4,03	3,88
18	Additional infrastructure	3,43	3,58	3,43	3,44	3,51	3,60	3,58	3,56	3,31
19	Respecting sustainable development of the destination	3,60	3,61	3,50	3,38	3,60	3,66	3,76	3,64	3,56
20	Offer of spa services and procedures	4,29	4,35	3,57	4,08	4,26	4,56	4,59	4,54	4,69

Source: authors

As it is shown in Table 2, in case of those factors where the dependence on gender was proven the average rating of women is higher than men. The dependence on age is not the same for all factors. In those cases, where the dependence on age was proven, the average rating of respondents 41 years and over is higher than rating by the younger generations. More specifically, factors 13 and 14 have the highest ratings in category 41-50 years, factor 7 in category 51-60 years, factor 2 in category 61-70 years and factor 3 in category 71 years and over.

The research also paid attention to the *impact of the quality factors on the visitors' loyalty towards the destination*. Considering the satisfaction with quality factors and the *intention to visit the destination once again*, five factors show impact on loyalty. Those five factors are:

- food,
- the availability of transportation to the destination,
- the image of the destination,
- the uniqueness of the destination,
- the offer of spa services and procedures.

When considering the satisfaction with factors and the *intention to recommend the spa destination to others*, the result is slightly different. Those factors are:

- food,
- the image of the destination,
- the uniqueness of the destination,
- the offer of spa services and procedures,

- accommodation.

First four factors are the same, only the factor of accommodation is added here. Therefore, generally speaking, six factors of destination quality have the direct impact on loyalty towards the spa destination.

4. CONCLUSION

The contribution of this research is the identification of the significance of individual quality factors of the Slovak spa destination among different age groups and gender of domestic respondents. The research confirmed that the significance of individual quality factors differs with the age and gender of respondents. These findings are important and can be used not only by destination management when targeting products to a specific target group but also by the providers of spa services. By diversifying product offerings they can attract new types of customers, so they will be able to gain competitive advantage among other spa service providers.

Regarding different age groups foreign researchers Boekstein (2014) and Peris-Ortiz, Del Rio, Alvarez (2015) were dealing with motivation, which leads to visiting spa resorts. Younger people more tend to visit spa resorts to relax. On the other hand, elderly people are more likely to seek the improvement of their health.

Spa tourism does not depend on the weather or season, the average length of stay is much longer than in case of other types of tourism and it can be settled by public health insurance. All of these specifics make spa tourism a significant part of Slovak tourism. Therefore it is necessary to be more concerned about the quality of the destination and its offerings.

Acknowledgements

The results presented in this paper are part of the project No. 15-21179S „The Quality Evaluation of Tourism Destination“, which is conducted with support of Grant Agency of the Czech Republic.

References

- Antunes, J.G. O reposicionamento do termalismo como estratégia de desenvolvimento turístico. O caso da região Dão-Lafões. *Revista de Turismo e Desenvolvimento*, 17-18, 2012, pp. 1469-1480, ISSN: 1645-9261.
- Bieger, T. *Management of destinations. (Management von Destinationen)*. 7th Ed. Oldenburg Wissenschaftsverlag, 2008. München.
- Boekstein, M. Tourism, health and the changing role of thermal springs-should South Africa reposition its thermal spring tourism product? *African Journal of Hospitality, Tourism and Leisure*, volume 3, Issue 2, 2014, pp. 1-9, ISSN: 2223-814X.
- Buhalis, D. *eTourism: Information technology for Strategic Tourism Management*. Prentice Hall, 2003. London.
- Cohen, M. Spas, wellness and human evolution. In M. Cohen & G. Bodeker (Eds.), *Understanding the global spa industry*, 2008, pp. 3–25. London: Butterworth-Heinemann.
- Grönroos, C. *Service Management and Marketing: Customer Management in Service Competition*, John Wiley & Sons, 2007. New York, USA.
- Gúčík, M., Kvasnová, D., Pančíková, K. Medical spa versus health tourism [online]. 2016 [cit. 2017-07-20]. Available from: <http://aak.cms.opf.slu.cz/pdf/2016/2/Gucik%20a%20kol.pdf>
- Jandová, D.: *Balneologie*. Praha: Grada Publishing, 2009. ISBN 978-80-247-2820-9.
- Kučerová, J., Marečeková, R. Inovácie vo vybraných kúpeľných miestach na Slovensku. In: *Folia Turistica* 3. Banská Bystrica: Univerzita Mateja Bela, Ekonomická fakulta, 2013, pp. 68-78. ISBN 978-80-8141-040-6.
- Larrubia, R.; Luque, A.M. Las estaciones termales en Andalucía: de la explotación tradicional a la configuración de un nuevo producto turístico integral. *Cuadernos de Turismo*, volume 10, 2002, pp. 101-122, ISSN: 1139-7861.
- Middleton, V. T. C., Clarke, J. R. *Marketing in Travel and Tourism*, Butterworth-Heinemann, 2001. Boston.
- Mlejnková, L. Spotřební chování v lázeňském cestovním ruchu České Republiky. 2011, 19(1). ISSN 0572-3043.
- Peris-Ortiz, M., Del Río, M.C.; Álvarez, J. Barriers to Implementing Quality Management in Spanish Thalassotherapy Centers. In: Peris-Ortiz, M. & Álvarez, J. (Eds.), *Health and Wellness Tourism*, Switzerland. Springer International Publishing, 2015. ISBN: 978-3-319-11489-7.

- Pásková, M., Zelenka, J. Výkladový slovník cestovního ruchu. 2. vyd. Praha: MMR ČR, 2002, 768 p. ISBN 978-80-7201-880-2.
- Puczkó, L., Smith, M. Health and wellness tourism. Oxford: Butterworth-Heinemann, 2009. 400 p. ISBN 978-0-7506-8343-2.
- Ryglová, K., Vajčnerová, I., Šácha, J., Stojarová, Š. The Quality as a Competitive Factor of the Destination. In *Procedia Economics and Finance*. 2015. pp. 550-556. DOI: 10.1016/S2212-5671(15)01667-6.
- SACR: Statistiky [online]. 2016 [cit. 2017-04-16]. Dostupné z: <http://www.sacr.sk/sacr/statistiky/>
- Vyhláška Ministerstva zdravotníctva Slovenskej republiky [online]. 2008, Dostupné z: http://www.pravo-medicina.sk/_files/30_2006.pdf
- Woods, M., Deegan, J. A Warm Welcome for destination quality brands: the example of the Pays Cathare region, *International Journal of Tourism Research*, 2003. Vol. 5, No. 4, pp. 269–282.

BEST EMPLOYER SURVEYS IN SLOVAKIA: THEIR ROLE IN EMPLOYER BRANDING

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ABSTRACT

The article presents a theoretical framework to initiate discussion on reasons for involving participation in various “Best employer” (BE) surveys as a part of organisations’ employer branding strategies. The concept of employer branding has already been widely introduced in Slovak businesses which also gave rise to the popularity of various local BE surveys. The aim of the article is to analyse the existing Slovak BE surveys and evaluate their potential and usefulness in the process of employer branding. With regard to the recent shortage of qualified workforce in Slovakia, especially in the manufacturing sector, we apply theoretical knowledge on employer branding to identify reasons why “best employer” surveys are a potentially powerful tool of enhancing HR processes and how employers can benefit from them.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: best employer survey, employer branding, Slovakia.

1. INTRODUCTION

In the last two decades, employer branding (EB) has received a great deal of attention both in academia and management practice. Now widely applied in practice as it is, the concept draws from a range of disciplines, predominantly human resources (HR) management, marketing, organisational behaviour and psychology. However, practical application of EB since the late 1990s has been in contrast with the stage of theory and academic research in the EB field. Several authors in the EB domain pointed to the underdeveloped “embryonic” state of the EB theory (e.g. Moroko and Uncles, 2008; Love and Singh, 2011). As a result, while many companies are embracing EB in quest for attracting and retaining the best talent and the topic is widely prevalent in press and management practice, both the theoretical definition and conceptual framework of EB still remain somewhat dissonant. Nevertheless, the practitioner community heavily relies on EB as a powerful tool to communicate the desired message about their organisation as an employer. Organisations which intend to strengthen their EB and position themselves as employers of choice can choose from a variety of activities such as traditional advertising featuring EB image, maintaining a recruitment website including a careers section, supporting academic publications, classic public relations activities, supporting its graduate recruiting via partnership with universities or participating in the best employer surveys thus securing a place in the ranking of “employers of choice”. While the variety of available EB activities is plentiful, in this article we only focus on best employer (BE) surveys as a tool for EB in Slovakia. The aim is to analyse existing BE surveys in Slovakia in which organisations can participate within their EB efforts and outline their potential in the process of EB.

1.1. Employer branding and its benefits

From the academic point of view, EB is strongly linked to the disciplines of human resource management and marketing, but also to aspects that stretch beyond these domains such as organisational culture (e.g. Mosley, 2007), psychological contract (e.g. Miles and Mangold, 2004; Backhaus and Tikoo, 2004) and other concepts belonging to the domain of organisational behaviour. However, academic research in the field seems to be overwhelmed by the popularity that EB has enjoyed in management practice. Managers’ perceptions of the characteristics of successful/unsuccessful employer brands, however, have not been empirically examined (Moroko and

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Uncles, 2008). As a result, EB has evolved into a theoretically “unfinished” concept which is widely applied in practice, albeit its theoretical fragmentation. Other related concepts include e.g. employment branding (Ewing et al., 2002; Berthon et al., 2005), employer reputation (Brooks et al., 2003) workplace branding (Love and Singh, 2011) or employee attractiveness (Berthon et al., 2005). Most of them emerged on the very same underlying principle of attracting and retaining skilled employees in context of the tightening employment market, demographic and social factors.

The term ‘employer brand’ appears to have first been used by Ambler and Barrow (1996) who tested the application of brand management techniques to HR management, indicating that marketing can indeed be applied to the employment situation, and defined employer brand as “the package of functional, economic and psychological benefits provided by employment, and identified with the employing company.” Since Ambler and Barrow (1996), many authors have provided definitions and conceptual frameworks of EB. For example Lloyd (2002) described EB as the “sum of a company’s efforts to communicate to existing and prospective staff that it is a desirable place to work.” According to Ewing et al. (2002) “employer branding is concerned with building an image in the minds of the potential labour market that the company, above all others, is a ‘great place to work’”. Sullivan (2004) referred to EB as “a targeted, long-term strategy to manage the awareness and perceptions of employees, potential employees, and related stakeholders with regards to a particular firm”. Furthermore, Backhaus and Tikoo (2004) noted that “the term employer branding suggests the differentiation of a firm’s characteristics as an employer from those of its competitors.” In its employer branding research, CIPD defined an employer brand as “...a set of attributes and qualities, often intangible, that makes an organisation distinctive, promises a particular kind of employment experience, and appeals to those people who will thrive and perform best in its culture (CIPD, 2008). Clearly, the variety of available EB definitions is plentiful. Most authors agree that key characteristics of the EB process are differentiation (as in traditional branding) and managing awareness and perceptions of (potential) employees about organisation as a potential employer. However, a comprehensive theoretical foundation of the EB concept has not yet been fully established though over time, the concept EB has gained complexity and started to obtain a more multidisciplinary character.

Academic research on the EB topic has shown that the potential list of benefits that EB brings about can be rather impressive. Variables that have been examined in relation to EB include e.g. staff turnover/retention, employee satisfaction; pay level, quality and quantity of candidate pool in the recruitment process or candidates’ intentions to apply. For example Aon consultancy (2009) reported that companies which rank as best employers get nearly twice as many job applications per employee than other organisations. Clearly, the size of the candidate pool brings about increased chances to find the right talent. The link between the image of an employer and the probability that candidates will apply to that employer has been examined in early 1990s already. Gatewood et al. (1993) revealed a positive correlation between the two variables, showing that a good image of an organisation can increase intentions to apply. Furthermore, reduced employee turnover and enhanced employee satisfaction are other benefits of EB efforts (see e.g. Miles and Mangold, 2004). Also, organisations effectively cultivating their employer brand have increased chances to gain competitive advantage, help employees internalize company values and support employee retention (The Conference Board, 2001). As Sullivan (2004) points out, “a successful EB management effort increases both the number and quality of applicants, reduces the turnover rate among top performers, and increases overall workforce productivity.” Companies with a strong employer brand can potentially reduce the costs of employee acquisition (Ritson, 2002). Another research (Turban and Cable, 2003) proved a strong connection between the employer reputation among undergraduate students and the number of applications for work in that organisation. Employer reputation has also been proved to play a role in reward management. Assuming that “individuals who feel more proud about affiliating with an organisation require a lower minimum salary to accept a given position with the organisation” Cable and Turban (2003) examined the minimum salary that job seekers require to accept a job. They found that “applicants are willing to pay premiums to accept jobs at certain firms because individuals value the pride that they expect from membership in reputable firms.”

As we implied above, most authors in the EB domain as well as most managers understand EB primarily in the recruitment context. However, there are opinions arguing that EB stretches beyond recruitment and talent acquisition, eventually having impact on employee engagement, leadership or performance management. Such dichotomy in EB perceptions largely determines the way how

companies organize their EB activities internally. One approach is to leave the whole stage to HR, arguing that EB is a matter of recruitment after all. Yet, it seems that this is hardly the case. For example, “an exclusive survey of 1,889 *Personnel Today* readers with responsibility for recruitment reveals that 95% of respondents believe employer branding is ‘important’, with 80% saying that it will become even more so. And yet only 25% of those surveyed have responsibility for employer branding.” (Wilcock, 2005). Furthermore, CIPD research shows that many practitioners dealing with EB experience “fragmentation of ownership, with poor communication between departments in the process.” (CIPD, 2008). Clearly, the departments obviously engaged in EB to the highest degree are HR and marketing. Both play a vital role in the EB process because in theory as well as in practice, EB is positioned at the very intersection between traditional HR activities and consumer/corporate branding. Certainly, there are some characteristics of consumer and corporate branding that are consistent with EB – especially being known and noticeable, being seen as relevant and resonant and being differentiated from direct competitors; still other characteristics of EB are additional to those of consumer/corporate branding, e.g. fulfilling a psychological contract (Moroko and Uncles, 2008). It might seem that the characteristics both domains have in common are at the centre of EB, explaining EB as a replica of traditional marketing in the employment context. According to this view, it should be sufficient if HR managers put on a marketing (or rather branding) cap to apply the well-established principles in context of talent acquisition. However, research and practice suggest that actual EB implementation is somewhat more complicated. Competing perspectives of HR and marketing in a number of companies show that the turf war has by far no clear winner yet. The call for accordance between marketing and HR has been voiced clearly (e.g. Chimhanzi, 2004; Chimhanzi and Morgan, 2005; Martin and Beaumont, 2003) but the opinions for establishing such congruence in organisational setting vary. Some propose that the role of marketing should be expanded further to the HR role. For example Martin and Beaumont (2003: ix) argue that “the literature concerned with the psychological contract and that on employer of choice and EB has similar messages. However, the marketing-oriented discourse of the latter two might be more useful than the concept of the psychological contract to HR practitioners trying to engage colleagues from other functions.”

1.2 Best employer surveys as a tool of employer branding

In their 2006 study, Joo and McLean defined a best employer (BE) survey (study) as “a study that aims at identifying employers of choice from voluntarily participating organisations for the purpose of employer branding, using tools such as HR practices inventory and employee opinion surveys that are geared toward measuring employees’ perceptions of HR practices, culture, leadership, personal and professional growth opportunities, pride in work and/or company, fairness, work-life integration, compensation and so on. [...] BE surveys are rooted, in large part, in the desire to communicate that organisations vary in the desirability of employment they offer” (Joo and McLean, 2006). Still, unlike most other employer branding activities, best employer (BE) surveys have a strong distinguishing factor that makes them so appealing to EB practitioners, i.e. benchmarking. Ranking grants employer attractiveness the quantification aspect; suddenly taking any employer branding initiative beyond words.

Being an employer of choice is a status that many organisations want to take pride in and utilize in their talent acquisition strategy. “In general, these surveys are widely distributed (targeting thousands of employers), cover fairly exhaustive “best HR practices” and the results receive top media/press attention” (Love and Singh, 2011). However, being an employer of choice officially stamped by a prominent BE ranking also increases the commitment to maintain the status and make sure that the company appears in the ranking next year as well. “It is believed that EB cannot be just the flavour of one season and the truly great workplaces need to consistently outperform their peers. [...] This phenomenon can be described as ‘sustenance of employer attractiveness’ (Saini et al, 2014). Worldwide, there are dozens of prominent BE surveys including Fortune’s 100 Best Companies to Work for and Aon Best Employers just to mention some of them, including hundreds of regional and local versions. As for the evaluation criteria, Love and Singh (2011) identified eight common themes in reviewing the criteria ratings for five different BE studies: Inspired Leadership, Strategic Plan that promotes “Best Employer HR practices”, Employee Communication, Performance Management,

Training and Development, Benefits based on “best practices”, Physical Workspace and Corporate Citizenship.”

Naturally, top-ranking employers in the BE surveys enjoy an imprint of certain prominence at the labour market. Being recognized as a top employer can enhance chances of top talent attraction. Some employers of choice incorporate their “prominence” solely in their recruitment strategy, others promote their good results in a BE survey internally as well in order to enhance satisfaction, loyalty and commitment of the existing workforce. Certainly, results of BE surveys can serve as a powerful tool in the branding process both externally and internally, helping companies gain competitive advantage in the war for talent. While this explains why so many employers are eager to participate in various BE surveys, it is also important to focus on other benefits and potential risks that BE surveys can possibly bring about.

2. MATERIAL AND METHODS

The main goal of the article is to analyse BE surveys in Slovakia and evaluate their potential and usefulness in the process of employer branding. In line with the main goal, we have posted the following research questions for our study: (1) How do Slovak BE surveys differ from each other in terms of criteria used in assessing employer attractiveness? (2) How do evaluation processes differ in researched BE surveys? (3) What kind of feedback do participating organisations receive? (4) What are the benefits for taking part in a particular BE survey for employers?

We have analysed the following four BE surveys taking place in the Slovak business environment, which have been organised for at least five years in the Slovak business environment:

1. *Aon Best Employer Slovakia* (see Aon, 2017a,b) is an employee engagement and satisfaction study organised by a global professional services company Aon operating in 120 countries. In Slovakia, the study has been organised annually since 2005 by local division Aon Hewitt, using a world-proven methodology. Based on the results of a study on employees' view on different areas of their work experience, and their overall satisfaction with employment, the success of the company is evaluated and compared to the market. The title “Aon Best Employer” is awarded to companies with the best scores. The companies compete in two categories according to their size (of country units), and more than one winner (with the same score) is possible in each category. The title is usually awarded to 4-10 companies every year.
2. *The Najzamestnávateľ* survey (see Profesia, 2015) is organised annually since 2012 by job portal providing the biggest platform for e-recruitment in Slovakia. The survey, which title can be translated as “BestEmployer”, combines nominations of a jury with public votes to identify best employers in different industries as seen by general public.
3. *Family Friendly Employer Award* (see IVPR, 2014; Pietruchová 2016; original Slovak title is “Zamestnávateľ ústretový k rodine, rodovej rovnosti a rovnosti príležitostí”) organised since 2000 by the Ministry of Labour, Social Affairs and Family of the Slovak Republic and administered by the Institute for Labour and Family Research is a survey focusing on issues of workplace gender equality, and creating family friendly working conditions for employees who make efforts to help reconcile work and family life. The survey was first organised annually, since 2011 it has been organised every two years.
4. The *Most Desired Employer* survey (see Nexteria, 2015) has been realised since 2013 by a non-governmental organisation Nexteria focusing on developing young generation of responsible future leaders. The survey is realised on a sample of university students studying in Slovakia, whereas these are divided according to their area of study into three groups: business, IT, and engineering, and are provided with questionnaires adjusted to their area of study (and most likely future work). The survey aims to identify “employers of choice” in each category of students, and grasp the underlying factors.

In order to compare the studies, we have analysed methodologies published on the websites of researched BE surveys, as well as related documents, such as survey instruments and post-survey feedback reports. The surveys were compared based on the following criteria: (a) Criteria for

participation in the survey, i.e. whether taking part in the survey is limited by any organisational characteristics or not. (b) Main focus of the survey, i.e. what the survey primarily assesses in order to recognise the best employer. (c) Survey process, i.e. what the course of the study is, whether it is a multiple-hurdle process or not. (d) Respondents, i.e. who presents their perception of inquired employer qualities via responding to a predetermined questionnaire or poll. (e) Post-survey feedback, i.e. what kind of feedback (if any) do participating organisations receive; whether it is generalised, or prepared individually for each participating organisation; and the depth and main focus of the feedback.

3. RESULTS AND DISCUSSION

As depicted in Table 1, there are notable differences among surveys striving to find employers worth admiration in the Slovak business environment. They differ not only in the criteria used for assessing employer attractiveness, and the course of the evaluation process, but also in the basic focus and choice of main evaluators of perceived employer qualities, and thus the quality, nature and depth of feedback they are able to provide to participating organisations. Although all of them offer some kind of formal recognition in terms of award, certificate, or publicity, the criteria for achieving the way how the “best employer” issue is approached significantly differs.

First of all, not all the studies are available for every company willing to assess its attractiveness and compare with others operating in the same environment. To enter *Aon BE Slovakia*, organisations have to meet local, regional, and global criteria on minimum number of full-time employees employed globally as well as in relevant region and country. Though the country unit only needs to have at least 50 full-time employees (+ min. 3 years of operation in Slovakia) to enter the survey, it still has to be part of a global company adhering to the rest of the criteria, too. In *the Most Desired Employer* survey, to have the chance to be considered by respondents as an “employer of choice”, the organisation has to be listed on one of the questionnaires (depending on its area of operation) by survey organisers. However, there is a possibility to enter the survey by being named as “desired employer” by respondents who have the chance to add any other organisation they see as their “dream employer” even if it is not on the list. Even though entering the survey this way is possible, the probability to get enough votes to rank among the most desired employers this way is much lower than being part of the list of nominations. In order to enter the remaining two surveys, organisations only have to meet the condition of operating in Slovakia.

The focus of the BE surveys ranges from the quality of internal HR processes and leadership, high employee satisfaction and engagement as perceived by actual employees of each participating organisation (*Aon BE Slovakia*), through the quality and impact of gender equality and family-friendly workplace measures being perceived and assessed by professional jury (*Family Friendly Employer Award*), to general perception of “employer of choice” by university students (*The Most Desired Employer*) or general public voting on the perceived attractiveness of companies pre-selected by a jury (*Najzamestnávateľ* survey). Accordingly, the initial information about participating organisation in a form of filled-in questionnaire completed by its formal representative bears a different importance in the whole survey process. While in some surveys it is not required at all, as they rely solely on the opinions of employees or students, in others it presents fundamental information based on which companies might proceed or be eliminated from further steps of the survey process. Obviously, answering the survey key questions by representatives of participating organisations goes hand in hand with the existence of professional jury assessing the submitted information and either short listing the organisations or even deciding the winners.

While it might seem that the main benefit BE surveys bring lies solely in the formal recognition of the winners, it is not completely true. Regardless of the position in the actual rank, taking part in BE survey might provide its participants with valuable information that might be further used to enhance employer branding strategies. First, it is important to understand, what kind of information is available post-survey, and whether this only summarises the results in general (*Family Friendly Employer Award* and *The Most Desired Employer*), or there is customized information for individual participants, such as actual state of employee satisfaction and engagement in an organisation, and comparison within local and regional markets, and industry (*Aon Best Employers Slovakia*), or profile of an average respondent voting for the organisation, and attributes respondents

associate with it with their level being compared within industry as well as all nominated companies (*Najzamestnávateľ* survey). Though *The Most Desired Employer* survey has a potential to give specific feedback on the reasons for choosing or refusing particular employers, or the factors most strongly influencing the choice of future employer within the group of respondents preferring (or rejecting) particular employer, only general feedback is provided post-survey.

Table 1 Best Employer Surveys in Slovakia

	<i>Aon Best Employers Slovakia</i>	<i>Najzamestnávateľ</i> Survey	<i>Family Friendly Employer Award</i>	<i>The Most Desired Employer</i>
Criteria for Participation	Local criteria (in Slovakia): ≥ 50 full-time employees ≥ 3 years of operation Regional criteria (CEE): ≥ 1000 full-time employees Global criteria: ≥ 5000 full-time employees ≥ 30% employed outside the headquarter country	Organisations operating in Slovakia	Organisations operating in Slovakia	Organisations operating in Slovakia nominated by either <i>Nexteria</i> or survey respondents
Main Focus	Effective leadership High performance orientation A compelling employer brand High employee engagement	Perception of "employer of choice", job-related and brand-related factors by general public.	Gender Equality (actual state and arrangements) Family friendly workplace measures	"Employer of choice" and "Inconvenient employer" + reasons for seeing it that way Factors influencing the choice of future employer
Survey process	1. Application and questionnaire preparation 2. Data collection / questionnaire survey 3. Results presentation, feedback and follow-up activities	1. Registering + questionnaire for organisation 2. Filtering participants / scoring the questionnaires 3. Selecting short-list by jury 4. Public voting/questionnaire 5. Presenting results + feedback	1. Registering + questionnaire for organisation 2. Assessment by jury 3. Results presentation	1. Data collection at Slovak universities / questionnaire survey 2. Results presentation
Questionnaire respondents	Employees of participated employer	Participating organisation General public	Participating organisation	University students
Existence of a jury	No	Yes	Yes	No
Post-survey Feedback	Actual state of employee satisfaction and engagement for each participating company. Comparison within local and regional markets, and industry	Comparison within industry/all nominated companies. Profile of an average respondent voting for the particular company. Attributes respondents associate with the company.	General feedback	General feedback

Source: Based on public data on individual survey methodologies, websites, and related survey documents.

For practitioners engaged in building and cultivating employer brands of their organisations, it must be a great reward to see their company name appear on top ranks of the BE list. Not only it seems as a tangible return on substantial EB investments, it also bestows companies to mark their recruitment ads with an impressive BE stamp. Also, the benchmarking character of BE surveys is in line with a general management fixation with rankings and tables. However, one fact employers should be aware while pursuing their EB strategy through BE surveys is that communicating a strong employer brand on the basis of poor HR practices, organisational culture, leadership or other organisational aspects is very unlikely to yield the desired EB benefits. A truly strong employer brand must inevitably be supported by what the actual workforce genuinely feels and thinks about "their" organisation. Thus participating in a BE survey with the primary goal to earn "the Stamp" without prior work on above-mentioned organisational aspects can potentially backfire, generating candidates with unrealistic expectations or – even worse – producing new employees who soon will feel the breach of the psychological contract.

Furthermore, winning a BE survey does not entirely cover the full potential of participation in it. Since ranking criteria in most of the prominent BE surveys are largely known and most employers feel a strong pressure to re-appear in the rankings regularly, a question arises what is the distinguishing factor that genuinely makes the winners the best companies to work for. Given all benefits of appearing on top ranks of the BE list and its positive impact on EB, how long can it take before competitors apply the same set of HR best practices to secure a top rank on the list? Employers worldwide might ask themselves this and similar questions while adjusting their HR and EB policies

accordingly. Clearly, Slovak employers are no exception, let alone they have to take into account certain specifics of the local economic landscape and labour market. The robust economic performance along with rising employment is starting to pose challenge on HR in terms of talent acquisition. According to OECD (2017), GDP growth exceeded 3.5% on average in 2015 and 2016 and is projected to stay strong in the next two years. A strong labour market has been a traditional arena for EB practices. Indeed, Slovak employers in some industries (especially manufacturing) need to fight the war for talent twice – first to attract employees, especially young people, to work within the industry, only then acquire talent for the company. The function of the education system has been discussed for decades; still the system fails to educate students in line with the current and future needs of the labour market. Moreover, the collaboration between the business world and educational institutions is not adequately supported (Urbancová et al. 2005). Demographic context of a fast-ageing population is making the shortage of skilled workforce even more alarming. The Slovak population, which is currently one of the youngest in the EU, is projected to become the 8th oldest by 2060. As a consequence, the share of working-age in total population could shrink from 71% today to 55% in 2060 (OECD, 2017).

BE surveys are by all means a powerful EB tool, especially in a strong labour market. As more and more employers are adopting the approach of competing to become employers of choice, saturation is another problem that might appear over time. What if a majority of organisations will once have a proud award attached to their recruitment ads? Will the overload with best employers make candidates less sensitive? Organisations engaged in EB have to consider this issue in their long-term EB strategies. Those who will want to sustain their competitive advantage and continue to be distinguished will perhaps have to find innovative ways to do so.

4. CONCLUSION

Best employer surveys present a powerful tool in employer branding strategies not only for the winners who take pride in displaying the BE award “stamp”. Participating organisations can benefit from valuable feedback that, if understood and handled in terms of both survey assets and limitations, can provide an important addition to organisation’s information base for sustainable employer branding strategy. It is very important that employers keep in mind that BE surveys – just like employer branding itself – are no panacea for recruitment and talent acquisition. Indeed, only a long-term thoughtful building of the employer brand internally and externally can eventually support organisation’s image in minds of potential employees.

References

- Ambler, T., Barrow S. 1996. The employer brand. *Journal of Brand Management*. 4(3): 185-206.
- Aon. 2009. *What Makes a Company a Best Employer?* Retrieved from: http://www.aon.com/attachments/thought-leadership/pov_Best_Employer_Position_Paper.pdf. Accessed July 28, 2017.
- Aon. 2017a. Aon Best Employers. [online] Retrieved from: <http://bestemployerseurope.aon.com/sk/news/about/?lang=en>. Accessed July 28, 2017.
- Aon. 2017b. How to participate. Retrieved from: <http://bestemployerseurope.aon.com/sk/how-can-my-company-participate/?lang=en>. Accessed July 28, 2017.
- Backhaus, K., Tikoo, S. 2004. Conceptualizing and researching employer branding. *Career Development International* 9(5): 501-517.
- Berthon, P., Ewing, M. T., Hah, L. L. 2005. Captivating company: dimensions of attractiveness in employer branding. *International Journal of Advertising* 24(2): 151-172.
- Brooks, M. B., Highhouse S., Russel, S. S., Mohr, D. C. 2003. Familiarity, Ambivalence and Firm Reputation: Is Corporate Fame a Double-Edged Sword? *Journal of Applied Psychology* 88(5): 904-914.
- Cable, D. M., Turban, D. B. (2003). The value of organizational reputation in the recruitment context: A brand-equity perspective. *Journal of Applied Social Psychology* 33(11):2244-2266.
- Chartered Institute of Personnel and Development (CIPD). 2008. *Employer branding: a no-nonsense approach*. London: CIPD.
- Chimhanzi, J. 2004. The impact of marketing/HR interactions in marketing strategy implementation. *European Journal of Marketing* 38(1/2): 73-98.
- Chimhanzi, J., Morgan, R. E. 2005. Explanations from the marketing/human resources dyad for marketing strategy implementation effectiveness in service firms. *Journal of Business Research* 58(6): 787-796.
- Ewing, M. T., Pitt, L. F., de Bussy, N. M., Berthon, P. 2002. Employment branding in the knowledge economy. *International Journal of Advertising* 21(1): 3-22.

- Gatewood, R. D., Gowan M. A., Lautenschlager, G. J. 1993. Corporate image, recruitment image, and initial job choice decisions. *Academy of Management Journal*. 36(2):414-427.
- IVPR, 2014. 12. ročník súťaže Zamestnávateľ ústretový k rodine, rodovej rovnosti a rovnosti príležitostí. Retrieved from: http://www.ceit.sk/IVPR/images/IVPR/2014/sutaz_12_rocnik_maj_2014.pdf. Accessed August 30, 2017.
- Joo, BK, and Mclean, G. 2006. Best employer studies: A conceptual model from a literature review and a case study. *Human Resource Development Review* 5(2): 228-257.
- Lloyd, S. 2002. Branding from the inside out. *Business Review Weekly* 24(10): 64-66.
- Love, L. F., Singh, P. 2011. Workplace branding: Leveraging human resources management practices for competitive advantage through "best employer" surveys. *Journal of Business and Psychology* 26(2): 175-181.
- Martin, G., Beaumont, P. B. 2003. *Branding and People Management: What's in a Name?* London: CIPD.
- Miles, S. J., Mangold, G. 2004. A conceptualization of the employee branding process. *Journal of Relationship Marketing*. 3(2/3): 65-87.
- Moroko, L., Uncles, M. D. 2008. Characteristics of successful employee brands. *Journal of Brand Management* 16(3): 160-175.
- Mosley, R.W. 2007. Customer experience, organisational culture and the employer brand. *Brand Management*, 15(2): 123-34.
- Nexteria. 2015. *V ankete o najžiadanejšieho tech zamestnávateľa zvíťazil Eset*. Retrieved from: <http://nexteria.sk/o-nas/pressroom/>. Accessed August 30, 2017.
- OECD Economic Surveys, Slovak Republic. June 2017. Retrieved from: www.oecd.org/economy/surveys/economic-survey-slovak-republic.htm. Accessed July 27 2017.
- Pietruchová, O. 2016. *Slovensko: a focus on encouraging parents and older people into the workplace*. Retrieved from: <http://www.gender.gov.sk/en/slovakia-a-focus-on-encouraging-parents-and-older-people-into-the-workplace/>. Accessed August 30, 2017.
- Profesia. 2015. *What is the Najzamestnávateľ?* [online] Retrieved from: <http://www.najzamestnavatel.sk/en/co-je-naj-zamestnavatel/> Accessed August 30, 2017.
- Ritson, M. 2002. Marketing and HR collaborate to harness employer brand power. *Marketing*. 24 (October):18.
- Saini, G. K., Rai, P., Chaudhary, M. K. 2014. What do best employer surveys reveal about employer branding and intention to apply? *Journal of Brand Management* 21(2): 95-111.
- Sullivan, J. 2004. Eight elements of a successful employer brand. *ER Daily*. February 23. Retrieved from: <https://www.ereadia.com/ere/the-8-elements-of-a-successful-employment-brand/> Accessed July 22, 2017.
- The Conference Board. 2001. *Engaging Employees through Your Brand*. The Conference Board. New York, NY.
- Turban, D. B., Cable, D. M. 2003. Firm reputation and applicant pool characteristics. *Journal of Organizational Behaviour*. 24: 733-751.
- Urbancová, H., Stachová, K., Stacho, Z. 2015. Methods of recruitment in the Czech and Slovak organisations. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis* 63(3): 1051-1060.
- Wilcock, R. 2005. Employer branding is key in fight for talent. *Personnel Today* May 17: 4.

DIFFERENCES IN THE ORGANIZATIONAL STRUCTURE OF FAMILY BUSINESSES IN THE SLOVAK REPUBLIC

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ABSTRACT

This paper deals with the issue of family businesses, which have recently gained significant importance in the global market environment, and may be considered to be the oldest and the most natural form of a business enterprise. The key factor which differentiates a family business from a non-family one is that it is comprised of the most basic societal structure, the family unit. The main objective of this paper is to determine what type of organizational structure is preferred by family businesses in Slovakia. An empirical survey was conducted in order to obtain information about the organizational structures of family businesses operating in the Slovak market. The paper provides a comprehensive view of the organizational arrangements of the family-business relationships in Slovak family businesses, which influences the whole management of the company, in practice. At the same time, this fact can be considered as one of the key factors of their permanent sustainability.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: family business, organizational structure, performance.

1. INTRODUCTION

Prosperous enterprises cannot exist without a good quality organizational structure. Organizational structure helps the enterprises to prevent development of chaos in management, which at the same time eliminates negative influences that can jeopardize the whole operation of an enterprise. As stated by Kober et al. (2007), Zavadská et al. (2013) and Zavadsky et al. (2014), it is essential that a model of organizational structure be in accordance with the material and financial resources, the workforce, and the know-how of the enterprise. At the same time, the field of industry of the enterprise must be taken into consideration, as well as its geographic location, and strategy. It must be pointed out that at present, there is no universal model of an effective organizational structure of a family enterprise. In the economy and among public, family businesses hold a very strong position. Despite this, they have not been given substantial attention. According to Collins et al. (2011), Kraus et al. (2011) and Miller et al. (2005), family businesses differ from other enterprises as to ownership, management, social philosophy, but also their approach towards managing the enterprise and its internal relations. Family businesses are largely different, while these differences must be taken into consideration within their whole operation, organizational structure including. With regard to the above mentioned, the main objective of this paper is to determine what type of organizational structure is preferred by family businesses in Slovakia.

2. MATERIAL AND METHODS

Besides long-term sustainability of their business operations, family businesses (FB), similarly as the non-family ones, are attempting to grow continually. This, at the same time, means changing the organizational structure from simple to a complex one. According to researches conducted in Europe, America, and Asia, as stated by authors Miller et al. (2005), Astrachan et al. (2006), Dewi et al. (2012), Volkov (2014), and Wang (2014), the three most commonly used types of organizational structure in family businesses are: simple, functional, and divisional. According to Hoffman et al. (2006), Zavadsky et al. (2014), and Wang (2014), organizational structure is closely related to the size of an enterprise, and in this case also to the proportional representation of family and non-family

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employees who work there. A structure commonly used in small enterprises identifies two organizational levels: management (members of family) and employees (members of family or people outside family). Decision-making is normally greatly centralized, as claimed by Kober et al. (2007), while the owner makes the most important decisions, and is involved in each detail and phase of business operations. Therefore, we speak about a simple organizational structure. This organizational structure enables flexibility and dynamics in entrepreneurship. Decisions can be made quickly. Gomez-Mejiva et al. (2011), Lunenburg (2012), and Zavadská et al. (2013) agree on the fact that with the growth of an enterprise, its supervision and control become a rather complex role for only one person. When an enterprise uses a functional organizational structure, managers are able to specialize in certain important decisions, and often become more efficient in fulfilling their tasks. Sicoli (2013) and Chevers et al. (2014) point out that this structure reduces the duplication of the management effort. It enables the general manager (owner) to focus on the supervision and control of the whole enterprise and its management, to develop and maintain important relationships with suppliers and customers, and to create an overall strategy for operating the enterprise. On the other hand, Kellermans et al. (2004), Zachary (2011), and Bee et al. (2014) warn that the functional organizational structure often violates the principle of management unity, and results in conflict. Family businesses are especially prone to conflict, considering the particularities of their organizational structure. Conflict is established as a result of dominant presence of the family, absence of clearly stated rules and divided competencies, an insufficiently formalized system to solve problems, absence of formal organizational structure and financing, as well as mixing of the entrepreneurial and family roles. Diversification, as stated by Wang (2014), is often a growing strategy not only in FBs, but also in non-family enterprises, and can thus lead to an enterprise choosing to introduce a divisional organizational structure. There are two types of divisional structure: M-form (multinational organizations) and H-form (holdings). The first type is based on multiple enterprises in related areas of their individual activities, and the other type is a holding enterprise, which is a result of unrelated diversifications. In this organizational structure, the manager of each department/section is normally a member of the family, and can dedicate his work to his/her department more easily. This specialization helps to achieve positive results, and as a result of strong will, may also win over competitors.

2.1 Methods

Methodology of this paper was divided into four stages. In the first stage of our research, it was necessary to perform an extensive search of Slovak and foreign literature, via the method of analysis of secondary sources. The main objective of this stage was to clearly define the problem of our research and create a theoretical basis for correct determination of a typical organizational structure of FBs in Slovakia. The authors of the research used such methods of scientific work as: summarization, synthesis of the acquired knowledge, and the methods of analogy and deduction. The second stage of the research focused on analyzing the primary sources acquired within the empirical stage, this performed via the questioning method. The questionnaire was aimed at finding out what the typical organizational structure used by FBs in Slovakia is. The data resulting from the questionnaire survey were evaluated by descriptive method, in a numerical and graphic way. Within the third stage of the research, a typical organizational structure used by FBs in Slovakia was created. The use of a systematic approach enabled the authors to propose a frame model of organizational structure. In the last stage of the research, the authors used the methods of analogy, deduction, and summarization of the acquired knowledge, to define theoretical and practical contributions of the conducted research.

2.2 Data collection and the research sample

The conducted empirical research represented the foundation to acquiring the knowledge of organizational structure of family businesses in Slovakia. With regard to the fact that FBs in Slovakia are not clearly defined in legislation, it was necessary to identify them first. As a foundation to further research, the authors decided to adhere to the definition of a family business used by the European Commission, which was recommended to all EU member states. As stated in Mandl (2008), FB is: “a firm of any size in which the majority of votes is in possession of the natural person(s) who established the firm, or in possession of the natural person(s) who has/have acquired the share capital of the firm, or in the possession of their spouses, parents, child or children’s direct heirs. At the same

time, At least one representative of the family or kin is involved in the management or administration of the firm. Listed companies meet the definition of family enterprise, if the person who established or acquired the firm (share capital) or their families or descendants possess 25 % of the right to vote mandated by their share capital.”

The questionnaire was distributed among 912 enterprises operating in the Slovak market, and sent in an electronic form via internet. The researchers received 386 filled-in questionnaires, which represents the return rate of 42.32 %. However, the criteria of the above stated definition of FB were only met by 254 filled-in questionnaires, which represents 27.85 % return rate of all distributed questionnaires. The questions were constructed in a way that enabled the most specific identification of the most frequently used organizational structure of FBs in Slovakia. The questionnaire was divided into two parts, as follows:

- Part A – 3 questions: identification of family businesses (A1 – A3),
- Part B – 14 questions: identification of the formal organizational structure of FB (B4 – B17). Questions in part B focused mainly on finding out the legal form of enterprises, the position of the founder or the successor within the enterprise and the family, the total number of employees in the FB, the ratio of family and non-family employees, position of the family members in the enterprise, management and ownership of the FB, number of family generations working in the FB, and the coordination of the individual departments in the FB.

3. RESULTS

In the following part of this paper, the authors present the results of a questionnaire survey focused on the identification of a typical organizational structure of FBs in Slovakia. The results are evaluated with the use of a descriptive method.

The research results have revealed that FBs in Slovakia, as presented in Figure 1, mostly operate on the basis of a self-employed trade license (almost 60 % of all responses). Limited liability in its different forms is used in 31 % of family businesses, and 7 % of FBs are self-employed farmers. Other FBs operate as different legal forms of business.



Figure 1 Legal forms of business of FBs in Slovakia

Source: authors

FBs of all eight regions of Slovakia were represented in the questionnaire sample. The structure of the sample is as follows: 12.2 % FBs are from Bratislava region, 9.5% from Nitra region, 12 % from Trnava and 12.6 % from Trenčín regions, 17 % FB were from Žilina region, 13.4 % from Banská Bystrica, 9.8 % from Prešov, and 14.2 % from Košice regions.

The research has revealed that 68.11 % of our respondents hold the post of an owner in the FB, while other respondents are co-owners. Besides holding these positions in their respective FB, the empirical research has shown that 44.1 % of our respondents are also the General Managers (directors) in the enterprise, 20.1 % are managers, and 24 % of respondents have no specific position in the given FB. The response “other” was indicated by 11.8 % of our respondents.

The following question focused on finding out the position of the FB’s founder in his/her family. The results have shown that founders are mostly the husband or the wife in the family, as claimed by 73.2 % of respondents, 20.4 % of the founders are the brother/sister in the family, 4.7 % of

respondents are in the position of the son/daughter, and only 1.7 % of our respondents are common-law spouses.

As to the number of staff, FBs mostly employ up to nine employees, which was indicated by 75.6 % of respondents. The second largest group were FBs constituted of 10 to 49 employees, as stated by 20.86 % of respondents. Only 3.54 % of family businesses in our sample employ more than 49 employees, while no FB employs more than 250.

The majority representation in FBs is by family members. Moreover, 76.40 % of all questioned FBs only employ the family members, and only 23.60 %, which represents 60 family businesses, employ staff outside their family, along with the family members.

The next question asked about the position of the family members in the FB. As shown in Figure 2, family members mostly hold positions of co-owners in the FB, as indicated by 60 % of respondents. The post of the General Manager (director) was indicated by 12 % of respondents, the managerial position by 15.70 %, and 3.5 % of respondents claimed that their family members hold the position of an employee.

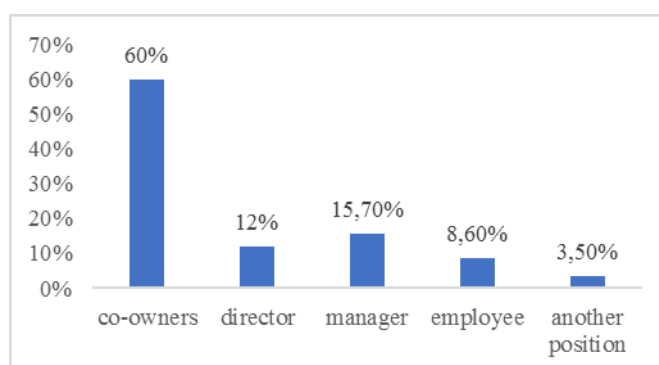


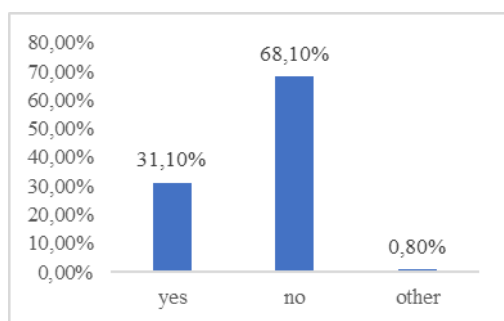
Figure 2 Position of family members in FBs

Source: authors

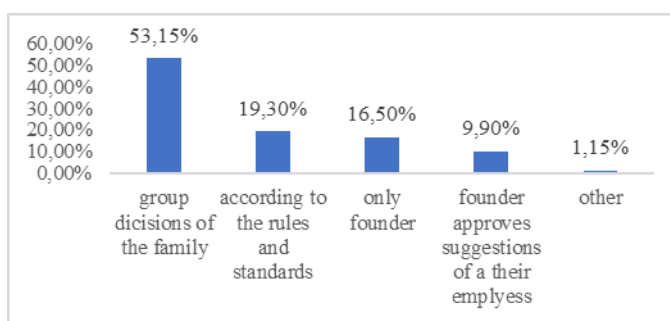
An important focus of our research was the ownership and management in FBs. The results indicate that as much as 83.5 % of FBs' ownership is solely in the hands of the family members. On the other hand, 16.5 % FBs have the ownership and management of the enterprise divided, while the family is the sole owner of the FB, and the management is formed by both the family and non-family employees.

As it can be interpreted from Figure 3, the formal organizational structure, in which the authority and responsibilities are clearly divided, is only represented by 31.1 % of FBs. As many as 68.1 % of FBs do not have a clearly defined organizational structure. This situation relates to the fact that the majority of FBs in our questionnaire research are self-employed, or have a sole trader's license respectively.

As to decision making in FBs, for 53.15 % of our respondents, group decisions of the family are essential. 19.3 % of FBs make decisions on the basis of rules and standards. However, on the other hand, 16.5 % of the questioned have indicated that the founder of the enterprise makes decisions him/herself, and in 10 % of cases, the founder approves suggestions of other employees. These results are presented in Figure 4.

**Figure 3 Organizational structure of FBs**

Source: authors

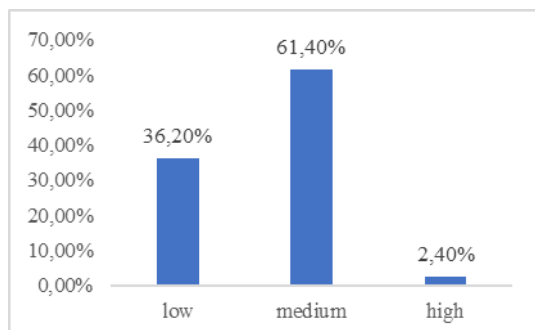
**Figure 4 Decision making in FBs**

Source: authors

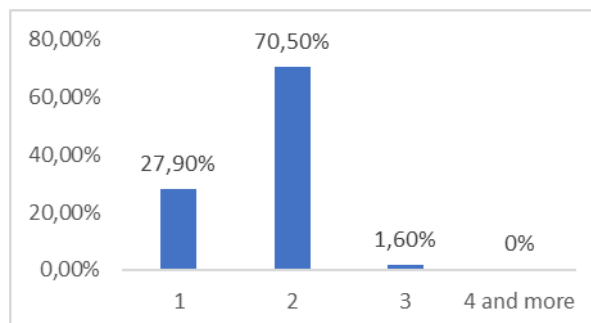
If a negotiation is to take place in a FB, it is mostly held at home, as stated by 54.33 % of respondents. 19.29 % provide a separate conference room or another special place they use for this purpose. Only 15.75 % of our respondents organize their negotiations in the founder's office. Since almost 10 % of respondents stated that they do not conduct any negotiations, they do not have a special place that would serve the purpose.

Figure 5 clearly shows that coordination between the individual parts (departments or sections) of the FB is perceived at an average (medium) level, as indicated by 61.4 % of our respondents. On the other hand, 36.2 % claim that coordination between the departments is low, and only 2.4 % consider the level of cooperation between departments in a FB as high.

The last area of our interest was the number of generations working along each other in a FB. As indicated in Figure 6, the empirical research has found out that most frequently it is two generations that work together in a FB (parents and children), which was indicated by 70.5 % of our respondents. The second largest group (27.9 % of FB) is formed by enterprises where only one generation is represented. There are, however, such FBs where three generations of a family work alongside each other. This was indicated by only 1.6 % of respondents.

**Figure 5 Coordination between departments**

Source: authors

**Figure 6 Number of generations working in FBs**

Source: authors

3.1 Summary of the achieved results

The results of our questionnaire survey have revealed that the majority of family businesses in Slovakia operate on the basis of the self-employed trade license, or have formed a limited liability enterprise. The questionnaire was distributed among the owners and co-owners of FBs, who at the same time hold the position of the General Manager (director) or a manager. Founders of family businesses are mainly those who hold the position of the husband/wife in the family. Since family businesses in Slovakia mostly employ nine and less persons, FBs can be ranked among micro enterprises. The second largest group is represented by small enterprises, where the FBs employ between 10-49 persons. As stated by Collins et al. (2011), Dewi et al. (2012), and Bee et al. (2014), a typical feature of these enterprises is employing family members. This fact has been proved in our empirical research among FBs in Slovakia. The results of the research indicate that it is three quarters of all family businesses which only employ members of the family. Family members are mainly holding the positions of co-owners and managers within the enterprises. As to the ownership and

management of the FB, it is exclusively in the hands of the family members. Similarly, the family does not allow a non-family employee's presence in management. Comparable results were obtained in a research of Wang (2014), who examined the organizational structure of family businesses in Taiwan. Similar to FBs in Taiwan, the Slovak family businesses do not operate under a formal organizational structure. Decisions in FBs are mostly made by the family. The fact that FBs connect the family life with the business life can be proved by the fact that business meetings most frequently take place at home. So as to preserve FBs for future generations, it is essential to secure the owner's successor. The research results prove that it is usually two generations that work together in a FB (parents and their children). As it was stated in Kober et al. (2007), this is a typical feature of sustainability of family businesses.

4. DISCUSSION

Based on the analysis of the secondary sources, and the outcomes of the questionnaire survey, a model of organizational structure of family businesses in Slovakia has been proposed as shown in Figure 7. The model should be viewed as a general expression of the most frequently used organizational structure of family businesses in Slovakia, which, in business practice, may be adjusted to serve the needs of the individual family businesses.

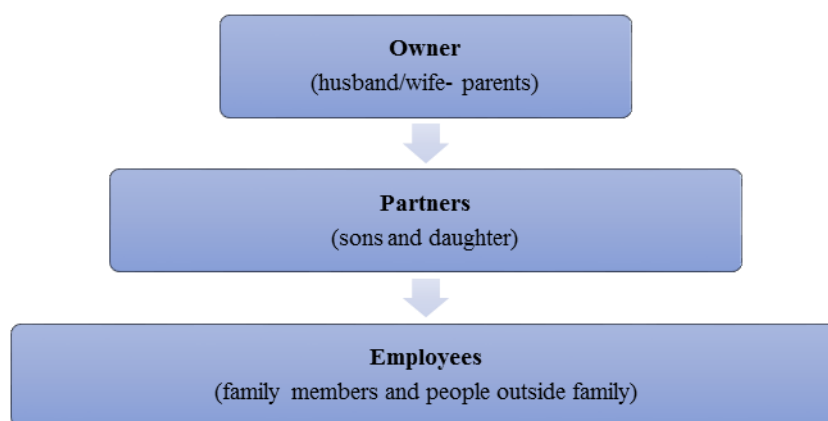


Figure 7 A typical organizational structure of family businesses in Slovakia

Source: authors

As it is obvious from Figure 7, family businesses in Slovakia use a simple organizational structure, which is typical for micro and small enterprises. Mostly frequently, as agreed upon by different authors, i.e. Miller et al. (2005), Lunenburg (2012), Volkov (2014), Wang (2014), and Bikar et al. (2016), this organizational structure is not formally constituted in the family business, but rather it is based on the arrangement of family relations. There is, therefore, a massive overlap of family and business relations. As claimed by Yui et al. (2007) and Granovetter (1995), in family or non-family businesses, two types of authority are distinguished, i.e. management, and ownership. In this case, both management and ownership are solely in the hand of the family. As shown in Figure 7, the presence of non-family employees is only accepted at the lower levels. These employees only fulfill the decisions made by the family members. As to the decision-making itself, the hierarchy and the power to make decisions is clearly determined, but the responsibility for the individual decisions is unclear. The reason is, as presented by Zachary (2011) and Sicoli (2013), that the family makes decisions as a whole. It is for this reason that one person cannot take responsibility for the decisions which have been made together. Wang (2014) suggests that coordination which functions in a family business is most often at the middle level. Management of the enterprise is, based on this organizational structure, oriented on the liking, or the lack of, towards individual employees (family members). It must be pointed out that two generations work together in a FB, thus creating the primary level for decision making. Most frequently, as claimed by Anderson et al. (2003) and Kober et al. (2007), the position of the co-owner is acquired by the child, who will become the successor of the enterprise's founder – the oldest son/daughter. On the other hand, according to Miller et al. (2005) and Wang (2014), the relation among all three indicated levels is the same (provided that it is only

family members who work in the FB). This structure is interfered into, as stressed by Zachary (2011), by one more issue that represents a typical factor of FBs, i.e. the family ethics of the arrangement of relationships. The founder is considered to be the 'head' of the enterprise, while other family members (mainly children) perceive him/her as the leader.

5. CONCLUSION

In family businesses, similarly to non-family ones, it is important to implement the formal organizational structure. For its long-term existence, sustainability and efficiency, effective management is required. Even though family businesses belong among the oldest type of enterprises, not enough attention is paid to them in Slovakia. With regard to the fact that in Slovakia family entrepreneurship is not legally defined, these enterprises remain hidden among others, non-family, enterprises. The conducted empirical research which investigated the organizational structure of family businesses in Slovakia has found out that these enterprises use a simple organizational structure. This structure is not formally constituted, but rather results from how the authority in the family is organized. Since in Slovakia no holistic research related to the number of family businesses has been conducted, it is not possible to claim that the results of the questionnaire survey may be applied into the whole population. In the future, it will be inevitable for the Slovak Republic, as well as other countries, to pay more attention to family businesses and their problems.

Acknowledgements

This paper has been written as a partial result of the following projects: VEGA MŠ No. 1/0010/17, No. 1/0802/16, and APVV-14-0506.

References

- Anderson, R. C., Reeb, D. M., 2003. Founding-family ownership and firm performance: evidence from the S&P 500. *Journal of Finance* 58(3):1301-1327.
- Astrachan, H. J., Shanker, M. C., 2006. Family businesses' contribution to the U.S. economy: a closer look. *Family Business Review* 16(3): 211-219.
- Bee, C., Neubaum, D. O., 2014. The role of cognitive appraisal and emotions of family members in the family business system. *Journal of Family Business Strategy* 5(3):323-333.
- Bikar, M., Vavrova, K., 2016. Global movements of major world indices: the performance comparison. In 16th International scientific conference on globalization and its socio-economic consequences. Rajecke Teplice, Slovakia, p. 191-198.
- Collins, L., O'Regan, N., 2011. Editorial: The evolving field of family business. *Journal of Family Business Management* 1(1):5-13.
- Dewi, A. C. E., Dhewanto, W., 2012. Key success factors of Islamic family business, In *International Conferences of the Asia Pacific Business Innovation and Technology Management*. Pattaya, Thailand, p. 53-60.
- Gomez-Mejia, L. R., Cruz, C., Berrone, P., De Castro, J., 2011. The bind that ties: Socioemotional wealth preservation in family firms. *The Academy of Management Annals* 5: 653-707.
- Granovetter, M., 1995. Coase revisited: business groups in a modern economy. *Industrial and Corporate Change* 4(1): 93-130.
- Hoffman, J., Hoelscher, M., Sorenson, R., 2006. Achieving sustained competitive advantage: A family capital theory. *Family Business Review* 19(2): 135-145.
- Chevers, D. A., Chevers, J. E., 2014. The impact of information technology material weakness on corporate governance changes in family-owned businesses. *International Journal of Business and Social Science* 5(6): 87-96.
- Kellermans, F. W., Eddleston, K. A., 2004. Feuding families: When conflict does a family firm good. *Entrepreneurship Theory and Practice* 28(3): 209-228.
- Kober, R., Ng, J., Paul, B. J., 2007. The interrelationship between management control mechanisms and strategy. *Management Accounting Research* 18(4): 425-452.
- Kraus, S., Harms, R., Fink, M., 2011. Family firm research: Sketching a research field. *Journal of Entrepreneurship and Innovation Management* 13(1): 32-47.
- Lunenburg, F. C., 2012. Organizational structure: Mitzberg's framework. *International Journal of Scholarly, Academic, Intellectual Diversity* 14(1): 1-8.
- Mandl, I. 2008. *Overview of family business relevant issues. 1st edition*. KMU Forschung Austria – Vienna. pp. 169.
- Miller, D., Le Breton-Miller, I., 2005. Management insights from great and struggling family businesses. *Long Range Planning* 38(6): 517-530.
- Sicoli, G., 2013. Role of corporate governance business in the family business. *The Global Conference on Business and Finance Proceedings* 8(1): 8-16.

- Volkov, D. A., 2014. Family business in Russia: results of the empirical research. *World applied sciences journal* 30(4): 468-474.
- Wang, Ch., 2014. The organizational evolutions and strategies of family businesses in Taiwan. *Open Journal of Business and Management* 2(1): 329-338.
- Yiu, D. W., Lu, Y., Bruton, G. D., Hoskisson, R. E., 2007. Business groups: an integrated model to focus future research. *Journal of Management Studies* 44(8): 1551-1579.
- Zachary, R. K., 2011. The importance of the family system in family business. *Journal of Family Business Management* 1(1): 26-36.
- Zavadska, Z., Zavadsky, J., Sirotiakova, M., 2013. Process model and its real application in the selected management areas. *E & M Ekonomie a Management* 16(1):113-127.
- Zavadsky, J., Zavadska, Z., 2014. Utilisation of business process models in managerial practice: An empirical study in Slovak companies certified to the ISO 9001 standard. *Total Quality Management & Business Excellence* 25(3-4): 319-337.

HOW THE INTERNAL STAKEHOLDERS OF LARGE CORPORATIONS PERCEIVE THE IMPLEMENTATION OF CONTROLLING

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ABSTRACT

Controlling is a key tool which enables enterprises to enhance their management system, achieve the determined goals, and improve their performance. The main objective of this paper is to propose such frame model of implementing, promoting, and utilizing controlling in corporate practice of large enterprises in Slovakia, which will place emphasis on respecting the psychological aspects of perceiving controlling by the individual internal stakeholders. Within an empirical research, a questionnaire was used as a method to survey the given problem in the business practice of large enterprises in Slovakia. As the final step, a standardized model of implementing, promoting, and using controlling in large enterprises was proposed. The model will facilitate the acceptance of controlling by all internal stakeholders, who should realize and understand its benefits. In this way, barriers to implementing the model in an enterprise will be eliminated.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: controlling, psychological aspects, large corporations.

1. INTRODUCTION

Jung (2014) defines controlling as a system that focuses on improving the management of an enterprise and achieving the determined goals. According to Zavadská et al. (2013), Benciková et al. (2016), Vavrova et al. (2016) and Musa et al. (2017), controlling is gaining more and more popularity mainly across large enterprises on Slovakia. It is very important to stabilize the philosophy of controlling in the minds of all employees of the company in compliance with the complexity of managerial direction. Controlling can function effectively in the enterprise only if it is understood and accepted by all internal business interest groups (stakeholders). Controlling cannot be fully functional without controllers and managers' cooperation, nor can it work without effective staffing. Based on the above, psychology and psychological aspects of perceiving controlling are an integral part of it. If an enterprise pays enough attention to the psychological aspect of perceiving controlling from the point of view of all internal stakeholders, the implementation and use of controlling in the enterprise should be smooth and respected by staff at every working position. From the above it is clear that the subject of psychological aspects of controlling is a very up-to-date issue and requires deeper exploration.

2. MATERIAL AND METHODS

Eschenbach et al. (2012) understands controlling in the business terminology as regulating standards, strategies, finances, markets, processes, information and behavior to support management, to achieve business goals. As Jung points out (2014), controlling is not only used as a short-term solution to problems but it is a tool that must be permanently integrated into the enterprise. Implementing controlling into enterprise, as reported by Bradley (2008), Chebukina et al. (2013), and Jung (2014), is neither a short-term nor a simple matter. Practice has shown that the concept of gradual introduction of controlling into an enterprise is much more effective. The idea stated above is supported by Eschenbach (2004), who also claims the same effect in terms of its continued

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implementation into the enterprise. The position of controlling in an enterprise depends on understanding its role by all internal interest groups. Rautenstrauch (2005) and Le Flanchec et al. (2017) report that frequent problems in controlling include conflicts between the controller and the manager. Hence, their effective cooperation is important, as managers guide staff at lower stages in the enterprise. One way to ensure an effective operation of all people in an enterprise is to clearly separate the assignments and competencies. The division of tasks in the enterprise at all levels depends on the size and type of the enterprise. However, Eschenbach et al. (2012), Zavadska et al. (2013), and Osorio (2017) emphasize that there are six working psychological rules applicable to the working relationship between the controller and the managers. The first rule is motivation. An enterprise can greatly influence the motivation of its employees by its activities. As Lumpkin et al. (1996) presents, an individual cannot be motivated in one particular way, neither can the same type of motivation work with all employees in the same way. The second rule is communication that affects a number of factors in an enterprise. In order to make communication as effective as possible for the use of controlling, according to Willcocks et al. (2000), it is necessary for each employee to decide on the need to communicate with superiors, meaning not to be strictly given to whom and with whom he/she can speak. As Musa et al. (2015) and Bikar et al. (2016) emphasize that an enterprise supported by information can only work if every employee takes responsibility for information, communication and labor relations within his area of responsibility. Feedback, as an additional psychological rule, is not only based on verbal or non-verbal information, but according to Andreas (2004) and Le Flanchec et al. (2017), also consists of working climate, expectations and corporate culture. Expectation is an important psychological tool, as both positive and negative expectations are reflected in employees' performance. Eschenbach et al. (2014) suggest that enforcement is of paramount importance in introducing controlling. The enforcement of intentions can be done by exerting pressure on employees or by using one's own method based on the individual behavior of each person. People react to the pressure that is developed in different ways. Yerkes-Dodson's law states that the relationship between performance and tension has a shape of U curve turned upside down, meaning that at medium pressure, the best performance is achieved. The optimum pressure level has an indirect proportion to the difficulty of the task. Another factor is trust building. Trust, as reported by Le Flanchec et al. (2017), is most often characterized at the workplace as an expectation from an organization or a leader that they will act within common moral ideas or values. According to Eschenbach (2004), trusting the controller does not mean that the employee or manager honors or unconditionally possesses the same views. It is a belief that he or she is morally clean and reliable. Change, as the last rule, is a crucial factor. Soulsby (1998) and Eschenbach et al. (2012) state that employees react differently to change. When controlling is introduced, there are a number of changes in the company that can induce psychological hostility in employees. Based on the above, the controller should introduce changes so as not to challenge employees against controlling, but to see the changes introduced positively. The main objective of this paper is to propose such framework model for the implementation, enforcement and use of controlling in corporate practice of large enterprises in Slovakia that will focus on respecting the psychological aspects of perceiving controlling by individual internal stakeholders.

2.1 Methods

There are four stages of the contribution methodology. In the first stage of the solution process it was necessary to carry out a literature research of domestic and foreign authors based on the analysis of secondary sources. At this stage, methods of scientific work such as summarization, knowledge synthesis, and methods of analogy and deduction were used. In the second stage, the analysis was focused on empirical research with the use of inquiry method. The questionnaire was orientated on the detection of psychological factors in the practice of Slovak large enterprises which influence perception of financial and non-financial benefits and barriers to controlling by individual internal interest groups of the enterprise in the phase of implementation, enforcement and use of controlling in practice. Questionnaire survey data were evaluated in a descriptive way, numerically and graphically. In the third stage, a framework model for the implementation, enforcement and the use of controlling in large companies has been proposed, while its implementation will lead to the adoption of controlling by all internal stakeholders. The framework model is designed with the use of system

access. In the final stage, theoretical and practical benefits of the research were defined by means of analogy, deduction and summation of knowledge.

2.2 Collection of the data and the research sample

An empirical survey was the starting point for learning about the issue. According to the Statistical Office, at the time of the survey there were 647 large companies registered in the territory of the Slovak Republic. The questionnaire was distributed among 4,935 subjects and the survey was completed by 412 respondents, meaning that there was 8.35% return on questionnaires. An electronic questionnaire was sent to employees and owners of all types of businesses (micro, small, medium, and large). Out of all enterprises, 117 questionnaires were filled by large enterprises. Given the differences of these enterprises between large and medium or small enterprises, particular attention has been paid to large enterprises. The questionnaire was divided into four parts, as follows:

- Part A – 5 questions: Fundamental characteristics of an enterprise.
- Part B – 4 questions: Implementation and enforcement of controlling.
- Part C – 7 questions: Benefits and barriers of controlling.
- Part D – 2 questions: Psychological aspects.

Questions in Part A focused on the size of the enterprise, the purpose of the business, length of the operations of enterprises in the market, legal form of business, and the position of the respondents in the enterprise. Questions in Part B were directed to the respondent's opinions on what should precede the implementation of controlling in the enterprise, in what way the controlling should be introduced, and what factors are necessary for the implementation of controlling. Questions in Part C addressed the issue of financial and non-financial benefits of controlling, and barriers to its implementation and enforcement in the enterprise. In the last part of the questionnaire, the respondents reported on the impact of controlling on selected facts by the use of Likert scale. In the last question, the respondents reported their feelings of introducing and building controlling.

3. RESULTS AND DISCUSSION

In the following part, the results of the questionnaire survey focused on the evaluation of the impact of psychological factors while introducing and enforcing controlling of Slovak large enterprises on internal interest groups are presented.

Half of the surveyed companies are production enterprises, 39% stated that their enterprise is involved in non-production activities. Depending on the length of time the businesses operate in the market, the largest group, precisely 75%, of enterprises, have been in the market for more than 15 years. Less than 15 years of operation in the market was indicated by 16% of enterprises. As to the legal form of business, the highest percentage of respondents are joint stock companies (61%), 29% are limited liability companies, and 5% are state-owned enterprises. As the respondent's position in the enterprise played a significant role in the questionnaire survey, the following question addressed this fact. The survey found out that up to 70% of respondents are employees, 29% of the respondents work in the company as managers and 1% of the respondents are the business owners.

In the next part of the empirical survey, the most appropriate way of implementing controlling in the enterprise was analyzed. As the results show, none of the responses have a significant predominant representation and according to 19% of respondents the phasing-in is the most appropriate way, i.e. into the whole enterprise at one time. Likewise, 19% implements the downward setup - from top management to individual organizational units. As the results of the questionnaire survey confirm, it is not possible to determine one single way of implementing controlling in an enterprise as the most suitable for all enterprises. Nevertheless, there is a need to select the appropriate way of implementation for each enterprise individually. The following question was aimed at examining respondents' opinions about what should precede the implementation of controlling in an enterprise. The results of the survey show that the most important pre-implementation steps are the analysis of the organizational structure, the familiarization of employees at all levels with the forthcoming changes, the analysis of the job tasks in the individual job positions, and the training.

In the implementation part of the questionnaire, attention was also paid to the individual psychological rules and their application and influence on the implementation and enforcement of controlling in the enterprise. All psychological rules have a large to very large effect on the results of

the survey. Communication has the greatest impact (95% of respondents think that it has a large impact). Based on the results of the survey, we can state that all the above mentioned facts are of great importance in implementing and enforcing controlling in an enterprise, and that the management of the company should not neglect any of them.

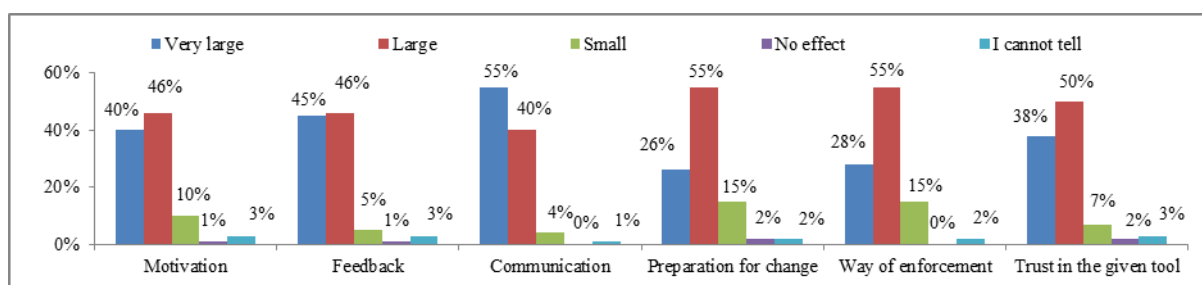


Figure 1 Influence of business practice on controlling

Source: authors

The following part of the questionnaire addressed the effective introduction of controlling into the enterprise. Up to 25% of respondents point out that it is necessary to introduce such management style that uses the initiative and suggestions of senior managers for the adoption of important operational decisions to implement controlling effectively. 20% of respondents recommend to revise the system of planning and control. The survey results indicate that up to 65% of enterprises have already introduced controlling in their operations, 21% of respondents do not know whether controlling has been implemented, 10% are planning to implement it, and 4% have neither implemented controlling nor plan to do so. This situation can be considered very favorable because up to three quarters of enterprises have already implemented controlling, or plan to implement it. The next question asked what respondents think about introducing controlling into an enterprise. Nearly half of the respondents think that introducing controlling is a good solution for their enterprise and 35% think it is necessary for them. 8% of respondents consider implementation of controlling to be the necessity of the business environment.

The attention was further paid to the financial and non-financial benefits of implementing controlling into an enterprise. The most important financial benefits of controlling appear to be the more precise financial plans and their fulfillment (27%), the growth of the economic result (23%) and the increase in the value of the enterprise (17%). Growth of the enterprise's profitability has a 12% representation, followed by growth of cash flow (8%), growth in the average wage in the enterprise (7%), and growth in the enterprise's liquidity (3%). Only 1% of respondents think that controlling has no financial benefits for the enterprise. The most important non-financial benefit of controlling for the enterprise was identified as clarification of information supporting optimum managerial decisions (19%). Only 1% less respondents indicated the improvement of corporate processes with reduction of costs as an effect. The third most significant benefit with 16% representation was control of the achievement of enterprise's goals and goals at lower management levels. Almost 13% of respondents indicated increasing the efficiency of quality of processes and the possibility of detecting deviations through measurable indicators as a benefit. 11% see benefits in compliance with all types of planning with the goals, and 9% in growth in productivity.

Following this, the attention was paid to what the internal stakeholders (owners, managers and employees) consider to be the most important barriers to implementation and enforcement of controlling. Up to 27% of employees stated they had no concerns about controlling. Concerns of excessive control is felt by 15% of respondents that hold the position of an employee in the enterprise, and the second biggest concern is the potential of standards not being fulfilled (12%). As to the owners, all who participated in the survey (1%) indicated that they had no concerns related to implementation of controlling in their enterprise. Managers have the greatest concerns about controlling not being accepted by their employees (21%), about excessive control (18%), and about potential sabotage of controlling by employees (16%). Only 14% of managers said they had no concerns about the controlling, which is 13% less than indicated by the employees. It can be said that managers have more concerns than the employees.

The following question examined how the respondents felt about the implementation and use of controlling in the enterprise. The most common feelings triggered by the implementation of controlling were curiosity (24%) and motivation (23%). Less frequent were feelings of satisfaction (10%), fear (10%), enthusiasm (9%), insecurity (8%) and lack of interest (8%), and almost negligible percentage was assigned to happiness (3%), resistance (3%), disappointment (2%). The last question in the questionnaire survey enabled researches to determine how the implementation of controlling into the enterprise influences the selected reality. The survey respondents suggested that controlling has the most positive impact on relevance of information, customer satisfaction, and the evaluation of employee performance. The survey participants also noted that controlling has no effect on power distribution among the workforce, the number of jobs in the company, and labor relations. The most negative effect of controlling is seen in creating pressure in the workplace.

To summarize, the questionnaire survey resulted in the following conclusions: The survey sample was composed of approximately the same number of production and non-production enterprises. More than half of the surveyed enterprises were joint-stock companies, and nearly one third belonged to limited liability companies. The most important pre-implementation steps, as perceived by our respondents, are the organizational structure analysis and instruction of the employees at all levels about the forecoming changes, as also stated by Andreas (2004). None of the ways in which controlling was implemented in the enterprise was significantly predominant. This statement is confirmed by the fact that there is no generally most appropriate way of implementation, as Jung (2014) also suggests. The research has also shown that motivation, feedback, communication, preparation for change, enforcement, and confidence in controlling have a great impact on its implementation, as stated by Eschenbach et al. (2012), and management should not neglect any of them. According to the respondents, it is necessary for the effective implementation of controlling to introduce such management style that uses the initiative and suggestions of mid-level managers to take important operational decisions. Up to three quarters of respondents stated that controlling has already been implemented in their enterprise or there are plans to implement it. This has been largely influenced by the fact that our survey primarily focused on large enterprises, where the use of controlling is much more frequent than in small and medium sized enterprises, mainly for economic reasons. The questionnaire also pointed out that almost half of the respondents consider the implementation of controlling to be a good solution for their enterprise, and 35% think that it is inevitable for their business. Based on the above, the overwhelming majority of respondents perceive controlling positively. Almost half of the employees said they had no concerns as to controlling, and the other half is mostly concerned about excessive control and failure to meet the standards. Managers appear to be concerned the most, as also presented by Eschenbach et al. (2012) and Jung (2014), about controlling not being accepted by employees, and also about the fact that they are excessively controlled. The survey further revealed that managers worry more than employees about the implementation of controlling. The most positive impact of controlling is viewed in relevance of information, customer satisfaction, evaluation of employee performance, and the most negative effect appears to be creation of pressure in the workplace. The most common feelings related to the implementation of controlling are curiosity and motivation. It is for this reason that when implementing controlling, the top management of the company and the controller should try to provide the employees with the most relevant information about controlling and should renew and remodel the motivation system in order for the employees to remain motivated and willing to cooperate.

3.1 The proposal of a model of implementing, enforcing and using controlling in large enterprises

Based on the analysis of the secondary sources, as well as the results of the questionnaire survey which focused on examining the psychological aspects of controlling, a frame model of implementing, enforcing, and using controlling in large enterprises was proposed. Its implementation will lead to controlling being accepted by all internal stakeholders in an enterprise. The proposed model represents a generalized approach that is applicable for large enterprises irrelevant of their field of industry. At the same time, the model provides the necessary space for adjusting the individual steps to specific conditions of a given enterprise.

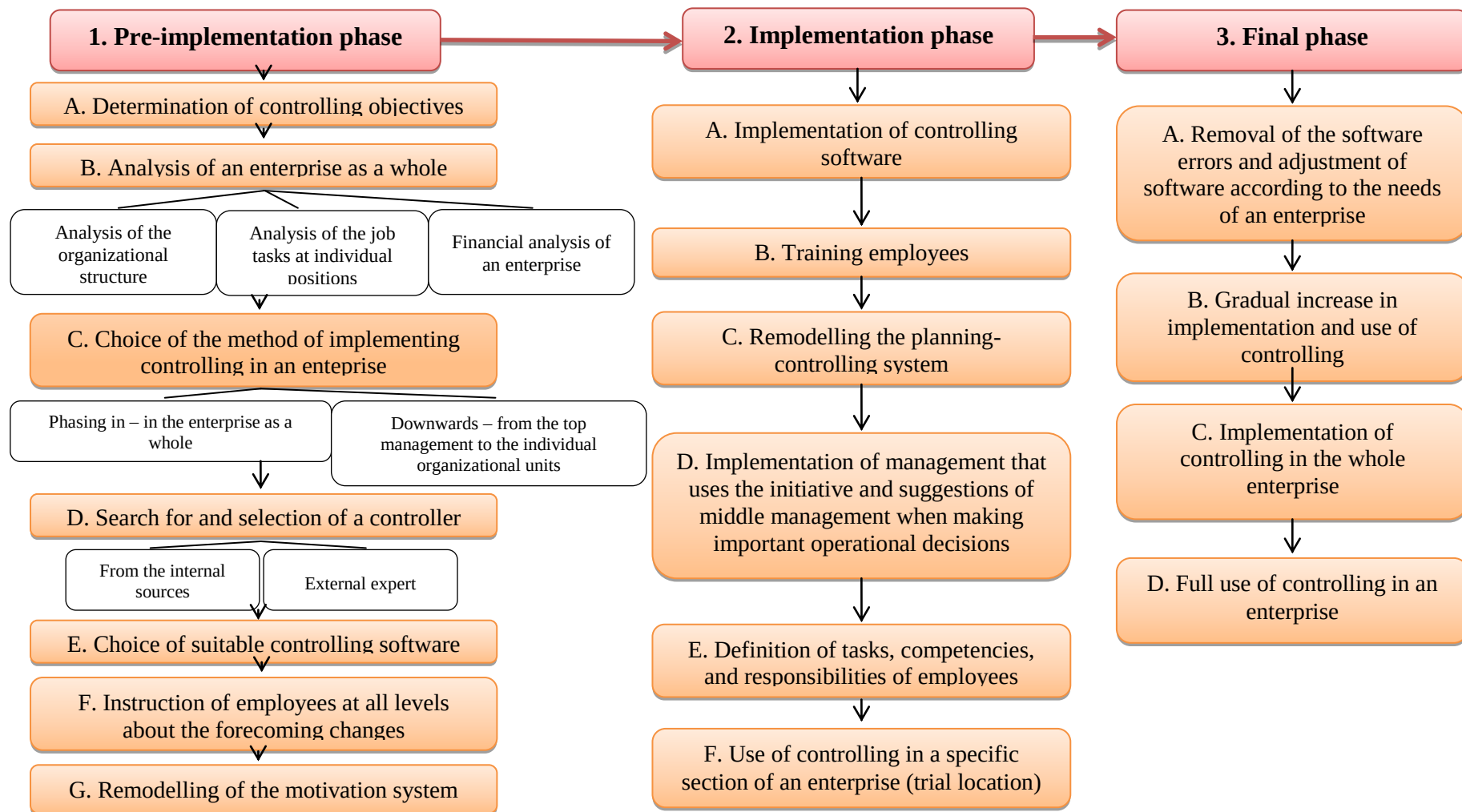


Figure 2 Model of implementation, enforcement and use of controlling in large enterprises

Source: authors

The proposed model is divided into three phases, while each phase contains several steps. The first phase is the pre-implementation phase, consisting of seven steps that are connected and follow each other. At the very beginning of implementing controlling in an enterprise, as stressed by Andreas (2004) and Chebukina et al. (2013), the goals must be clearly determined. Top management must determine those goals which it plans to achieve with the implementation of controlling. At the same time, it is essential to perform the economic analysis of the enterprise, as presented by Zavadská et al. (2013) and Jung (2014). Eschenbach et al. (2012) suggest that for each enterprise different way of controlling implementation is suitable. This has been proved by the results of a questionnaire survey. The choice of the most appropriate controlling software is also extremely important. For large enterprises, as pointed out by Jung (2014), it is better to purchase a professional controlling program which takes account of all specifics of the given enterprise. Instructing all employees about the forecoming changes, as claimed by Willcocks et al. (2000) and proved by the results of the empirical survey, is an essential part of the controlling pre-implementation phase in an enterprise. It is important that all employees understand that controlling is not a tool which is implemented in the enterprise to enable management to have more control over them (employees) than there was before, neither it is a tool that should hurt them in any way.

The second implementation phase consists of six steps. The first step is the implementation of controlling software that has been adjusted to serve the specifics of the given enterprise. During its implementation, the data from all originally used programs in the enterprise are imported into the new software. Due to the changes which controlling brings into an enterprise, it is necessary to train employees to ensure the required performance of staff, as claimed by Bikar et al. (2016). According to Eschenbach (2004), controlling changes the whole system of planning and control of all activities in an enterprise. Therefore, it is essential to make adjustments in the system of planning and control. Taking account of the results of the questionnaire survey, large enterprises in Slovakia are advised to introduce such management style which uses initiative and suggestions of middle management concerning important operational decisions.

Thus the middle managers can bring in interesting suggestions as to the everyday operations of an enterprise. Since the enterprise has performed the analysis of its organizational structure within the pre-implementation phase, it is necessary to re-define the job tasks, competencies, and responsibilities of all work positions in the enterprise. According to Le Flanchec et al. (2017), it is inevitable to inform all employees about the applied changes in their tasks, competencies, and responsibilities. The last step of this phase is the introduction of controlling in a chosen unit/section of the enterprise that serves as a trial location. This has been confirmed by Eschenbach et al. (2012) and Shebukina et al. (2013).

The last phase consists of four steps. Firstly, it is necessary to remove all errors of the controlling software which were found during the trial period (use of controlling in a chosen specific location of the enterprise), which is followed by incorporating the final improvements into the software. Following this, as also agreed on by Jung (2014), controlling can start to be implemented into the whole enterprise. The way how controlling is implemented into the whole enterprise must be determined individually by each enterprise. Implementation of controlling into the whole enterprise is the final phase of the whole implementation process. Eschenbach et al. (2012) and Bencikova (2012) considers controlling to be fully implemented only at the moment when it forms an integrated system and has a clear role and function in the enterprise. If the enterprise has adhered to all implementation steps and paid adequate attention to each of them, while at the same time considering the psychological factors of controlling, its use in the enterprise should be smooth and respected by employees at all working positions.

4. CONCLUSION

In Controlling may be defined as a tool which facilitates making the right decisions related to ensuring strategic goals; it enables flexible response to change, uses opportunities, and eliminates threats. In corporate practice, the fact that this tool greatly affects the internal stakeholders in an enterprise, is often forgotten. The owners, managers, but mainly the employees, are influenced by various psychological aspects, which have a significant effect on the efficiency and effectivity of controlling. The proposed model of implementation, enforcement and use of controlling, which emphasizes the respect for psychological aspects of its perception, is applicable in all types of large

enterprises, and provides space for partial modification of certain steps to specific conditions of each enterprise. The given problem is largely unexplored and provides space for deeper research and analysis. Further research in the given field should focus on different psychological aspects than the ones which are mentioned here, should analyze the individual aspects in more detail, or, alternatively, find its application in other regions within the European Union.

Acknowledgements

This paper has been written as a partial result of the following projects: VEGA MŠ No. 1/0010/17, No. 1/0802/16, and APVV-14-0506.

References

- Andreas. I. N.. 2004. Firm performance effects in relation to the implementation and use of enterprise resource planning systems. *Journal of Information Systems* 18(2): 79-105.
- Bencikova, D., 2012. What is the CQ and how to benefit from it? In *International conference on cultural expressions and identities Europeennes*. Banska Bystrica, Slovakia, p. 57-67.
- Bencikova, D., Poliak, P. 2016. Intercultural competences in international organizations, In 16th International scientific conference on globalization and its socio-economic consequences. Rajecke Teplice, Slovakia, p. 151-158.
- Bikar, M., Vavrova, K., 2016. Global movements of major world indices: the performance comparison, In 16th International scientific conference on globalization and its socio-economic consequences. Rajecke Teplice. Slovakia. n. 191-198.
- Bradlev. I.. 2008. Management based critical success factors in the implementation of enterprise resource planning systems. *International Journal of Accounting Information Systems* 9(3): 175-200.
- Eschenbach, R., 2004. *Controlling*, 2nd edition. ASPI Publishing : Prague. pp. 816.
- Eschenbach, R., Siller, H. 2012. *Profesionální controlling*. 2nd edition. Wolters Kluwer : Prague. nn. 396.
- Chebukina, M. V., Shatalova, T. N., Jirnova, T. V., Bobkova, E. Y., 2013. Controlling as a tool for implementation of the system for the enterprise resource potential management in its capitalized form. *World applied sciences Journal* 27(4): 444-447.
- Jung, H. 2014. *Controlling*. 4th edition. De Gruyter Oldenbourg : München. pp. 714.
- Le Flanchec, A., Mullenbach-Servayre, A., Rojot, J., 2017. Human resource management and innovation strategies: A French study based on the response 2011 database, In *International conference on regulation, change and the work*. Ottawa, Canada, p. 173-202.
- Lumpkin, G. T., G. G Dess., G. G., 1996. Clarifying the entrepreneurial orientation construct and linking it to performance. *The Academy of Management Review* 21(1): 38.
- Musa, H., Debnarova, L., Musova, Z., 2015. The level of disclosure in corporate governance in Slovakia, In 15th International scientific conference on globalization and its socio-economic consequences. Rajecke Teplice, Slovakia, p. 469-476.
- Musa, H., Debnarova, L., Musova, Z. et al., 2017. Gender equality and corporate governance in Slovakia. *E & M Ekonomie a Management* 20(1): 98-110.
- Osorio. A.. 2017. Self-interest and equity concerns: A behavioural allocation rule for operational problems. *European Journal of Operational Research* 261(1): 205-213.
- Rautenstrauch, T., Müller, CH., 2005. Verständnis und Organisation des Controllings in kleinen und mittleren Unternehmen. *Zeitschrift für Planung & Unternehmenssteuerung* 16(2): 189-209.
- Secundo, G. Elia, G., 2014. A performance measurement system for academic entrepreneurship: a case study. *Measuring Business Excellence* 18(3): 23-27.
- Soulshv. A. Clark. E.. 1998. Controlling personnel: management and motive in the transformation of the Czech enterprise. *International Journal of Human Resource Management* 9(1): 79-98.
- Vavrova, K., Bikar, M., 2016. Effective tax administration as a factor affecting the competitiveness of Slovakia at the global level, In 16th International scientific conference on globalization and its socio-economic consequences. Rajecke Teplice. Slovakia. n. 2324-2331.
- Willcocks. L. P., Svkes. R.. 2000. Enterprise resource planning: the role of the CIO and it function in ERP. *Communications of the ACM* 43(4): 32-38.
- Zavadská, Z., Zavadsky, J., Sirotiakova, M., 2013. Process model and its real application in the selected management areas. *E & M Ekonomie a Management* 16(1):113-127.

AVAILABILITY OF QUALIFIED LABOUR FORCE AS A LIMITING FACTOR FOR COMPETITIVENESS OF SLOVAK ENTERPRISES

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ABSTRACT

The aim of this paper is to analyse the causes of the current adverse state of the labour market, whose main flaw is a lack of qualified labour force. However, high schools produce a large amount of graduates every year, which cannot be employed in their respective field. This conflict should be solved by implementing dual education. In the contribution we have processed results of our own qualitative and quantitative research realized through questionnaires field research and in-depth interviews. Results of the survey point to a low level of knowledge about dual education. Factors which motivate students in choosing of their further education have been identified and measures by whose implementation it would be made possible to increase the interest of students in this type of education and from a medium-term standpoint to improve the labour market situation.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: labour market, education system, dual education.

1. INTRODUCTION

The situation on the labour market is changing significantly. After years of high unemployment, the time has come when especially industrial firms have the problem of finding enough qualified workers. There are many new jobs in the labour market that have to be filled. We observe a significant imbalance between the real need of technically or specifically educated employees in contrast to the interest of young people to study and professionally engage in technical professions in the future.

The effective interconnection of the labour market with the education system becomes a necessity. In this respect, Slovakia is only at the beginning of finding suitable solutions that should help to improve situation on the labour market. One of the important measures since the school year 2015/2016 was there-introduction of dual education at secondary schools. However, this system of education, once common and exploited, has a relatively small interest from pupils.

The aim of the paper is to analyse some causes of the current unfavourable situation on the labour market. The partial aims of the work are:

1. To find out the level of awareness of the pupils finishing the elementary school education about the possibilities of dual education.
2. To examine the motivational factors that influence pupils in choosing further education.
3. To identify the main causes of pupils' low interest in dual education.
4. To propose measures, the implementation of which could increase the interest about this type of education and thus gradually improve the situation on the labour market.

2. MATERIAL AND METHODS

2.1 Disproportions between labour market needs and education system in Slovakia

Slovakia currently has one of the fastest growing economies. Employment is rising enormously, but the structure of school leavers does not correspond to the demand on the labour market. Firms are experiencing an increasing shortage of skilled manpower, while the biggest problems have the industries that need a technically educated manpower. [1]

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The problem of shortage of skilled manpower does not only concern secondary-educated employees but also graduates of universities. It should be noted that in practice there is an increasing justification of the interconnection of the knowledge of the technologist and the economist. Companies are aware of the need for graduates of technical fields to have at least basic economic knowledge and understanding that they can use in common practice. [2]

Also survey conducted among students of the University of Economics in Bratislava at the Faculty of Business Management showed that “students lacked enough positive practical experience in successful enterprises. If they have practice, they are often only agreements for auxiliary, often administrative activities that only insufficiently prepare them for self- entrepreneurship”. [3]

Education in modern perception is ensuring the readiness to perform certain work, occupation or activity. Constantly higher demands are placed not only on jobseekers, fresh graduates of secondary schools and universities, but also on educators who have the possibility and ability to provide, shape and influence students' education. [4]

Employers of the various companies are more often reporting that they need people to expand their production but there are not people in the labour market and therefore they want to address this shortcoming by importing foreigners from abroad.

It is paradoxical that, in the absence of a qualified manpower, both secondary and tertiary schools produce each year the number of graduates who are not employed in the field studied. According to current research, up to 63% of secondary school graduates and 53% of university graduates are not employed in the field they studied. Such ineffectively set education system costs the state annually more than 250 million €. [1]

The chance to solve this problem is to make vocational secondary education more attractive and to improve the quality by dual education, which is based on the cooperation of secondary vocational schools and companies in the preparation of qualified workers according to the needs of the labour market.

2.2 Dual education system and its application in practice

Dual education is a system of vocational education and training for the profession, which acquires the knowledge, ability and skills necessary for future occupation. It has been introduced into practice since the school year 2015/2016. It aims to facilitate the smooth transition of pupils from education to the labour market and to increase the employability of graduates of secondary vocational schools in the labour market. It is particularly marked by the close connection between general and vocational theoretical education at school with practical training at the employer. Dual education system is the modern way of preparation for a profession in which a pupil learns how to transform theoretical knowledge into practical skills directly at the employer. Unlike the classical schooling method, all practical training takes place in real conditions directly at the practical training workplace of a particular employer, and general and vocational theoretical education remains part of the teaching at a secondary vocational school. [5]

In the school year 2015/2016, 422 pupils started the first year of the dual education system and in the school year 2016/2017 there were 998 pupils. Altogether, in the school year 2016/2017 there were 1.420 pupils being prepared in 53 secondary vocational schools in all regions of the SR. According to the Ministry of Education of the Slovak Republic, the ministry wants to promote the benefits of dual education and to support this type of education in such sectors where at present there are not enough pupils needed for the labour market. [6]

Currently, 1.450 employers, 7 corporate and professional organizations, 280 secondary vocational schools and 8 higher territorial units are involved in this system. [7]

The idea of dual education - to give the pupil the most up-to-date education in close co-operation with the needs of practice in the company, is good and proven in practice. The problem remains the low interest of pupils in the finishing classes of elementary schools to participate in this system. [8]

In countries that have the tradition of dual education, their results are seen in higher employment of young people as well as in the skill level of the manpower. Entering of companies to education at the same time increases the attractiveness of vocational schools. The key issue therefore

is the promotion of dual education and more effective communication in order to show the pupils and the general public that today's industrial work is no longer what their parents remember.

2.2.1 Methods and methodology of the search

In the paper are elaborated the results of own primary quantitative and qualitative survey conducted in the form of questionnaires and the managed interview method. The research was carried out during three weeks of June 2017. A survey sample for the quantitative part of the research consisted of 220 pupils finishing primary schools from Trnava and Bratislava. Respondents initially responded in writing to open questions examining their preference for choosing a secondary school as well as their awareness of dual education. In the next block of selective questions, pupils expressed their attitude to the significance of the various factors characteristic for dual education.

The aim of this part of the research was to verify two hypotheses:

H1: More than half of primary school pupils do not know what dual education means.

H2: The possibility of obtaining a scholarship or other financial income during a secondary school education is the strongest motivational factor for pupils.

The qualitative part of the research was carried out in the form of In-Depth Interviews (IDI) with two groups of respondents. One group consisted of 10 class teachers of the interviewed pupils. The aim of this part of the research was to find out the opinions of the teachers on the current way of promoting dual education and the possibilities to make it more efficient. The second group of respondents was created by 15 pupils from the original research sample, who decided to study at secondary school in the form of dual education. The aim of this part of the research was to find out the circumstances and reasons for their decision and the opinions of these pupils on the causes of low interest of their peers in this form of secondary education.

3. RESULTS AND DISCUSSION

3.1 Quantitative research on pupils' awareness of dual education and motivational factors

Based on the evaluation of the questionnaires completed by 220 pupils finishing primary school it can be stated that only 36% of them correctly understood the concept of dual education and were able to define it. This awareness of dual education was on average the same for pupils in Trnava and Bratislava.

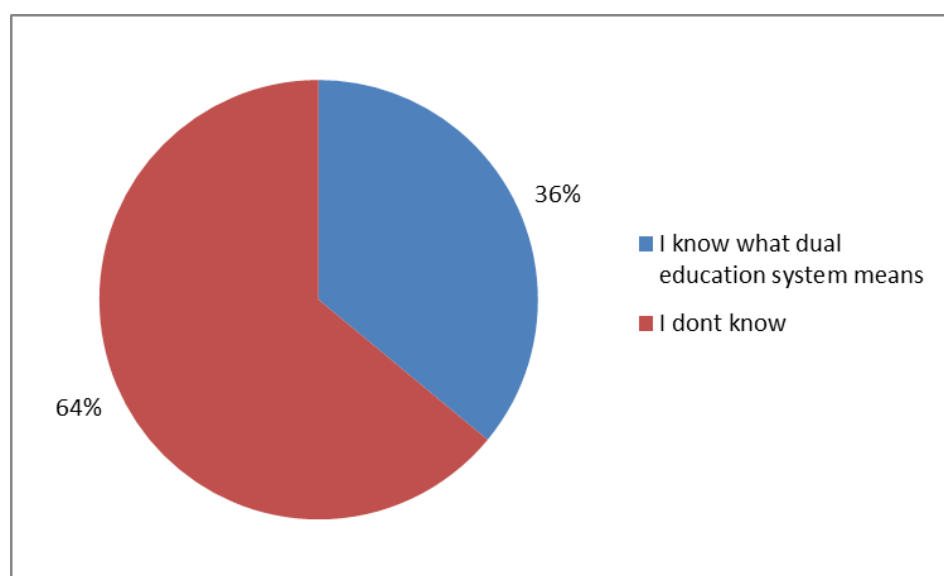


Figure 1 Awareness of the dual education of pupils finishing elementary schools

Source: own processing

However, the level of awareness of dual education differed significantly in individual schools, which, as we found out in a later qualitative survey, was mainly related to the effectiveness of

classroom teacher work and career counsellor at that school as well as to whether pupils had the opportunity to participate in the lecture or other promotional action about the dual form of education.

Subsequent exploration of motivational factors that characterize dual education has confirmed that it is the most interesting option for pupils to obtain financial means during a secondary school study, either in the form of motivational scholarships from the state, corporate scholarships or the possibility of rewarding productive work for the future employer. Total or partial interest in these benefits (grades 4 and 5 on a five-part scale) was reported by up to 80% of respondents. As a very significant motivating factor, the survey showed the possibility to have more practical than theoretical education during secondary school studies. This option would be preferred by up to 78% of respondents. As the least attractive factor (complete or partial disinterest till neutral attitude), respondents considered the provision of work clothes during professional practice - this option was not motivating for up to 65% of pupils.

Based on the results, it can be concluded that both hypotheses, set at the beginning of the survey, have been confirmed. In our survey, more than half of pupils - 64% - could not explain what dual education means. The second hypothesis was also confirmed that the most motivating factor for pupils is the possibility of financial income during secondary school studies.

As a significant motivation factor was manifested the possibility of a greater proportion of practical education at the expense of the theoretical one.

3.2 Qualitative research of the causes of ineffective communication with the target group

In this part of the research, the outcomes of targeted in-depth interviews with pedagogues - class teachers in selected schools, as well as pupils who have decided for dual education have been evaluated.

The most important conclusions from in-depth interviews with pedagogues can be summarized as follows:

- It is necessary to talk with pupils about dual education before the 9th grade, when the most of them are already determined where to study at secondary school. According to pedagogues, the optimal is the 8th grade, when pupils are more advanced, they begin to think more seriously about their future, and they begin to consider the qualitatively presented information about dual education.
- Pupils are very influenced by their parents' opinion in their decisions. As the parents of today's 9th grade pupils do not have their own real experience with this type of education, their awareness of dual education is very low, and their opinions are often distorted and inaccurate. According to pedagogues, it is therefore very necessary to work with this target group and to convince parents that this type of education is interesting for them and also for their children. Dual education often has the image of a poor apprentice school for less-gifted pupils from socially disadvantaged families who have no prospect of having a better education or, to continue studying at university.
- Pedagogues have pointed out that the generation of today's pupils uses other communication channels and other means of expression, and the information campaign about dual education should be adapted to this fact. It is necessary to speak the language of 13-14 year olds and preferably to use the social networks through which these children draw the most information.

Based on the evaluation of the results of the interviews with teachers, it can also be concluded that there is a direct connection between the interest of the certain teacher about dual education and the results that the pupils of that school have shown in this area. Schools in which class teachers were themselves convinced that dual education is a very interesting option for their pupils showed much better results in informing pupils about this form of education as well as in the number of pupils who were decided for this form of further education.

These conclusions were indirectly confirmed by in-depth interviews with 15 pupils who have decided for the dual education. The most important conclusions from these interviews can be summarized as follows:

- Ten pupils declared that they were positively influenced by their parents or their close relatives who work in firms involved in dual education. Close relatives working in companies involved in the dual form of education. These pupils themselves during excursion had the opportunity to see the premises in the company where they will work, as well as personally learn about the other benefits that this type of education provides.

- Four pupils have decided on dual education based on the recommendation of their elderly friends, who are already studying in the form of dual education and have the opportunity to use its benefits.
- One pupil found information about this education opportunity on social networks, with the support of parents he gained the additional information and considered that this form of education would be the most beneficial for him.
- All pupils consider dual education as a very interesting way to continue studying at secondary school, and the reason for the small interest of their peers they see mainly in the wrong form of communication and information about dual education.

3.3 Proposed measure for increasing the interest of pupils in dual education

Based on the results of in-depth interviews, it can be stated that the effectiveness of the information campaign about dual education is influenced by the awareness and positive set-up of the three reference groups that have the greatest impact on pupils. They are:

1. pedagogues who work with pupils,
2. parents or close relatives of pupils with a positive attitude to dual education,
3. older friends or acquaintances already studying in the form of dual education.

Each of these groups can very effectively mediate information to pupils and motivate them to think about this way of studying.

On the basis of these facts, it is possible to propose procedures by which the form of dual education could be much better known and searched among the pupils of the finishing classes of elementary schools.

An important part of the whole process is motivated and well-informed teachers and educational advisors who can mediate information about the advantages and benefits of dual education to pupils as well as help to guide their careers in the way they can best use their potential. It is therefore necessary to ensure that teachers themselves understand the benefits of dual education and are motivated to provide this information to their pupils. It is important to remove the myths of vocational education in the school environment, such as education for less talented pupils who do not have the perspective of studying at university. At the same time, it is necessary for schools to support the technical and logical thinking of pupils.

The second very important target group are the parents of children who are still a strong authority for pupils of this age influencing their decisions. Most of the pupils in our survey have decided for dual education especially based on communication with parents who have been convinced of the benefits of such a way of education. Therefore, it would be desirable for the parents of the eighth and ninth grades to have adequate time in the parents' associations and to provide parents with a thorough knowledge about all the possibilities and benefits of dual education for their children. For this purpose, it would be necessary to elaborate or to obtain information materials specifically designed for parents from individual companies involved in dual education that would sum up the most essential information about this form of education and contact on which parents could learn the details.

The last reference group that significantly influences pupils in their decision-making are their older friends who are already studying at secondary schools. Assuming that the form of dual education is really beneficial to them and they consider it a good choice, they can convince younger students about that. Therefore, we recommend recruiting former graduates of the elementary school who are studying in the form of dual education with co-operating employers. The ability to get information from such a trusted source can be an important impetus for many pupils to become more interested in the form of dual education.

Last but not least, it is necessary to ensure that information on the opportunities and benefits of dual education is given to pupils in their language and through their communication channels social networks that are completely different from communicating with their parents' generation.

4. CONCLUSION

Based on the results of our survey, it can be concluded that there is a significant discrepancy between the current state of the education system in Slovakia and the needs of labour market. This inconsistency can be partly solved by introducing quality dual education at secondary schools.

The results of our own quantitative and qualitative survey at elementary schools, which we have conducted through questionnaires and controlled interview method, point to a low level of awareness of pupils about dual education. It can be concluded that both hypotheses, set at the beginning of the survey, have been confirmed. More than half of pupils could not explain what dual education means and the most motivating factor for pupils is the possibility of financial income during secondary school studies.

We have identified more factors motivating elementary school pupils when choosing further education. We have found that career counselling at elementary schools is not systematic and it is not enough to inform the parents of pupils about the possibilities and benefits of the dual educating of their children. Based on these facts, we have proposed measures in particular in the field of communication policy by the implementation of which could be possible significantly increase the awareness and thus also the interest of pupils in this type of education.

References

- [1] Dítětová, I. Prognoses of the Labour Market in the Slovak Republic. Bratislava: TREXIMA 2017.
- [2] Zatrochová, M. Education of graduates in the field of financial literacy at technical schools. In: Education for Entrepreneurship in the Slovak Republic. Ekonom. Bratislava 2014. n. 81
- [3] Šubertová, E. High quality education as a fundamental prerequisite for the positive attitude of students towards entrepreneurship and their success in life. In: Economics, Finance and Management IX. Ekonom. Bratislava 2015. n. 726
- [4] Kaianová, J. Business as a Challenge for Modern Education. In: Business - pedagogical aspects of its application in practice. Ekonom. Bratislava 2013. n. 62.
- [5] Ministry of Education, Science, Research and Sports of the Slovak Republic Basic Principles of the Dual Education System. [quoted on July 4. 2017] Available at: <https://www.minedu.sk/zakladne-principy-systemu-dualneho-vzdelavania/1>.
- [6] Ministry of Education of the Slovak Republic: Providing practical lessons in the dual education system. Dual education system. Development of secondary vocational education. [quoted on June 29. 2017]. Available at: http://www.notrebvoyn.sk/dv_v-praxi.
- [7] Federation of employers' associations of the Slovak Republic: Dual education [quoted on June 25, 2017]. Available at: <http://www.azzz.sk/projektv/dualne-vzdelavanie/>
- [8] Federation of employers' associations of the Slovak Republic: Dual education starts: [quoted on June 20. 2017]. Available at: <http://www.azzz.sk/2017/04/dualne-vzdelavanie-nedosahuje-zelane-vysledky-vo-firmach-chyba-pracovna-sila/>. (10)

DIFFERENCES OF APPLICATION PART-TIME IN EU COUNTRIES, PROS AND CONS

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ABSTRACT

The aim of this paper is to find a connection between average wages across countries and Hofstede's Cultural Dimensions. The objective is based on data from a database, to find the correlation between selected elements and to obtain findings which might demonstrate how cultural differences can depend on Part-time form application. The basis for exploration of the Part-time issue is its unique standing in the world and in the EU its place in society depending on the definition and importance of work in the respective country. This article briefly summarized the positive and negative aspects of Part-time work, the implementation of it in organizations, advantages and disadvantages for the employees. Through this research questions necessary for further research in the field of Part-time work have surfaced. The results are transformed into tables and charts utilizing Pearson's Correlation Coefficients. The conclusion is the emergence of options, descriptions and recommendations for influenced dimensions.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: Flexibility, Part-time, Average Wage, Dimensions, Organizational Culture.

1. INTRODUCTION

Part-time work is defined to be work with a lower range of hours worked in a pre-defined setting in contrast to full-time work. It has been proving itself to be one of the most common flexible forms of working arrangements. Eurofound's European Industrial Dictionary defines flexible forms of work organization as working relationships that do not correspond to the standard or classical Full-time model with a uniformly structured working time for one employer with a long-term perspective (Eurofound, 2007).

We can include forms of work which are different from a classical contract. This can be determined by various factors so for example the place of performance (Location Flexibility), for example, the home office or even working in café aided by the constant development and improvement of IT equipment. The working time itself has been adapted in part time contracts (Time Flexibility), seeing that that are not congruent with a classic eight-hour working time which has been the standard arrangement for many years. So to name a few, flexi-time form, work-time account and ultimately Part-time can be viable alternatives. Based on the duration of the contract (Numerical Flexibility), companies flexibly influence the number of employees as required. These include agency staff (hired through a temping agency), self-employed workers, entrepreneurs, seasonal workers, and also students. Questions such as "When? Where? How Long? "Are needed to distinguish flexible forms of work organization from traditional (Full-time) work (Wojcak, 2013).

The Part-time industry was booming in the sixties of the last century, when the Part-time workforce almost doubled. Since then the number of such contracts is constantly rising and so is the percentage of women in the total labour force (Brewster, et al., 1993). More recent sources report that in the EU (28 countries) in 2002, people who were employed Part-time were at 5.22% and in 2015 this figure has increased to 16.77% of employment. To understand this figure better and in a more holistic and international context in Japan, in 2002, 17.72% of employment was Part-time and 22.67% in 2015. In Chile in 2002, Part-time work constituted 5.22% and in 2015 already 16.80% of employment (OECD, 2016).

Part-time work is also the basis for employment growth in Canada in 2016. Of 140,000 newly created positions are 124,000 employed on a Part-time basis (The Globe and Mail, CA, 2016). In

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2016, the Australian economy created nearly 302,500 jobs, of which most namely 132,700, were considered to be Part-time (Australian Government, 2016). Based on previous findings also in the history of work, it is the traditional and conventional form of flexible work that has been studied by many authors (Gordon, 1987; DuRivage, 1992; Levitan and Conway, 1988, Rubery, et al., 2014;)

To see how Part-time work is applied worldwide it is often contrasted with other flexible forms of work organization (Telework, Telecommuting, Self-employment, Job-sharing, Temporary Agency Work and Flexi-time). The concept of Part-time work has been given greater formal attention at an international level, in the form of international conventions or directives (The International Labour Organization, Part-Time Work Convention, 1994, No. 175, Council Directive 97/81 / EC). These binding formal provisions are intended to prevent situations where Part-time employees are discriminated against through worse working conditions than Full-time employees.

2. THEORETICAL FRAMEWORK

2.1 Part-time

A Part-time contract is a form of employment that carries fewer hours per week than a Full-time job. They work in shifts, which are often rotational. Workers are considered to be Part-time if they commonly work fewer than 30 hours per week. According to the International Labour Organization, the number of Part-time workers has increased from one-fourth to a half in the past 20 years in most developed countries, excluding the United States. There are many reasons for working Part-time, including the desire to do, having one's hours cut back by an employer and being unable to find a full-time job. The International Labour Organisation Convention 175 requires that part-time workers be treated no less favourably than Full-time workers (ILO, 1994).

A Part-time employee may work fewer hours each day of the workweek or fewer days per week. Changing lifestyles and conditions create the need for many people to reconcile work and personal life in a way other than it was in the past. Significant trends are emerging that make an increased interest in flexible work assignments of other forms of work and finding a balance between work and family care. Working parents want more time and care to spend their children while staying in touch with their profession.

There is an increasing importance of leisure-time activities of sporting, artistic, traveller character. The importance of lifelong learning is increasing. To practice certain professions, continuous education is a prerequisite. Many, in order to increase their attractiveness at the workplace, are completing their education. Increasing working pace and demands on workers. This leads to reflections on alleviating stress and seeking a more flexible form of work (Sajgalikova, et al., 2017).

2.2 Part time: Pros and Cons from the Perspective of the Employer and the Employee

Part-time jobs tend to often be taken up by women, three times more than they are by men. Relatively often this flexible form of work organization is also applied to disabled people. According to the Statistical Office of the Slovak Republic, up to 40% of people with disabilities are employed in this form (Employment Institute, 2013).

Creating part-time positions brings potentially many benefits to organizations. It can significantly reduce costs by ensuring the presence of employees at the workplace only when they are really needed. At the same time it helps to get highly qualified employees who have to take care of children or have other duties and do not seek employment at a full-time level. In terms of employees, this form of work can also be a chance to maintain working habits and skills if an employee cannot work full time for family or health related reasons. Another example of the benefit may be a form of reward for a senior executive. He can obtain an additional contract from an employer to an existing full-time, which can lead to an improvement in his financial situation and a higher loyalty to the organization. Employers often turn to retirees and full-time students. Another benefit may be the fact that part-time employees are rarely interested in membership of a trade union organization, in any case, they are less assertive in enforcing their demands which might also stem from a lesser involvement in the company altogether.

This type of flexible work organization however can also tend to bring disadvantages. Part-time employees, due to other commitments, and also seeing how their income is not the main source

of income for the family, they tend to often show less commitment to work than their Full-time colleagues. A further problem for workers is that they are opening fewer opportunities to enhance their career options. Employees with such a form of employment may, in addition, be exceptionally rigid in terms of working time, because they might require a very fixed schedule in order to fit their other obligations in their timetable (Trelova and Peracek, 2015).

In the case of Part-time employees, corporate education is also a problem. Where two to three employees are employed part-time a company as well as one employee on a Full-time basis, the time and cost of their education would increase by two to three times. Another disadvantage is the deep-rooted view that a Part-time employee is more difficult to maintain as a Full-time employee. This view appears to be based on the recognition that Part-time employees do not identify with the organization. Part-time has its own advantages and disadvantages, and it is yet to be defined what is caused by the difference in application within different EU states.

2.3. Dimensions of Organizational Culture (Hofstede)

Hofstede stresses that the cultural dimensions are only a framework to help with the assessment of a given culture and thus better guide decision making. There are other factors to take into consideration such as personality, family history, and personal wealth. The proposed dimensions cannot predict individual behaviours and do not take into account individual personalities (Hofstede, 2001). One of his most notable accomplishments is the establishment of the Cultural Dimensions Theory, which provides a systematic framework for assessing the differences between nations and cultures. The theory is based on the idea that value can be placed upon six cultural dimensions (Hofstede, 2010).

Power Distance Index - Culture in companies can be described as the concept of structured power hierarchy in the organization whose members expect the organizational culture. To a high degree it is influenced by factors such national culture, power relations, educational attainment and type of employment.

Individualism - The degree to which individuals are integrated into groups. This dimension has no political connotation and refers to the group rather than the individual. Cultures that are individualistic place importance on attaining personal goals.

Uncertainty-Avoidance Index - This dimension measures the way how a society deals with unknown situations, unexpected events and the stress of change and also how comfortable people are with changing the way they work or live.

Masculinity - This would describe the distribution of emotional roles between the genders. This dimension measures the level of importance a culture places on stereotypically masculine values such as assertiveness, ambition, power, and materialism as well as stereotypically feminine values such as an emphasis on human relationships.

Long-term Orientation - This dimension describes a company's time horizon. Short-term oriented cultures value traditional methods take a considerable amount of time to build relationships. This means the past and the present are interconnected and that what cannot be done today can be done tomorrow, where is innovation pressure for further aims and vision.

Indulgence vs. Restraint - This dimension measures a culture's ability to satisfy the immediate needs and personal desires of its members. Restraint has strict social rules and norms under which satisfaction of drives is regulated and discouraged.

3. SURVEY OBJECTIVE AND METHODOLOGY

The main purpose of our research was to examine the reasons for differences in the application of Part-time within the EU countries. We looked answers for two basic research questions: Does the extent of Part-time contracts influence the diversity of national cultures? Does the Average wage influence the application of Part-time job in a given state?

We examined relationships between the Hofstede's dimension and the rate of application of Part-time, the average wage and the part-time application. The existence of a more significant relationship between a surveyed dimension, average earnings, and part-time application shows correlation and also a regression analysis. If it were to exist we would be interested in the positive or negative addiction. We used logical induction, synthesis and deduction in developing results and

drawing conclusions. To determine addition research was used Pearson's Correlation Coefficient while in Figures are shown results of Regression Analysis. Results are interpreted in both a graphic and narrative form. The identity of the States in the creation diagrams were used with the country code by ISO 3166-1 Alpha 2. For Hofstede's Dimensions we used the following abbreviations - Power Distance Index (PDI), Individualism (IDV), Masculinity (MAS), Uncertainty Avoidance Index (UAI), Long Term Orientation (LTO), Indulgence (ING).

Hypotheses and Alternative Hypotheses:

Ha: There is a significant dependence between the percentage of part-time workers and the PDI rate in that country.

Ha': There is no significant dependence between the percentage of part-time workers and the PDI rate in that country.

Hb: There is a significant dependence between the percentage of part-time workers and the IDV rate in that country.

Hb': There is no significant dependence between the percentage of part-time workers and the IDV rate in that country.

Hc: There is a significant dependence between the percentage of part-time workers and the MAS rate in that country.

Hc': There is no significant dependence between the percentage of part-time workers and the MAS rate in that country.

Hd: There is a significant dependence between the percentage of part-time workers and the UAI rate in that country.

Hd': There is no significant dependence between the percentage of part-time workers and the UAI rate in that country.

He: There is a significant dependence between the percentage of part-time workers and the LTO rate in that country.

He': There is no significant dependence between the percentage of part-time workers and the LTO rate in that country.

Hf: There is a significant dependence between the percentage of part-time workers and the ING rate in that country.

Hf ': There is no significant dependence between the percentage of part-time workers and the ING rate in that country.

Hg: There is a significant dependence between the percentage of part-time workers and the average wage in that country.

Hg': There is no significant dependence between the percentage of part-time workers and the average wage in that country.

4. RESULTS AND DISCUSSION

To find answers to two research questions: *Does the extent of Part-time contracts influence the diversity of national cultures? Does the Average wage influence the application of Part-time job in a given state?* Data are processed in Table 1. The values of countries of cultural dimensions are derived from the Hofstede's Institute research. The core data on part-time, average wages used in the survey are statistical reports on Eurostat, documents and guidelines of the European Union as data coming from the field survey.

Table 1 Hofstede's Dimension, Average Wage and Percentage of Part-time Workers in EU Countries

Country	Code Country	PDI	IDV	MAS	UAI	LTO	ING	Average Wage	Part-time
Austria	AT	11	55	79	70	60	63	3548	27.70%
Belgium	BE	65	75	54	94	82	57	3872	24.10%
Bulgaria	BG	70	30	40	85	69	16	414	2.20%
Croatia	HR	73	33	40	80	58	33	1020	5.90%
Czech Republic	CZ	57	58	57	74	70	29	944	5.20%

Denmark	DK	18	74	16	23	35	70	4443	20.90%
Estonia	EE	40	60	30	60	82	16	1036	9.20%
Finland	FI	33	63	26	59	38	57	3576	12.70%
France	FR	68	71	43	86	63	48	3119	18.30%
Germany	DE	35	67	66	65	83	40	3829	26.80%
Greece	GR	60	35	57	100	45	50	1681	9.30%
Hungary	HU	46	80	88	82	58	31	812	5.70%
Iceland	IS	30	60	10	50	28	67	3177	20.10%
Ireland	IE	28	70	68	35	24	65	2872	21.30%
Latvia	LV	44	70	9	63	69	13	776	7.10%
Lithuania	LT	42	60	30	60	82	16	642	7.60%
Luxembourg	LU	40	60	50	70	64	56	4574	17.80%
Malta	MT	56	59	47	96	47	66	1754	13.70%
Netherlands	NL	38	80	14	53	67	68	4071	46.90%
Norway	NO	31	69	8	50	35	55	5595	23.70%
Poland	PL	68	60	64	93	38	29	844	6.60%
Portugal	PT	63	27	31	99	28	33	1453	9.60%
Romania	RO	90	30	42	90	52	20	487	8.40%
Slovakia	SK	100	52	94	51	77	28	862	5.70%
Slovenia	SI	71	27	19	88	49	48	1488	9.30%
Spain	ES	57	51	42	86	48	44	2180	15.50%
Sweden	SE	31	71	5	29	53	78	3737	23.00%
Switzerland	CH	34	68	70	58	74	66	5968	37.60%

Source: (Hofstede, 2017; Eurostat 2015)

To determine the existence of dependence between the application of the Part-time, Hofstede's Dimensions and Average wage, we used the Pearson's Correlation Coefficient (1) :

$$\rho_{x,y} = \text{corr}(X, Y) = \frac{\text{cov}(X, Y)}{\sigma_x \sigma_y} = \frac{E[(X - \mu_x)(Y - \mu_y)]}{\sigma_x \sigma_y} \quad (1)$$

Coefficient results of the investigation are shown in Table 2.

Table 2 Pearson's Correlation Coefficients between the Percentage of Part-time, Hofstede's Dimensions and Average Wage

	Correlation Coefficient
PDI/Part-time	-0.5635393
IDV/Part-time	0.5401016
MAS/Part-time	-0.1096361
UAI/Part-time	-0.4117332
LTO/Part-time	0.0436562
ING/Part-time	0.7285702
AW/Part-time	0.8380183

When interpreting the Correlation Coefficient, we used tools created by Cohen for the interpretation of the Correlation Coefficient in the social sciences. The absolute value of the correlation of less than 0.1 is trivial, from 0.1 to 0.3 is small, from 0.3 to 0.5 is medium, large is 0.5 and over 0.7 is very large (Cohen, 1988). Table 2 shows that the dependence between the percentage of part-time employees in EU countries is significant for three dimensions: PDI, IDV and ING. The greatest dependence is seen on Average wage.

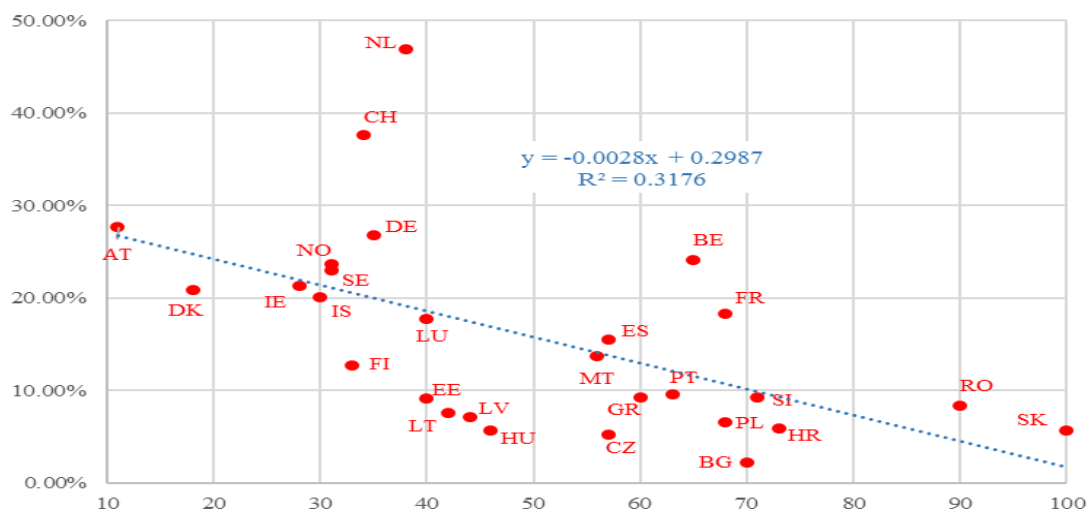


Figure 1 Relationship between PDI and Percentage of Part-time Employees in EU Countries

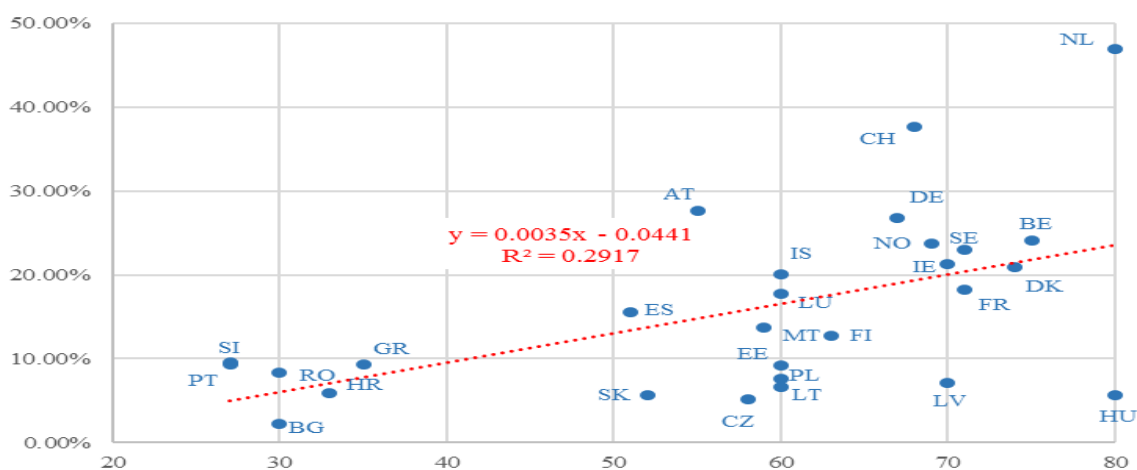


Figure 2 Relationship between IDV and percentage of part-time Employees in EU countries

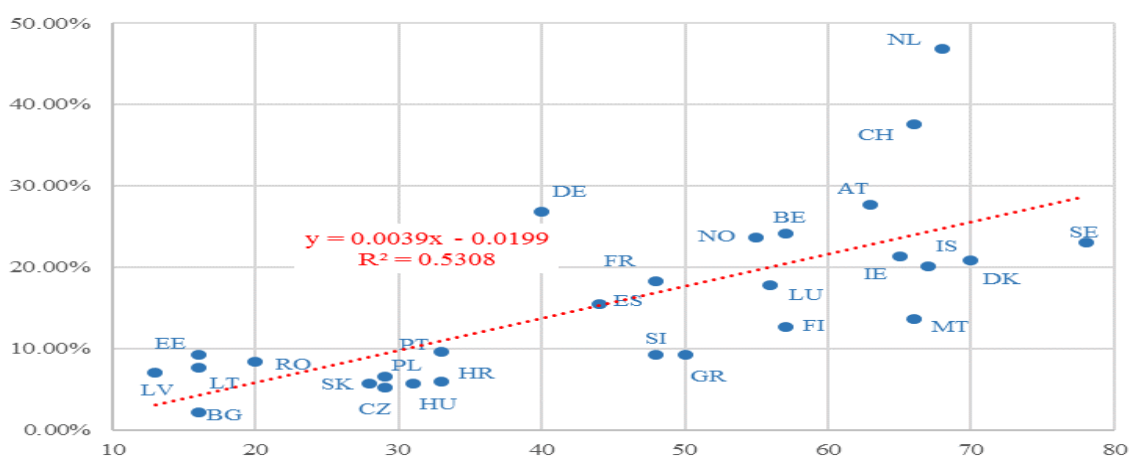


Figure 3 Relationship between ING and the percentage of part-time Employees in EU countries

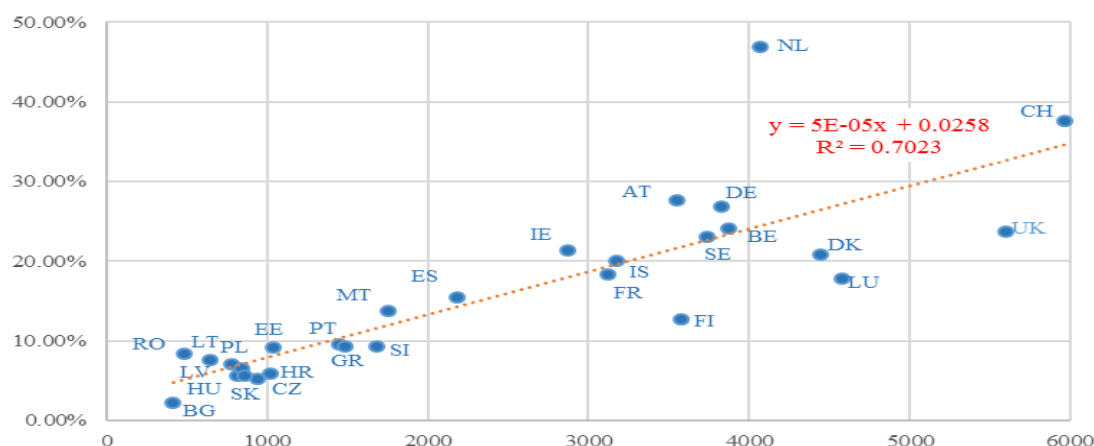


Figure 4 Relationship between Average Wage and Percentage of Part-time Employees in EU Countries

Figure 1 clearly shows the dependency of IDV on the use of Part-time employment. A correlation coefficient of 0.54 is by Cohen large dependence, but it is a boundary, because at values below 0.5, it is middle dependence.

Figure 2 clearly shows the negative dependence of the impact of PDI on part-time application. The correlation coefficient was -0.56. The higher the PDI team, the lesser it is in Part-time. It is actually a logical outcome of what Hofstede's PDI dimension is.

Figure 3 shows the IDV part-time dependency. The correlation coefficient was 0.73. The higher IDV, the higher rate of the Part-time application. R^2 is greater than 0.5. We can also analyse regression analysis. The analysis gives the equation $Y = 0.0039x - 0.0199$, which can be interpreted as follows: the difference in IDV by 10 will affect the number of employees with a part-time contract of 3.9%.

Figure 4 shows a very high positive dependence between average wage and the use of part-time in EU countries. The correlation coefficient value is 0.84. R^2 is 0.7. A regression analysis represented by the equation $Y = 0.00005x + 0.0258$, it can be interpreted that the difference in average wage by EUR 1,000 will affect the number of employees with a 5% part-time contract.

5. CONCLUSION

From these results we can accept hypotheses Ha, Hb, Hf and Hg. Other hypotheses are rejected. The answer to the research question: Does the extent of Part-time contracts influence the diversity of national cultures? We would answer with yes but cannot deduce that explicitly. This is due to the fact that Pearson's Correlation Coefficient pointed to a mean borderline dependence to high for PDI and IDV in the number of part-time workers. In the ING dimension, it is a boundary high to very high dependence.

The answer to the research question: Does the Average wage influence the application of Part-time job in a given state? Would have to be answered with yes also.

The Dependence here is unambiguous, as is the apparent relationship between the variables. Raising wages can regulate the number of full-time and part-time workers in a country. Wage affects the level of employment at a full-time level. The combination of several part-time contracts can be more advantageous for the employee and potentially create an income assurance. Currently, many organizations operate in a dynamic and complex environment where is a high degree of uncertainty. Part-time workers have been perceived in the past as those who were the first to be made redundant.

At present, knowledge-workers and experts in a particular field are particularly valuable. They can begin to favour multiple part-time contracts as field specialists or consultants wanting to secure their income through multiple organizations. This can also reduce organizational costs. This would be valiant for example if an organization spends a disproportionately high cost of retaining an expert on a particular area. His performance in the organization would then not necessarily be full-time and he himself would have the possibility of two or more part-time contracts.

Acknowledgements

We are grateful to all study participants for their contributions and support in this research paper "Differences of Application Part-time in EU Countries, Pros and Cons".

References

- Australian Government: Department of Employment. (2016). *Australian Jobs 2016*. [Online]. [Accessed: May 11, 2017]. Available at: https://docs.employment.gov.au/system/files/doc/other/australianjobs2016_0.pdf
- Blahunkova, I. (2016). *Importance of Effective Leadership – German Insights in Czech context*. [Online]. [Accessed: May 13, 2017]. Available at: <https://konferenciablog.files.wordpress.com/2016/10/15th-int-conf-management-in-theory-and-practice.pdf>
- Brewster, C., Hegewisch, A., Lockhart, T., Mayne, L. (1993). Flexible Working Patterns in Europe. In: *Issues in People Management, Report*. No. 6: Wimbledon : IPD. p. 13
- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. New Jersey: Lawrence Erlbaum Associates. 2Ed. 567 p.
- DuRivage, L. V. (1992). *New Policies for the Part-time and Contingent Workforce*. Armonk : Economy Policy Institute.
- Employment Institute. (2013). *Nove formy organizacie prace – vychodiska, trendy a prognozy*. [Online]. [Accessed: December 11, 2016]. Available at: <http://www.iz.sk/download/flexibilne-formy-zamestnavania-prispevok.pdf>
- Eurofound. (2007). *Atypical work*. [Online]. [Accessed: December 12, 2016]. Available at: <http://www.eurofound.europa.eu/areas/industrialrelations/dictionary/definitions/atypicalwork.htm>
- Gordon, R. A. (1987). *The role of part-time jobs in the labor supply choices of young women*. Madison : University of Wisconsin.
- Hofstede, G. (2017). *Cultural Dimensions*. [Online]. [Accessed: May 15, 2017]. Available at: <https://geert-hofstede.com/cultural-dimensions.html>
- Hofstede, G. H. (2001). *Culture's consequences: Comparing Values, Behaviors, Institutions and Organizations Across Nations*. 2 Ed. New York: Sage.
- Hofstede, G., Hofstede, G. I., Minkov, M. (2010). *Cultures and Organizations: Software of the Mind*. Revised and Expanded. 3 Ed. New York: McGraw-Hill.
- ILO. International Labour Organization. *Inclusive Labour Markets, Labour Relations and Working Conditions Branch*. [Online]. [Accessed: April 13, 2017]. Available at: <http://www.ilo.org/travail/lang-en/index.htm>
- ILO. International Labour Organization. (1994). *Part-Time Work Convention – No. 175*. [Online]. [Accessed: April 13, 2017]. Available at: <http://www.ilo.org/dyn/normlex/en/f?p>
- Levitan, A. S., Conway, E. A. (1988). *Part-time employment: living on half-rations*. Washington : George Washington University.
- McGregor, A., Sproull, A. (1992). Employers and the Flexible Workforce'. *Employment Gazette*. May 1992.
- OECD. (2016). *Part-time employment rate*. [Online]. [Accessed: May 13, 2017]. Available at: <https://data.oecd.org/emp/part-time-employment-rate.htm>
- Rubery, J., Smith, M., Fagan C., Gimshaw, D. (2014). *Woman and European Wmployment*. New York : Routledge.
- Sajgalikova, H., Copus, L., Polakova, M. (2017). *Where is the happiness-generated optimism streamed in? European perspective*. Vienna: IBIMA Conference. p. 3235-3244.
- The Globe and Mail. Canada (2016). *Canada gains 44,000 jobs, driven by boom in part-time positions*. [Online]. [Accessed: May 11, 2017]. Available at: <https://www.theglobeandmail.com/report-on-business/economy/canada-pumps-out-surprising-44000-jobs-in-october/article32673813/>
- Trelova, S., Peracek, T. (2015). *Pracovne pravo pre manazerov*. 2. Ed., Bratislava: Univerzita Komenskeho v Bratislava, 171 p.
- Wojcak, E. (2013). *Flexibilne formy organizacie prace*. Bratislava : Ofprint. 124 p.

THE CURRENT SITUATION IN THE SLOVAK MARKET IN THE WOODEN HOUSE SECTOR

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ABSTRACT

The aim of this paper is to analyse the situation at Slovak market of wooden house producers. This paper focus on the wooden houses market share of the total family houses production and is tracing the trend in number of wooden houses producers from 1993 to the present - because Statistical Office of the Slovak Republic is not keeping records of these figures. Output of this paper is to update the database of wooden house producers and to determine the market share of wooden houses in the total building sector in 2016 by addressing individual producers with the use of available Internet databases as well as addressing individual district offices of Construction Administration. This paper will give an overview of the current state of the Slovak wooden houses market and will show its development trend same as the locations in Slovakia, where market is overcrowded with producers and, on the contrary, where it is not sufficiently covered.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: building sector, house producers, market share, wooden house.

1. INTRODUCTION

Wooden house is defined as construction work that has a main load-bearing structure made of wood, wood components, or wood-based materials. Facade is not determining, it can entirely be from different material. Wooden construction is wider concept, it is not just the wooden structure itself, but this also always makes supporting part of the woodwork. The wooden structure is also composed of other components, materials or accessories in addition to this supporting wooden structure. The wooden construction itself can even be "hidden" and invisible for the viewer. Wooden construction can have several layers in wall and ceiling structures. Appropriate choice of layers has significant impact on the quality of timber structure and its operation, eg. due to danger of water vapor condensation in construction in winter. The wooden construction is the ecological way of building by the use of natural material itself, but mainly by the energy saving during heating season (Štefko, 2013).

In Western Europe, timber-based construction structures are successfully used for many different types of objects much wider than in our country. In these areas wood is considered as not only the equivalent for other materials, but also the luxury material and solvent people with higher incomes tend to purchase them. Modern wooden constructions are equal partners to masonry structures, in some parameters they even top them. Woodworking technology has changed greatly, woodworking has changed and its protection from adverse effects and pests has changed.

Certain wooden buildings cannot be discerned from classical brickwork, as the construction is "masked" by plaster, façade tiling... Nowadays, there is smaller number of massive wood buildings. The more interest is in prefabricated wooden panel houses (Kujanová, 2016).

Wood as construction material compared to others is truly unique and unrepeatable. No other material has so many positive features and is so diverse, unvaried and incomparable with respect to each element. Wood is raw material whose exceptional properties are mainly good effects on indoor climate, pleasant scent, moisture control, increased heat sensation and excellent building-physical properties (Vaverka, 2008). Wood as a building material has great potential in the woodworking application. Different building systems allow manufacturers to be highly versatile and they bring difficulties for customers in choice of the type of construction.

The basic systems of timber constructions according to Ružičku (2014) include:

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- Solid wood buildings- log cabin,
- Panel construction,
- Timber frame construction,
- Skeleton construction,
- Half-timbered construction system,
- Prefabricated panel construction system,
- Cell system.

Nowadays most commonly used in addition to the log cabin Kujanova (2016) is the panel construction and the most popular is the timber frame construction of wooden house. The basic advantages of woodworks according to Ružička (2006) include:

- Lower heating costs (thermal insulation properties)
- Extremely short construction time
- Dry construction technology
- Suitable for low-energy or passive construction
- Comfort of the indoor environment
- Healthy housing, environmentally friendly
- Possible use of heat gains
- Fresh air (recuperation)
- Air-tightness and silence
- Save the environment

For modern wooden houses housing comfort and indoor climate are typical, naturally when choosing a suitable heating and ventilation system. Immediate heat losses are very low, same as energy consumption for building heating. The time to achieve the thermal comfort of the house is considerably shorter. Heat is not placed first in constructions as by masonry buildings, but the inner space is being heated initially. According to Štefko et al. (2004) by proper designed composition and use of diffusion open materials, we are not getting condensation of water vapour as a result. The resulting moisture is released continuously to the outside environment, thereby minimizing damage to the structure and molding at their maximum, and thus achieving a healthy living. Among the drawbacks we can mention lower thermal accumulation capacities, faster temperature drops, shorter service life compared to masonry and acoustic properties. The construction itself has to be perfectly constructed in all details, as each mistake can affect the overall effect of the construction.

In Slovakia it can be estimated that wood-based buildings account for less than 10% of all new constructions. In the Czech Republic it is almost 18%. More common are they then in the UK - 20%, Austria - 35%, Germany - 49%, the United States and Canada - 80%. In Sweden and the Nordic countries it is more than 80%. In Austria, in the form of national programs, efforts are made to increase the share of timber construction to 80 - 90% (Šuštiaková, 2016). In Slovakia, grants for wooden buildings are currently being prepared through a draft regulation of the Ministry of Agriculture and Rural Development of the Slovak Republic (MARD SR), to provide grants for the construction of wooden houses with low energy consumption. The ministry's primary aim is to support the use and processing of our timber directly here in Slovakia, instead of exporting it abroad (Slováci budú môcť získať 5- až 13-tisíc eur na výstavbu nízkoenergetických drevodomov, 2017). According to the Minister of the MARD SR Gabriela Matečná: "Wooden houses are advantageous from the energy and ecological point of view. We would be able to support approximately 100-200 timber houses in this year by allocated financial volume. In Slovakia, about 1,000 of them are built annually." Wood is a sustainable renewable resource. It is important that the domestically produced raw material is processed by domestic capacities and the value is added to it in our country and not abroad. The MARD SR will provide individuals grant of EUR 11,000 in class A0, EUR 10,000 in class A1 and in the capital of the SR area EUR 6,000 in class A0 and EUR 5,000 in class A1¹. (LP/2017/602 Vyhláška Ministerstva pôdohospodárstva a rozvoja vidieka Slovenskej republiky o rozsahu, podmienkach a spôsobe poskytovania dotácie na zhotovený drevený rodinný dom s nízkou potrebou energie, 2017).

¹ Energy classes of global indicator (primary energy consumption), A0 - $\leq 54 \text{ kWh/m}^2 \text{ a}$, A1 - $55-108 \text{ kWh/m}^2 \text{ a}$.

One of the major problems of wooden house is, in addition to low awareness of its advantages and construction and maintenance techniques, the financing problem in terms of investment. The most common solution is to use a mortgage loan. The number of mortgage loans has increased by 50% since 2009, ie from the economic crisis to 2016, and has even doubled in the amount of funds provided (Eurostav, 2016). Their volume is slowly reaching the pre-crisis level. This trend is mainly due to low interest rates and thus the availability of housing loans is the highest in the Slovak independence era. The development is also favourable for the house construction sector and therefore the market situation gives the wood the opportunity to apply in this sector as well. We can expect that, due to state support and increased awareness of wood buildings for potential customers, the market share of wooden houses will grow in the coming years as well.

The article deals with the market share of wooden houses in the total production of family houses and identifies the trend of the number of timber houses producers from 1993 to the present. The output of this contribution is to update the database of wooden houses producers and to determine the market share of timber constructions in the total construction for 2016 by addressing individual producers according to available Internet databases as well as addressing individual district construction offices. This paper provides an overview of the current state of the Slovak wooden house market, presents the trend of development as well as the locations in Slovakia, where the market is overfilled with manufacturers and vice versa, where it is not sufficiently covered.

2. MATERIAL AND METHODS

The construction of family houses is now more accessible than in the past, as mortgage loans are at minimal interest from the establishment of the Slovak Republic. Young people under the age of 35 can even get a mortgage loan with a state contribution for the first 5 years at zero interest. This fact can start up the market for family houses in the Slovak Republic, which is also confirmed by Figure 1 and Table 1. The volume of housing loans in the Slovak Republic reached in January 2017 cumulative of already 19.256 billion EUR. According to the data of the National Bank of Slovakia (NBS), it increased by 77.5 mil. EUR. A year ago, the volume itself was yet only 17 billion. EUR. Mortgage loans for real estates are still dominant, amounting at the end of January to 11.966 billion, EUR (NBS, 2016).

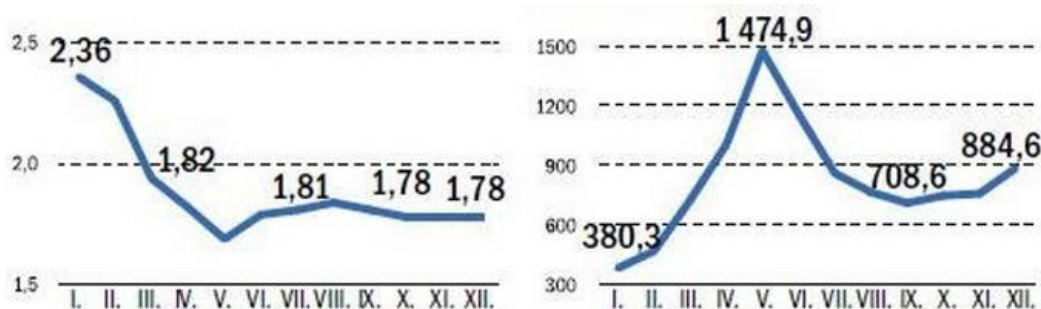


Figure 1 Interest rate of loans and growth of loans in millions € in 2016

Source: NBS, 2016 Available: <http://finweb.hnonline.sk/spravy-zo-sveta-financii/907306-rekord-slovaci-si-na-byvanie-pozicali-9-6-miliardy-eur>

Table 1 Development of number of built family houses in Slovakia

Number of Flats or house/Year	2011	2012	2013	2014	2015
Houses or Flats currently in process of building	12 740	13 090	14 758	15 836	19 640
Number of already finished Flats or Houses	14 608	15 255	15 100	14 985	15 471

Source: Eurostav, 2016

The favourable market situation admittedly increases the demand for family houses. Wooden constructions are experiencing an increase in market share from 2% in 2002 to the current 10% of the total number of completed constructions, which in nominal value represents about 1 000 built wooden houses per year (Jedenást' uchádzačov o drevostavbu roka, 2017).

By the assessment of the current situation on the Slovak wooden house market, we have set the goal of determining the number of active wooden houses producers since 1993, as this figure is not available.

We proceeded by searching in available databases such as (zoznam.sk, azet.sk, stavebnik.sk and starting.sk). By confrontation through the business register we found out whether they belong to the woodworking sector. The thus-obtained, verified and up-to-date database of timber producers was categorized into regions and subsequently into districts. We were able to create a penetration map of woodworking producers in Slovakia. Subsequently, according to the business registers data, we have determined the scope of individual companies, and we were able to create a report of the growth of producers since the establishment of the SR to the present

Another observing parameter was the legal form (trade licence, Ltd.) and its representation in this sector. The second aspect of this article was also stating whether the estimated number of 1,000 realized wooden houses, representing a 10% share, was real as indicated on its website by the Association of Wood producers of the Slovak Republic (ZSDSR).

We have approached by mail all district construction offices to provide us with the actual amount of finally approved timber constructions in the Slovak Republic for the year 2016. However, the data we have collected were not ultimately complex. There were authorities very willing to provide the information. Then there were offices that did not respond, but these were in the minority. At last, there were authorities who answered they are not even gathering such records. Therefore, this estimated market share of wooden houses in Slovakia can not be confirmed or refuted on the basis of data obtained from construction offices. We see the solution in the expansion of the statistical data, which would just follow the number of completed flats and flats in process of building in type of wooden house.

3. RESULTS AND DISCUSSION

Figure 2 on the right side presents the number of wooden houses in Slovakia for 2015 with the top 25 producers. What represents 15% of the producers, which made 45% of the wooden houses (440 pieces). We can say that if other companies make 3 wooden houses on average per year, which can be a real number, the estimate of the market share of MADR SR 10% is close to the real market situation. This, admittedly has also been reflected in an increase in the number of wooden houses producers (Figure 2). This dynamic increase has brought number of speculators and inferior woodworkers, which may have also made the growth of the market share of woodworking in sector wooden house even less striking. From the results it can be stated that from the establishment of the SR to the present, the trend of the number of timber producers is increasing. In our database we have registered 163 currently active entities dealing with assembled wooden houses. The condition for inclusion in the database was the availability on internet databases, the functioning website and the subject of activity stated in the business register as construction of wooden houses. The database was updated to June 30, 2017. The Figure 2 shows that increases are relatively high at 5 year intervals. We can see that the number has almost doubled between 2002 and 2007. Subsequently, in 2012 there was an increase by another third. The same situation occurred in comparison of years 2012 and 2017. So from that we can consider this as very dynamically developing sector.

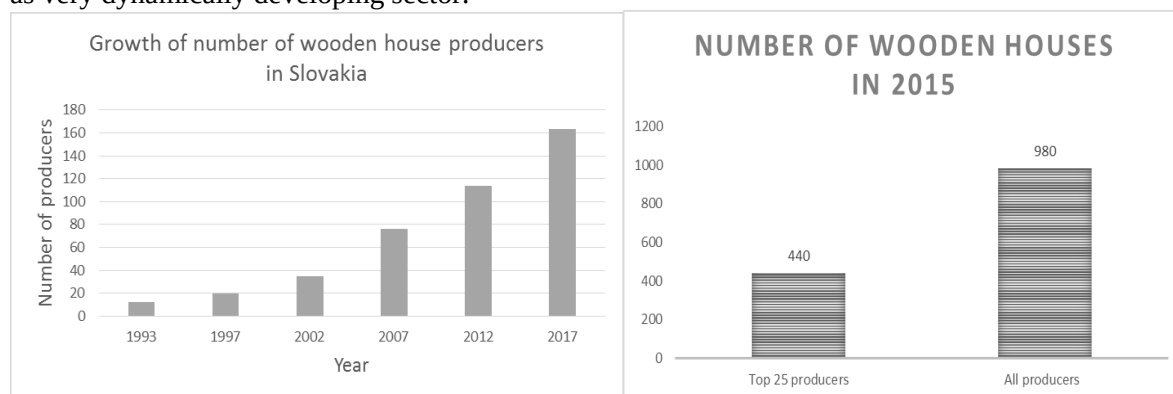


Figure 2 Number of wooden house producers and number of wooden houses in 2015

Source: own study and research of BAU holding – rodinné domy, s.r.o.

In addition to the updated database, we distributed the producers according to the region's competencies and subsequently we mapped their coverage for each region. On the basis of these clear maps, we can see the distribution of competition in individual regions of Slovakia, which can also be an interesting information for the producers themselves from the point of view of the availability of the provided timber constructions.

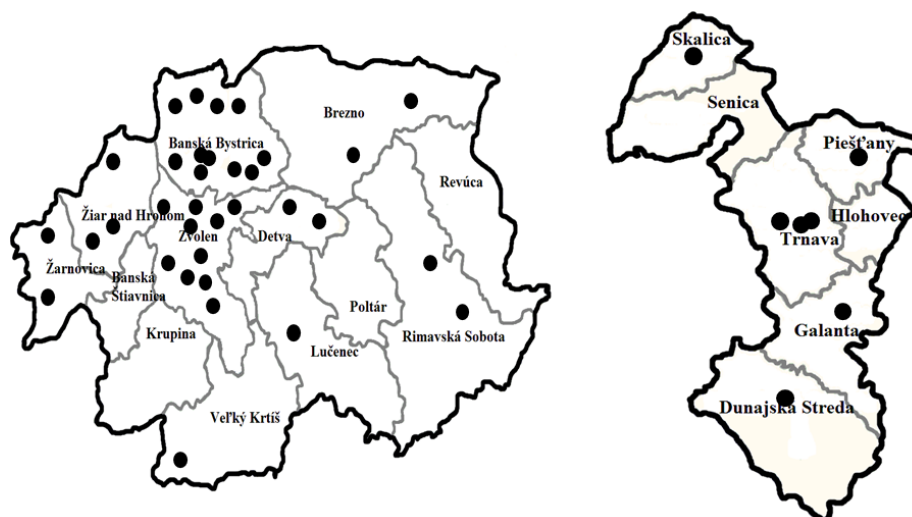


Figure 3 Coverage of wooden house producers in Regions of Banskobystrický and Trnavský
Source: own study

As we can see in Figure 3 in the Banskobystrický Region (BB), most of the companies are situated around Banská Bystrica and Zvolen. The southern parts are less covered and the number of producers in other districts does not exceed number of 3. The situation in Trnavský kraj (TT) shows us that there is a significantly lower number of producers than in the BB region. This may be due to smaller influence of woodprocessing tradition, as well as the fact that in Zvolen there is the Technical University with the Faculty of wood sciences. The awareness in the surrounding area has therefore wider and also more historical background. Figure 4 shows the regions with the smallest number of timber houses producers. There are also districts that do not have a producer at all. The largest representants are in region capitals - Trenčín and Nitra, as they are economically the most developed.

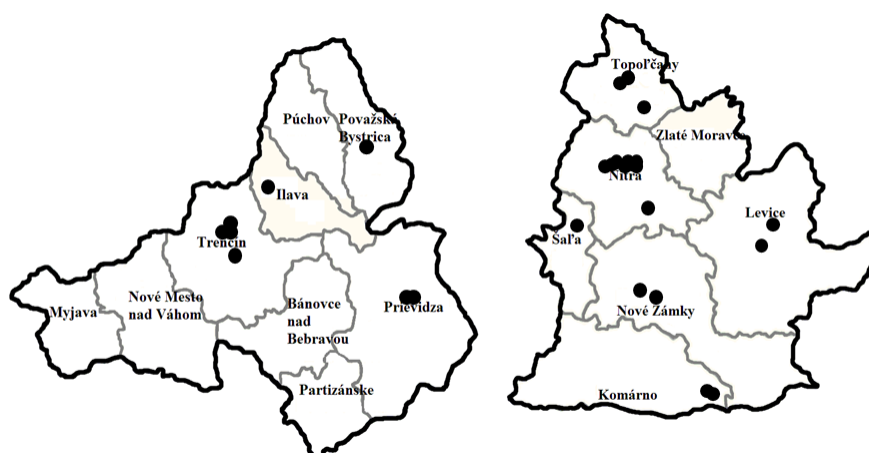


Figure 4 Coverage of wooden house producers in Regions of Trenčiansky and Nitriansky
Source: own study

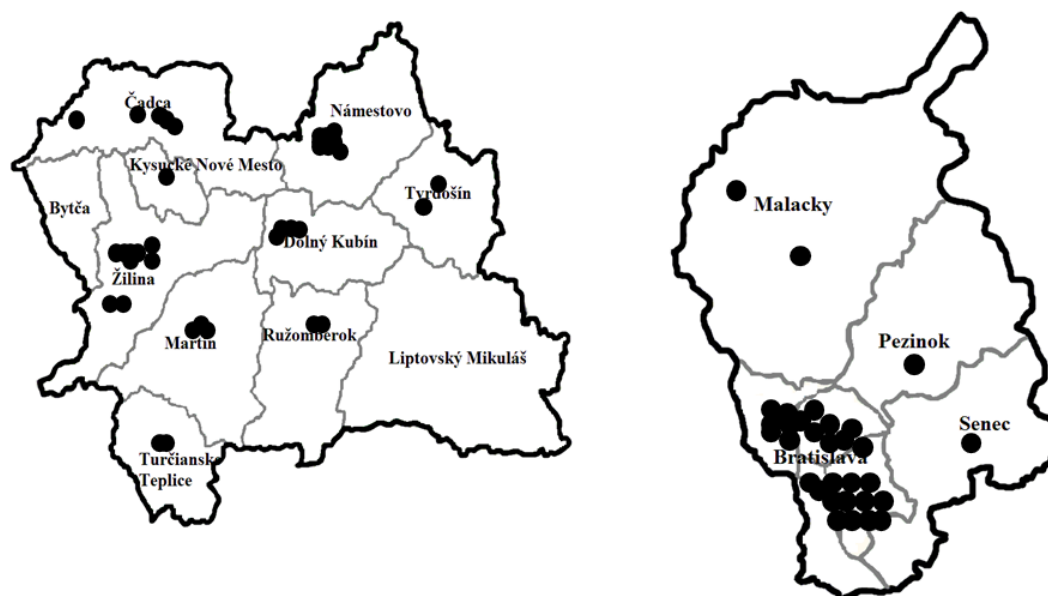


Figure 5 Coverage of wooden house producers in Regions of Žilinský and Bratislavský
Source: own study

Figure 5 shows a relatively even representation in the Žilinský Region. No company was registered in the Liptovský Mikuláš district, but this does not mean that there are no branches of the other producers. The region of Bratislava is, admittedly the most economically strong and the number of producers is the third highest after the ŽI and BB regions with a 19% share. Most companies are centralizing around Bratislava. In other districts, the number of producers is only symbolic and their competition comes mainly from the Bratislava district.

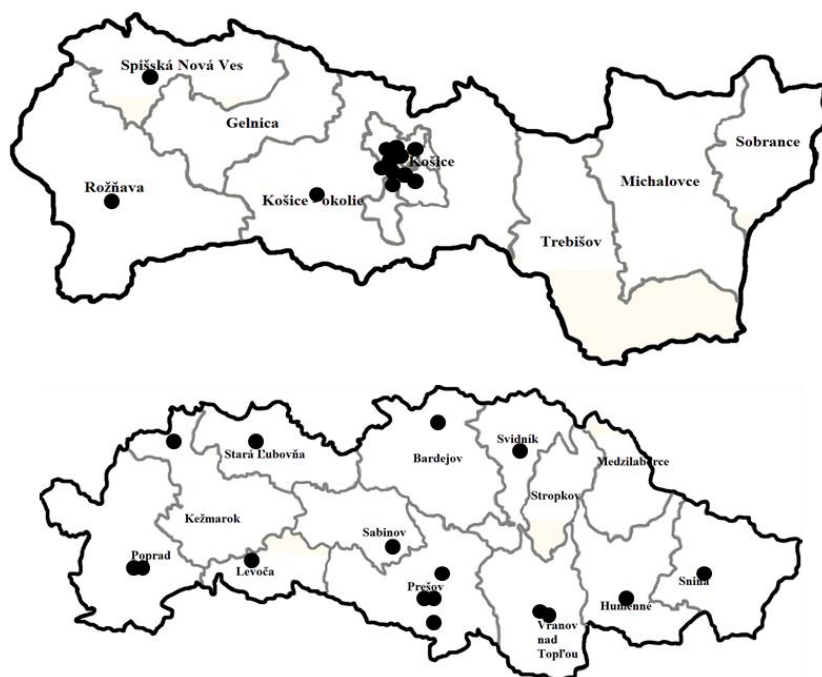


Figure 6 Coverage of wooden house producers in Regions of Košický and Prešovský
Source: own study

The last two regions are in the east of Slovakia - Košický (KE) and Prešovský (PR) (Figure 6). The number of manufacturers does not exceed the total of more than 10%. But it is a bit more than in the TT and TN regions. An interesting feature for the eastern regions is the relatively even distribution of woodworking producers in the PR region and vice versa the concentration of producers in the KE region in the regional capital city of Košice. Košice is the cultural center as well as the economic driver of this region. An important factor is the decline in the number of producers towards the Ukrainian border, where we see districts without representation of wooden house producer. However, it is important to note that the object of our interest was the analysis of the seat of the company, which does not exclude the possibility of realization of the building work in other regions of Slovakia and even abroad.

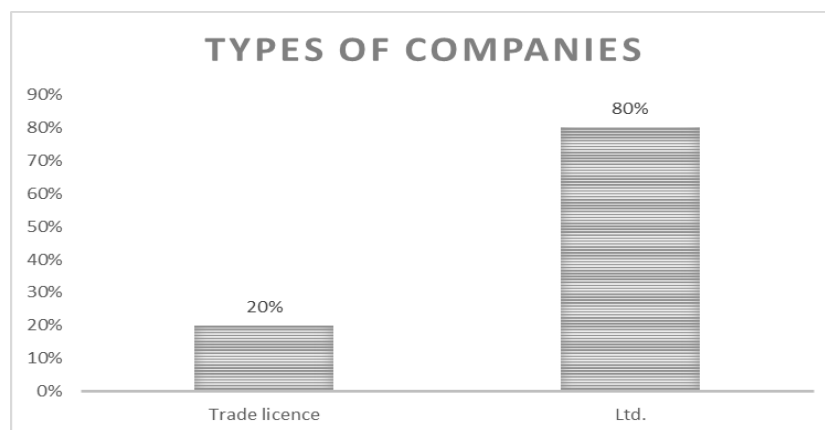


Figure 7 Types of companies in wooden house sector

Source: own study

Figure 7 shows us the ratio of the type of timber producers according to the legal form, with domination of limited liability companies (Ltd.-s) in this sector. This is due to the clear advantages of this legal form (Ltd.) over the enterprise of the individual with trade licence (the way of guarantee, the amount of social and health payments, etc.).

4. CONCLUSION

In this article we presented the growth development of the number of wooden houses producers in Slovakia. We also referred to their coverage within the regions of Slovakia. In this way, we updated the database of wooden houses producers in Slovakia, which is available at the contact addresses of the authors. We predict that the number of producers, in our opinion, will continue to rise on the basis of the information gathered. We are also expecting the increase of the wooden houses market share in the overall number of constructions. This should also help prepare a subsidy to support the construction of wooden houses as well as their advantages in terms of extreme short construction time, ecology and construction technology. Problematic factors, however, still appear to be the still-historically traditional concepts of the safety and maintenance of masonry houses. Weak and uncoordinated marketing support for wooden house producers as well as the products themselves, therefore low awareness among a general public of potential customers.

Our priority proposal is to extend the monitoring of statistical data of wooden houses and wooden houses in process of building in Slovakia by the Statistical Office, because the number of realized wooden houses is currently not available. Therefore, we had to draw this figure only from MARD SR estimates. We have made contact with building authorities via e-mail to find out this number, but the collected responses have not been sufficiently statistically relevant.

Acknowledgements

We wish to thank project VEGA -- Scientific Grant Agency of the Ministry of Education, Science, Research and Sport of the Slovak Republic and Slovak Academy of Sciences; (Project

No.1/0320/17 Economic and Social Context of European 20/20/20 Targets from the Viewpoint of Economy Low-energy Houses). We wish to thank project IPA No. 15/2017 - Wooden houses and their potential in terms of tightened conditions of energy performance buildings.

References

- Štefko, J., Soyka, R. 2013. Wooden buildings. Bratislava: Dolis s.r.o., 2013. 124 p. ISBN 978-80-228-2504-7.
- Kujanová K. Drevostavby – Vieme o nich všetko?.2016. In Dom a bývanie. [online]. [Access 10.4.2017]. Available: <http://www.domabyvanie.eu/page/index.php?log=clanok&uid=44>
- Vaverka J., a kol.. 2008: Dřevostavby pro bydlení. Grada Publishing, Praha.
- Ružička M. 2014: Moderní dřevostavba. Grada Publishing, Praha, 160 p. ISBN 978-80-247-3298-5.
- Ružička M., 2006: Stavíme dům ze dřeva. Grada Publishing, Praha, 120 p. EAN 24764580
- Štefko, Jozef – Reinprecht, L. 2004. Dřevěné stavby, konstrukce, ochrana a údržba. Bratislava: Jaga group, 2004. 196 p. ISBN 80-88905-95-8.
- Šuštiaková, M. 2016: Moderné drevostavby – konštrukcie budúcnosti? [online]. [Access 10.7.2017]. Available: <http://mprojekty.sk/blog/modern%C3%A9-drevostavby-kon%C5%A1trukcie-bud%C3%BAcnosti>
- Národná Banka Slovenska NBS. 2016. Správa o úveroch za rok 2016. [online]. [Access 6.9.2017] Available: <http://finweb.hnonline.sk/spravy-zo-sveta-financii/907306-rekord-slovaci-si-na-byvanie-pozicali-9-6-miliardy-eur>
- Eurostav. 2016. Stavebníctvo 2015: Top 100 producentov. [online]. [Access 6.9.2017]. Available: http://www.casopiseurostav.sk/documents/top_100_tabulky/top100_stavebnictvo_2016.pdf
- Jedenásť uchádzačov o drevostavbu roka. 2017. [online]. [Access 6.9.2017]. Available: <http://www.stavebnictvoabyvanie.sk/stavebnictvo/architektura/2969-jedenast-uchadzacov-o-drevostavbu-roka>.
- Zoznam.sk. [Access 30.6.2017]. Available: <https://www.zoznam.sk/katalog/Stavba-dom-dielna/Stavebna-cinnost/Montovane-domy/>
- Azet.sk. [Access 30.6.2017]. Available: <https://www.azet.sk/katalog/montovane-domy/>
- Stavebnik.sk. [Access 30.6.2017]. Available: <https://www.stavebnik.sk/stavebne-firmy.html>
- Starting.sk. [Access 30.6.2017]. Available: <http://www.starting.sk/montovane-domy>
- Slováci budú môcť získať 5- až 13-tisíc eur na výstavbu nízkoenergetických drevodomov.2017. [online]. [Access 6.9.2017]. Available: <http://www.mpsr.sk/index.php?start&navID=1&id=11984>
- LP/2017/602 Vyhláška Ministerstva pôdohospodárstva a rozvoja vidieka Slovenskej republiky o rozsahu, podmienkach a spôsobe poskytovania dotácie na zhotovený drevený rodinný dom s nízkou potrebou energie. 2017. [Access 8.8.2017]. Available: <https://www.slov-lex.sk/legislativne-procesy/SK/LP/2017/602>.

IMPORTANCE OF THE E-GOVERNMENT ACT AND ITS IMPACT ON THE MANAGEMENT AND ECONOMY OF THE ENTERPRISE IN THE SLOVAKIA

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ABSTRACT

Bureaucracy and the complicated way of communication of entrepreneurs with public authorities represent a major problem of business development in Slovakia. In order to remove this obstacle, in 2013 became part of the law system of the Slovak Republic Act No. 305/2013 Coll. on the electronic form of exercising the powers of the public authorities and on the amendment and supplementation of some laws (the e-Government Act). The main objective of the legislator was to create a legal environment for the execution of power of public authorities by electronic means, thereby simplifying, speeding up, streamlining and unifying individual communication processes while removing the excessive fragmentation of the legislation in the whole range of existing legislation in the area of electronic public services towards entrepreneurs and public authorities towards each other. This law codifies electronic communication as a major form of communication between business entities and public authorities, as well as communication within the public authorities together with the historically basic but still decisive and inevitable classical paper form. The e-Government Act establishes the power of public authorities to exercise the power of a public authority and to communicate with entrepreneurs electronically. The aim of the article's authors is to investigate, by means of several scientific methods, its impact on the management and economy of an enterprise, to analyse and to draw attention to its shortcomings and to propose measures for their elimination

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: electronic communication, entrepreneur, management, public authorities.

1. INTRODUCTION

A high-quality business environment that creates the conditions for long-term sustainable growth is a basic prerequisite for the development of business and increasing the competitiveness of the Slovak Republic on an international scale Nováčková, Milošovičová (2011). The business environment, in its broadest sense, reflects the quality of the economic conditions and assumptions for the economic activity of these business entities. In recent years, however, Slovakia has also experienced a decline in the quality of the business environment, as reflected, for example, in the evaluation of World Bank or World Economic Forum. Research shows that the most problematic is particularly ambiguous and often changing legislation, high taxes and other charges, poor law enforcement or inadequate bureaucratic burdens on entrepreneurs Pilková et al. (2015). In order to remove bureaucracy, the National Council of the Slovak Republic approved on 4 September 2013 a government bill on the electronic form of the exercise of powers of the public authorities and on the amendment of certain laws (the e-Government Act). This proposal has become the cornerstone of the electronic performance of the powers of the public authorities. The national concept of informatization of the public administration has defined the basic architecture of integrated information systems of public administration and the standards of their construction in order to ensure interoperability and independence from the technologies.

The Act came into force by publishing in the Collection of Laws of the Slovak Republic on October 8, 2013, but became effective from March 1, 2017. Due to the exceptional nature of the law, which is fundamentally breakthrough, the legislator has established more than three years legislative time, for the public authorities, the public, as well as the entrepreneurs to properly acquaint themselves with the content of this legislation and to prepare for its application in practice. In terms of

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classification, it is divided into ten articles, of which Article I is of major importance. Other Articles II to IX constitute an active derogation (deletion) of legislation relating to the electronic exercise of public authority, and the last Article X sets the date of the law's entry into force for the aforementioned 1. March 2017.

The subject of the Act is the regulation of information systems intended for the exercise of powers of the public authorities in electronic form, the rules and conditions for electronic submission, the electronic document, as well as certain conditions and methods of public authority and electronic communication between public authorities Gregušová et al. (2010). An integral part of the exercise of public authority by electronic means is also the legal regulation of the examined electronic delivery, and the associated functioning of electronic mailboxes, the creation of a legal environment to ensure the identification and authentication of individuals as well as the authorization of documents. Despite the fact that Act No. 275/2006 Coll. on information systems of public administration introduced electronic depreciation and output from public administration information systems, the e-Government Act also regulates conversion and guaranteed conversion separately. It is a transfer of an electronic document into a documentary form. For the performance of public administration and public authorities, it is also necessary to regulate the conditions and methods of payment and the payment of administrative fees by the public authorities for the services provided.

2. MATERIAL AND METHODS

The studied issue is insufficiently scientifically processed due to its specificity and uniqueness. Despite the general absence of this issue, it is possible to mention a number of specialists who deal with this issue, including D. Gregušová, B. Susko and M. Chlipala. Several scientific articles have been used to process this article, for example electronic filing and delivery, electronic depreciation and output of information systems of public administration as part of informatization in conditions of the Slovak Republic, Electronic form of execution of powers of public authorities or some (selected) legal aspects of electronic signature in the Slovak Republic. In addition, the authors were based on professional literary literature, especially in the field of economics and law, as it is a multidisciplinary issue. From the point of view of the applied scientific methods of exploration representing highly qualified human activity aimed at obtaining scientific knowledge, the method of analysis, abstraction, comparison and descriptions was applied mainly to the penetration from the phenomenon.

3. RESULTS

3.1 Electronic delivery

The provisions of Sections 29 to 34 of the e-Government Act regulate electronic service, which replaces the existing rules of service under special laws, in particular procedural rules governing individual procedures. This is especially the law no. 71/1967 Coll. Administrative order, Act no. 300/2015 Civil Dispute Settlement, Act no. 563/2009 Coll. on Tax Administration (Tax Code) and on Amendments to Some Laws and Others. The e-Government Act left the possibility for specific rules to provide for a different method of delivery, the way it was performed, including a different adjustment of the delivery fiction, and so on. However, the law, as well as any questions not covered by the special regulations will always govern the law of the place of delivery (electronic mailbox).

The first distinguishing criterion for delivery is whether it is delivered to one's own hands. Thus, all electronic documents which are legally identical to documents in paper form and that specific rules stipulate that they be delivered to their own hands are delivered. Self-hand delivery itself modifies this law in a standard way as a delivery, in which the addressee confirms to the sender that the delivery has taken place. For purposes of confirmation, an electronic delivery service was created as a document created in an automated way, and the recipient has no influence on the content of the document. Article 30 (1) of the e-Government Act defines it as an electronic document containing the date, hour, minute and e-mail, the identifier of the recipient's person, the identifier of the sender's person, and the identification of the electronic government report and the electronic documents that are electronically delivered.

If the addressee is a public authority, an electronic document is produced and certified by the electronic office of that authority. Another situation arises if the addressee is not a public authority. In this case, electronic delivery creates an electronic delivery module in an automated manner, and the electronic mailbox module administrator ensures that the recipient is available to the recipient when downloading the electronic document and must confirm it. For this purpose, a special authorization tool for delivery notes has been introduced; confirmation is done by clicking on the specified delivery function. Such a procedure prevents speculative acts on the part of addressees who do not receive a document from being made available before confirming receipt.

The electronic delivery note is sent to the electronic mailbox of the sender of the relevant electronic administration whose delivery confirms the electronic receipt, even if the electronic mailbox is not activated. In particular, it should be emphasized that the data contained in the confirmed electronic delivery note is considered to be true unless the contrary is proved. This means that an electronic receipt has the same status as a document and is considered a public document Gregušová and Halászová (2015).

The place of delivery pursuant to § 30 paragraph four of the e-Government Act is the exclusively activated electronic mailbox, which means that it is always delivered to the electronic mailbox. The law also allows parallel delivery to another mailbox on a specialized portal, but only if hand delivery is not required. The electronic mailbox is not delivered if the electronic mailbox is not activated if a special regulation states that it is delivered only in paper form or delivered to persons in custody, punishment, etc.

The moment of delivery is in the case of the public authority when the message is stored in the mailbox and, in the case of other persons, the moment of confirmation of the delivery note, the expiration of the storage period if it is delivered to your own hands or the next day after saving in other cases. In other words, the public authority, unlike other persons, does not have the 'benefit of a standstill period', which is set at 15 days, calculated from the day following the date of the electronic administrative report. By imposing an electronic administrative report is meant the moment when the electronic administration is objectively available to the recipient in the addressee's electronic mailbox.

An electronic public message delivered by law shall be deemed to have been served by the day, hour, minute, and second by electronic delivery or by a mild expiration of the retention period (whichever comes first). This also applies if the addressee did not know about the storage. If it is not delivered in its own hands, delivery will occur on the day immediately after the electronic administration has been stored. A different rule applies if the addressee is a public authority. In this case, an electronic administrative report is delivered by storing it in an electronic mailbox, as the law orders the public authorities to receive electronically delivered official reports on a daily basis, j. even over public holidays or national holidays.

If electronic delivery occurs on a public holiday or on a business day, the time limit for the execution of the act, the beginning of which is related to the moment of electronic delivery, shall commence on the next following business day. However, this does not apply in specific cases where public authorities or other persons are also obliged to act on working days, in matters of care for minors, when it is urgent to act and decide.

3.2 Delivering ineffectiveness proceedings

Following the delivery fiction, the law regulates a unified way of dealing with ineffectiveness of deliveries in cases where fiction cannot occur. This procedure is entrusted, for reasons of efficiency and cost to the organ before it; is two-step with the possibility of a judicial inquiry Ficová et al. (2010). The procedure starts at the request of an addressee who is not a public authority. A prerequisite for a positive decision by the competent authority that service is ineffective is proof that the addressee:

- objectively unable to take over a message due to the fact that it did not occur on its part or by its initiation (interruption of electricity supplies, Internet outages, etc.), or
- on his side, there were also reasons that objectively prevented him from taking over the message, but this assumption would have been associated with disproportionate difficulties that he was not fair to demand from overcoming (eg. hospitalization).

Such a proposal, together with the reasoning and evidences, must be submitted within 15 days of the date when the addressee of the content of the electronic administration was informed or could become acquainted. Otherwise, the right to consider the option of forgiveness of the missed time-limit shall expire.

The public authority may also decide that electronic delivery is ineffective even if it is clear from the file content that the addressee could not have been aware of the content of the electronic administration within the standstill period. In the event of serious personal injury, the public authority may also decide to postpone the effects of electronic delivery on the decision in the main proceedings. The condition is that there should be no harm to the rights of other persons acquired in good faith or public interest damage exceeding the prejudice to the addressee. In some status queries, this ineligibility action is not allowed, for example, in the case of a divorce decision *Cirák et al.* (2008).

The public authority in electronic non-enforcement proceedings will allow the participant to take over the electronic administrative report that the electronic delivery is ineffective, including all the electronic documents it contains. If a public authority has ruled that electronic delivery is ineffective, the electronic administrative report, including all electronic documents, shall be deemed to have been delivered on the date on which the decision on the ineffectiveness of the electronic delivery has become final. A decision on the ineffectiveness of electronic delivery can be challenged by appeal.

3.3 Electronic official board

As a special way of delivery, the law regulates service by stamping on the official board of a public authority, public notice or other similar means of publication for an indefinite circle of persons. For this purpose, an electronic board is set up, accessible to everyone via the Internet. It does not replace hangover on the official board, but it acts as an add-on. When communicating with a public administration body and entrepreneurs, in the construction process, the official table is used quite often as a means of delivering documents *Srebalová* (2008). He remembered this lawmaker, and in the provisions of Section 34 of the e-Government Act he adapted the legal institute of the Electronic official board. This can be defined as the electronic repository to which they are sent and on which electronic documents are published, as provided by law. Published here:

- an electronic document that is identical in law to an act of the e-Government with a document in the form of a document, which the special regulations state that it is served by a notice on the official board of a public authority, public notice or other similar publication an indefinite circle of persons,
- another electronic document, about which a special regulation, eg. Act No. 50/1976 Coll. on Building Planning and Building Regulations (Building Act), as amended, provides that it is published or posted on an official board, public notice, web site or other similar publication for an indefinite range of persons *Vrabko et al.* (2013).

However, disclosure on the Electronic official board does not replace the obligation to publish or display under specific regulations. Publication shall take place on the same day as on the official board or on the website of the public authority.

3.4 Electronic mailbox

The condition of electronic delivery is the existence of functional electronic mailboxes set up by a public authority, a legal person, a natural person, an entrepreneur, a body of international law, an organizational unit or other organization to be specified by a separate regulation. It is the responsibility of the electronic mailbox administrator to ensure that:

- the electronic mailbox was available,
- access and disposition are only available to persons authorized to access and dispose of the appropriate electronic mailbox,
- the possibility of activating, changing and cancelling permissions to the electronic mailbox,
- the storage of electronic messages and electronic documents with content identical to that received in the electronic mailbox has been allowed, and
- the date and time of each action has been recorded.

In addition to these duties, the administrator of the electronic mailbox module in the electronic mailbox module also provides additional information such as, for example, the electronic mailbox identifier, the date and time of setting up, enabling, deactivating and cancelling of the electronic mailbox, and the date and time of the change of the electronic mailbox entitlements, specifying the hour, minute and second, and the identifier of the person who changed the authorization. Such data may be made available, in addition to the owner of the electronic mailbox, only to a public authority for the purposes, to the extent and under the conditions and manner in accordance with the special rules under which the information contained in the letter of confidentiality, the secrecy of other documents and records and the secrecy of the messages documents. As far as archiving is concerned, the administrator of the electronic mailbox module has been in charge of setting up an electronic mailbox until three years have elapsed since the electronic mailbox was cancelled Gregušová and Susko (2004).

In terms of reducing costs, entrepreneurs are primarily a mandatory provision of Section 12 (1) of the e-Government Act, which establishes that the electronic mailbox is established free of charge. Equally important is the provision that it is possible to set up only one electronic mailbox for each legal position. In practice, this means that if the owner of an electronic mailbox is simultaneously a person in several legal positions, tradesman and the statutory body of the company, a special electronic mailbox for each of these legal statuses is set up.

Everyone to whom an electronic mailbox has been set up is, by law, its owner, but the electronic mailbox is not subject to proprietary rights. It follows that it is entitled to dispose of it only in the manner prescribed by law and the possibility of selling, renting or otherwise using the electronic mailbox is excluded. The electronic mailbox administrator establishes the electronic mailbox immediately after he learns of the following:

- a public authority, a legal person (eg. a trading company),
- authorization for the business of a natural person, in the case of an electronic mailbox of a natural person of an entrepreneur,
- on the day when a natural person who is a citizen of the Slovak Republic reaches the age of 18 when it is an electronic mailbox of a natural person who is not an entrepreneur.

The administrator of the electronic mailbox module publishes a list of e-mail addresses of public authorities and electronic mailboxes at the central portal and ensures its connection to the electronic mailbox module so that a list of those addresses is also provided when creating an e-mail.

Activation and access to the electronic mailbox is an essential part of its functioning for the needs of the entrepreneur, which in practice means allowing its use to the owner. Granting access and disposal with the electronic mailbox and changing the access and disposal rights with the electronic mailbox is the legal act of the owner of the electronic mailbox identifying the person authorized to access and dispose of the electronic mailbox and determining the extent of his access and disposal rights with an electronic mailbox. Granting access and dispatch with the electronic mailbox and changing access and dispatch permissions will be done by the owner of the electronic mailbox by an electronic document authorized by the electronic mailbox owner delivered by the electronic mailbox administrator via the specified mailbox or document with the officially certified signature of the owner of the electronic mailbox. The administrator of the electronic mailbox module shall be able to access and dispose of the electronic mailbox within the scope of the granted authorization without delay and, if it is executed by document in paper form, within 10 working days from the day of its delivery.

Access to the electronic administration and its content in the electronic mailbox is also authorized by the public authority for the purposes, to the extent and under the conditions and manner according to special regulations, according to which it is possible to disclose data that are contained in the letter of confidentiality, secrecy of other documents and records; secrecy of messages and other documents Vrabko et al.(2012).

The provision of Section 14 of the e-Government Act also regulates the issue of deactivating the electronic mailbox, which means the procedure to ensure that the electronic mailbox can no longer be used for the purposes of electronic delivery, thereby unaffected access to it. The deactivation itself is provided by the administrator of the electronic mailbox module and executed by day: the death of a natural person (even in the case of a declaration of death);

- the validity of the decision on the deprivation or limitation of legal capacity,

- the disappearance of a legal person (eg a commercial company) or a public authority without a legal successor, the termination of the activity of a public authority in the case of a natural person or the deletion of the registered organizational unit from the statutory register,
- specified in the electronic mailbox owner's request to deactivate the electronic mailbox (first but the third business day after receipt of the request).

The legislator also allowed the possibility of reactivating a previously deactivated mailbox provided that it was not cancelled. However, the reactivation options are limited by law and are unlikely to occur in business practice. The electronic mailbox administrator shall be removed from the electronic mailbox after the expiration of three years from the day on which the owner discovers the death of the owner, the declaration of the owner of the electronic mailbox or the death of the owner without a legal successor or for any other legitimate reason.

4. DISCUSSION

In the context of the discussion, it can be stated that the aim of the legislator was to create a functional model of electronic services of public authorities and public authorities and to link the basic registers of public administration. From the above, it can be stated that the e-Government Act creates a common model interface for interoperability and the use of data from them for the purpose of a unified use of the managed data contained therein. The use of electronic personal mailboxes will, in our opinion, make it possible to reduce the paper agenda and its full and complete conversion to electronic form, which will also mean the abolition of the public administration and, in particular, the acceleration and reduction of processes from the perspective of the business sector.

The law extends the use of the guaranteed electronic signature to all e-Government services as a basic verification tool for electronic communication with public administrations, which it has and will have unquestionable financial benefits for entrepreneurs. The costs of the "paper" agenda, postage, administrative and court fees, or fees associated with the official verification of signatures at a notary or on a matrix in some proceedings, will be reduced. A substantial contribution to the law is also saving the time needed for the administration. Another advantage of the completion of the process of electronization of public administration will be the use of data sharing, thus increasing the comfort of the population and, in particular, the business entities in dealing with the authorities. This is in particular the limitation of unnecessary bureaucracy caused by frequent, repeated and unreasonable transmission of the same data to the various authorities that require them. At the same time, it is expected to reduce the need to submit documents in paper form, which the competent public administration and public authorities will be able to obtain from public registers and public authorities, and possibly other information systems managed by other public authorities.

5. CONCLUSION

According to the original text, the e-Government Act came into force on November 1, 2013, and the activation of the electronic mailboxes of selected people had to come as early as August 1, 2015. However, there were serious problems. First the state's unpreparedness, later the unpreparedness of entrepreneurs. The main reason for postponing the activation of electronic mailboxes was the fact that, despite extensive media coverage, only a small number of statutory agents had an electronic ID card, "EID cards", which can also be seen as irresponsible behavior. Activating electronic mailboxes without real access would cause serious financial problems in particular. Due to these problems, the law was amended and it was assumed that electronic delivery would be "triggered" on August 1, 2016. This was not the next amendment to the law, and this electronic commencement date moved on January 1, 2017. Neither was the deadline an amendment to the law came up again and the definitive date for electronic commencement was set on July 1, 2017, when electronic mailboxes were automatically activated because businesses are obliged to communicate electronically with the state.

Another serious problem on the part of entrepreneurs is lack of computer literacy and this fact can very negatively affect the possibility of electronic communication. Even on the side of the state, however, problems arose due to the slowness of the system, because sometimes it is possible to enter into it only in the evening or at night, which is unacceptable from the point of view of the business and in this respect the state fails. For these reasons, some public authorities, Financial Administration of

the Slovak Republic and the Social Insurance Agency communicate with entrepreneurs in the previous way.

In general, the e-Government Act is expected to simplify, accelerate, streamline and unify the communication processes and to enhance the security of this communication. The contribution of this contribution is through the use of selected scientific research methods to process newly established legal institutes, which will, to a decisive extent, affect the business environment in the Slovak Republic. The contribution is mainly addressed to the professional public as well as to the business sector, which has to communicate electronically with the public authorities, without knowing the current legal situation, which has so far been almost untouched, can have unpleasant consequences, in particular from the point of view of the economy and management of the company concerned.

References

- Cirák, J., Števček, M., Ficová, S., Pavelková, B., Gandžala, J., Križan, M. 2008. *Občianske právo : všeobecná časť*. 1st edition. Heuréka, Šamorín, pp. 21
- Ficová, S., Števček, M., Bajánková, J., Cirák, J., Kováčová, E., Smyčková, R., Švecová, D. 2010. *Občianske súdne konanie*. 1st edition. C. H. BECK, Bratislava, pp. 174
- Gregušová, D., Halásová, Z. 2015. *Elektronická podoba výkonu pôsobnosti orgánov verejnej moci. Vplyv politiky na právo*, In Zborník z vedeckej konferencie s medzinárodnou účasťou. Sládkovičovo, Slovenská republika, p. 36
- Gregušová, D., Chlipala, M., Susko, B. 2010. *Elektronické podanie a doručovanie, elektronický odpis a výstup z informačných systémov verejnej správy ako súčasť informatizácie v podmienkach Slovenskej republiky*. In Acta Facultatis Iuridicae Universitatis Comenianae. Univerzita Komenského v Bratislave, Bratislava, pp. 163-174
- Gregušová, D., Susko, B. 2004) K niektorým (vybraným) právnym aspektom elektronického podpisu v Slovenskej republike : (Zákon č. 215/2002 Z. z. o elektronickom podpise) In Acta Universitatis Palackianae Olomucensis. Olomouc, Czech republic, pp. 142-160,
- Nováčková D., Milošovičová P. 2011. *Medzinárodné ekonomické právo*. 1st edition. Eurounion, Bratislava, p. 12
- Pilková, A., Holienka, M., Kovačičová, Z., Reháč, J. 2015. *Komerčné, sociálne a inkluzívne podnikanie na Slovensku GEM Slovensko 2015*. 1st edition. Univerzita Komenského v Bratislave, Bratislava, p. 242
- Srebalová, M. 2008. *Rýchlosť správneho konania a nečinnosť správneho orgánu*. 1st edition. Univerzita Komenského v Bratislave, Bratislava, pp. 88
- Vrabko, M., Cepek, B., Martvoň, A., Pekár, B., Srebalová, M., Škrobák, J., Tóthová, K., Vačok, J. 2012. *Správne právo hmotné : všeobecná časť*. 1st edition. C. H. BECK, Bratislava, pp. 200
- Vrabko, M., Cepek, B., Martvoň, A., Pekár, B., Srebalová, M., Škrobák, J., Tóthová, K., Vačok, J. 2013. *Správne právo procesné : všeobecná časť*. 1st edition. C. H. BECK, Bratislava, pp. 67

EXPLORING PERSONALITY OF THE BRAND NIVEA: A COMPARATIVE RESEARCH BETWEEN TWO COUNTRIES

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ABSTRACT

Brands are heavily reliant on emotional appeal to achieve consumer recognition and interest. The key seems to be in self-expression benefits that brands provide to their customers. In this context, brand personality has a decisive role in brand adoption and decision-making processes. The purpose of this study is to evaluate the personality of the brand Nivea and to examine the differences between Slovak and Czech market. An online survey with a sample of 500 Slovak and Czech consumers was carried out with the main goal to describe Nivea as a person, characterize the friends of the brand and suggest hobbies of the brand. In general, Nivea is seen as a sensitive, caring and kind person with strong connection to family, beauty and cosmetic. Slight differences were found when comparing the Slovak and Czech perception. The cultural differences result in differences of perception and attitude regarding brands. Therefore, it is beneficial to examine the global brands in national contexts.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: Nivea, brand personality, Czech consumers, Slovak consumers.

1. INTRODUCTION

Brand personality is defined as “the set of human characteristics associated with a brand” (Aaker, 1997). To describe a brand any human feature can be used. The associations might be linked to certain demographic features (such as age, or gender), beliefs, hobbies, and personality traits (Rojas-Méndez, Erenchun-Podlech and Silva-Olave, 2004). This concept works because consumers often describe the brands with help of human personality traits.

By assuming the brand as a person, it can create a self-expressive benefit that becomes a vehicle for the customer to express his or her own personality (Aaker, 1997). Kotler and Keller (2016) confirmed customer usually choose the brands which match their self-image or sometimes consumers choose a brand based on their ideal self-image or social self-image.

Since brands, like persons, are usually described with adjectives, the psychological approach seems to be a good method for identifying the main characteristics of brands' personalities in the perception of consumers, and to select the best adjectives for conveying certain characteristics (Caprara, Barbaranelli and Guido, 2001). Consumers can easily view a brand as having a friendly or exciting personality or as a person with whom they may choose to have a relationship (Blackston, 2000).

In the field of marketing and consumer behavior understanding and measuring brand personality is very important because brand personality can be used as one of the means of communication to increase consumer preferences. It can differentiate the brand within a product category, (Aaker, 1997; Biel, 1992;).

Consumers can make attributions about the brand's personality, “inner character,” goals and values. In some marketing strategies, the brand is actually made to be “alive” and action-oriented (Aaker, Fournier, 1995). Fournier adds brand personality has an impact on various key variables, such as attitude, preference, usage imagery, and emotion (Fournier, 1998).

According to Khani et al, (2013) brand personality comes from three main sources:

- the relationship that customers have with the brand;
- the image which is a company trying to present;
- the unique features of product.

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Aaker (1997) used methods similar to human psychology to identify five brand personality dimensions: sincerity, excitement, competence, sophistication and ruggedness. Further researches suggested different traits, e.g. Levy and Rook (1999) divided brand personality into five dimensions, which are excitement, competence, peacefulness, sincerity, and sophistication. In the Japanese context there was no Ruggedness dimension as in the American study, and another dimension – Peacefulness, was identified as a very strong trait. In Spain, in addition to the Sincerity, Excitement and Sophistication dimensions (that also existed in the USA and Japan), Peacefulness (found in Japan but not in the USA) and Passion (not found in the other two countries) were identified. In Brazil, the dimensions of brand personality were Credibility, Joy, Audacity, Sophistication and Sensitivity (Muniz, Marchetti, 2012).

Because of the differences in personalities within cultures, there has been a need to examine the brand personality construct from an international perspective.

2. MATERIAL AND METHODS

The goal of the research was to examine the personality of the Brand Nivea in Slovak and Czech consumers. The participants were evenly distributed 500 Slovak and Czech subjects. Average age was 26 years with standard deviation of 5.17. They were chosen on principles of convenience sampling and the participants have been selected from available population.

Respondents were presented a questionnaire. First, they were asked if they know the brand and only those reported knowing it were considered for the study. Then they were asked to imagine Nivea was a person. “What kind of person it would be?”, “Who would be Nivea friends with?”, “What kind of hobby it would have?”, “Would it be male or a female?” – these were the questions to describe the brand personality.

To visualize the results from the open-ended questions, word cloud Tagxedo was used.

3. RESULTS AND DISCUSSION

According to the brand manual (Lund, 2012) Nivea’s brand personality represents “a universal complex of positive human values closely woven together”. The brand associations are divided into three dimensions:

- Fundamental Values of Human Co-existence: confidence, generosity, responsibility, social orientation, honesty, reliability, respect, humanity, love, harmony, understanding, sympathy, liking, warmth
- Competence values: authority, authenticity, security, naturalness, and gentleness,
- Pragmatism values: timelessness, simplicity, easy accessibility, and fair price.

Nivea as a brand is characterized by generosity, friendliness and protection giving people a perception of appreciation (Eliasson, Alftén, 2016). When many other care and beauty brands, in order to stay relevant, focus on innovation and expertise, Nivea prides itself on using the same basic product formula, which cares for skin and protects it, for more than 100 years. Nivea has spent years building up a unique and consistent brand, creating such associations as gentleness, warmth, closeness, softness, and care. Nivea’s brand philosophy is ‘pure and simple’ (Thangaraj, 2004).

To be able to describe the personality of the brand, we will examine what kind of person Nivea is, who are the friends of Nivea and what kind of hobbies it has. First, answers of the Slovak consumers are provided.

Nivea, according to Slovaks (Fig. 1), is a woman in her 40ties. It is perceived as a sensitive and caring person foremost. It is also gentle, kind and nice. Other adjectives to describe Nivea as a person are clam, sophisticated, attractive, feminine and polite. Furthermore, Nivea can be seen as loving, elegant, family-oriented, protective, pure and charming. All the features attributed to the brand were positive and in general, Nivea is a soft, feminine brand closely connected to family.

Considering the friends of the brand, Slovaks confirm the family image of Nivea. They think Nivea, as a person would spend time with her family, children, parents and other housewives. Her friends are beautiful, smart, kind, intelligent and good-looking. It can be concluded, these are the characteristics Slovaks project into the brand itself.

The hobbies of the brand, according to respondents, are reading, cooking, do it yourself activities, beauty, fashion, cosmetics and shopping. Nivea also likes to spend time with her friends and

family, goes out for coffees and is interested in healthy lifestyle. The brand is also connected to practicing sports like skiing, dancing, diving, golfing, fitness, going to the gym and tennis. Therefore, we can conclude Nivea is a family person who takes care of herself as well as of the household.



Figure 1 Nivea as a person according to Slovak consumers

Source: Author

Czech consumers (Fig. 2) describe Nivea as a woman who is 43 years of age. She is caring, kind, sensitive and sophisticated. She also is family oriented, nice, gentle, feminine and patient. Even though the majority of the respondents see Nivea as a soft and feminine lady, some of the answers suggest she might be old, mature and selfish of grandmother-like. Other associations with the brand are educated, happy, confident, honest and calm. In general, the personality according to Czech consumers represents positive feminine values.

According to Czech consumers, Nivea, if it were a person, would be friends with her family, children, grandchildren and parents, other housewives, other mums and with mature ladies. Most of the people Nivea would spend time with are closely connected to family.

Hobbies of the brand include family, fashion, and reading, cooking and gardening. Other hobbies are taking care of the household, travelling, cosmetics, knitting, do it yourself activities, art and walks in the nature. In accordance with the above traits, Nivea is a mature family woman who likes to make sure her family is taken care of.



Figure 2 Nivea as a person according to Czech consumers

Source: Author

Despite common historical context findings from various researches suggest that Czech and Slovak consumers are different. Although the general attitudes and behaviors are similar, some slight

differences may be identified. According to Foret and Prochazka (2007), quality is the most important factor in Czech consumers when buying groceries. Price is very important in clothes and home appliances shopping and Czech consumers purchase these items in specialized outlets. Wanninayake (2014) adds Czech customers are less ethnocentric, they do not prefer to buy domestic brands. They can be described as price conscious customers.

Slovak consumers are brand oriented, (Olšovský, 2016). They care about products they buy regardless of the price. When they have their favorite brands, country of origin is not important for them and they are willing to pay more money for it. The main reason for buying Slovak products is to support the economy and we can say that Slovak consumers are very aware of the benefits of supporting domestic production. Nevertheless, consumer ethnocentrism is not typical for Slovaks (Vilčeková, 2014, Sulíková and Strážovská, 2016).

Slovak consumers see Nivea as a very feminine brand, gentle, and caring. She likes to take care of her family and her children and other close relatives are the people she spends time with. All the features attributed to the brand were positive and in general, Nivea is a soft, feminine brand closely connected to family.

Czech consumers describe Nivea as caring, kind and feminine, but contrary to Slovak perception, the brand seems to be older. Czechs describe her also as mature, grandmother-like. This is depicted in the hobbies Czech consumers attribute to the brand – knitting, spending time with grandchildren and reading. There were not very many sporting activities mentioned by the Czech consumers. On the other hand, Slovaks describe the brand as fresh and active doing sorts like skiing, dancing, diving, golfing, fitness, going to the gym and tennis.

The overall perception of the brand is very similar in both of the countries – feminine, sophisticated, family-oriented and beauty conscious brand. This image is completely in accordance with the brand manual and can be described as “a universal complex of positive human values closely woven together”.

4. CONCLUSION

It is important to realize if the concept of human personality is applied to marketing, the principles of different cultures and different perception apply to humans as well as to brands. The cultural differences result in differences of perception and attitude regarding brands. Therefore it is beneficial to examine the global brands in national contexts.

Both researchers and practitioners have given considerable attention to brand personality because it is clear that perceptions associated with a brand go beyond functional attributes and benefits of a product. Brand personality can diversify the brand from other brands since brand has its own individual character. Having a favorable and unique brand personality, which creates positive brand equity, is important because it is a basis for competitive advantage and can even generate revenue for a company.

Consumers can relate brands to people, celebrities of important figures that can be easily used by marketers to connect the personality of a brand with the desired person.

However, although brand personality is naturally appealing some facts need to be taken into consideration. First, there are still some questions on how it should be defined and to what extent it differs from brand image. Second, there is no unified or „the right way“ to measure brand personality. While some of researchers use qualitative methods, such as image descriptions, free associations, others use rather quantitative ways to detect the traits of brands. The presented study makes contributions to examining brand personality of the brand Nivea in Slovak and Czech audience. However, a number of important limitations need to be considered. First, the current research was not specifically designed to evaluate all the factors related to brand personality. Second, the research is not representative because of the sampling method and clearly; the sample may not represent any definable population larger than itself. Non-probability sampling is a good method to use when conducting a pilot study therefore; further research is required to obtain representative results. Thirdly, the generalizability of these results is subject to certain limitations. A number of possible future studies using the same experimental set up would be a contribution to this topic.

References

- Aaker, J., 1997. Dimension of brand personality. *Journal of Marketing Research*. 34(3): 347–356.
- Aaker, J., Fournier, S., 1995. A brand as a character, a partner and a person: three perspectives on the question of brand personality. *Advances in Consumer Research*, 22(4): 392-401.
- Biel, A.L., 1992. How brand image drives brand equity. *Journal of Advertising Research*. 32(6): 6–12.
- Blackston, M., Observations: Building brand equity by managing the brand's relationships. *Journal of Advertising Research*, 2000, 40(6): 101.
- Caprara, G. V., Barbaranelli, C., Guido, G., 2001. Brand personality: How to make the metaphor fit? *Journal of economic psychology*. 22(3): 377-395.
- Eliasson, N., Alftén, J., 2016. "Would you buy it?" What triggers ethical consumption, based on personality archetypes. Retrieved from <http://www.diva-portal.org/smash/get/diva2:931738/FULLTEXT01.pdf>
- Foret, M., Procházka, P., 2007. Buying behaviour of households in the Czech Republic. *Agricultural Economics–Czech*. 53(7): 318-324.
- Fournier, S., 1998. Consumers and their brands: Developing relationship theory in consumer research. *The Journal of Consumer Research*. 4(4): 344-349.
- Khani, S. et al, 2013. The Relationship of Appliance Consumer Personality Trait, Brand Personality, Brand Loyalty and Brand Equity in the Mobile Phone Industry. *International Journal of Fundamental Psychology & Social Sciences*. 3(4): 63-71.
- Kotler, P., Keller, K. L., 2016. *Marketing Management*. 15th Edition. Pearson India: Uttar Pradesh, p. 342.
- Levy, S., Rook, W., 1999. *Brands, Consumers, Symbols and Research*: Sidney: Sage Publications, p. 203-212.
- Muniz, K. M., Marchetti, R. Z., 2012. Brand personality dimensions in the Brazilian context. *Brazilian Administration Review*. 9(2): 180-187.
- Olšovský, F., 2016. Ethnocentrism of Slovak and Czech consumers - Generation Approach. In *proceedings of the Vision 2020 conference on Innovation Management, Development, Sustainability and Competitive Economic growth*. Bratislava, Slovakia, p. 3458-3466.
- Rojas-Méndez, J. I., Erenchun-Podlech, I., and Silva-Olave, E., 2004. The Ford Brand Personality in Chile. *Corporate Reputation Review*. 7(3): 232-251.
- Sulikova, R., Strazovska, L., 2016. Women in Management. In *proceedings of the 16th International Scientific Conference on Globalization and its Socio-Economic Consequences*. Steyer, Austria, p. 2167-2173.
- Thangaraj, J., 2004. Fascinating fonts; is the power of typography a marketing myth. *Style DeKalb IL*, 2 (1).
- Vilčeková, L. (2014). Slovak Consumers' Attitudes toward Foreign versus Domestic Brands. *Journal of Marketing Management*, 2(1): 33-42.
- Wanninayake, W. M. C. B., 2014. Consumer decision-making styles and local brand biasness: Exploration in the Czech Republic. *Journal of Competitiveness*. 6(1): 36-41.

PSYCHOLOGICAL ASPECTS OF CONTROLLING IN MICRO AND SMALL ENTERPRISE

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ABSTRACT

Management of production enterprises has currently been going through changes which move its focus from dealing with production systems, and technical and technological issues, to discussing psychological factors, as well as solving problems of human resources in an enterprise. The objective of this paper is to present the key positive and negative psychological factors which arise among the individual internal stakeholders within the process of implementing and using controlling in micro and small enterprises in Slovakia. Within an empirical research, a questionnaire was used as a method to survey the respondents on the given problem in business practice of micro and small enterprises in Slovakia. The results of the research have identified the positive and the negative psychological factors of implementing and using controlling among the individual stakeholders of small and medium enterprises. In the end, the authors propose a model of implementing controlling in business practice with the emphasis on reducing and removing the barriers to the individual stakeholders of an enterprise, so that following its implementation, controlling will fulfill its key roles, and will be fully functional after the barriers have been removed.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: controlling, managerial tool, psychological aspects, micro and small enterprises.

1. INTRODUCTION

Controlling in enterprises is a tool of management which supports enterprise decision-making and management (Horvath, 2003). According to Chodasova (2012), controlling should be part of every modern enterprise, because its role is to prepare documents for managers who make optimal business decisions on their basis. Controlling is a fundamental part of fulfilling the business strategy and a way to change the view of, as well as the approach to, analyzing the status of the planned tasks. According to Sedliačiková, Šatanová and Foltínová (2012), the controlling system, is a system which performs the control of the plan fulfillment, analyzes deviations from the established plans, and creates operational and strategic plans. It can also be described as a collection of rules that helps to achieve business goals (Eschenbach and Siller, 2011).

As presented by the authors (Feldbauer-Durstmüller and Mühlböck, 2009), in the past, controlling was mainly promoted in large enterprises. It is currently being implemented into micro and small enterprises, mostly in the form of external controlling (Urigshardt, 2008). When introducing and using controlling, it is necessary to take into account also the psychological aspect that affects the internal stakeholders of the enterprise, which are managers, owners and employees (Steiger and Lippmann, 2012). Based on the above, it is necessary to shift the attention from the solution of purely economic, technical and technological problems to the human resources of the enterprise in implementing this instrument. These represent a flexible component in terms of performance and benefits for the enterprise (Seemann, 2016). According to the authors (Foltínová, 2013, Fui-Hoon Nah et al., 2001, Havlíček, 2011), controlling brings changes to enterprises however, groups with different interests may react to the changes in a different way. In order to achieve successful implementation, it is important to know the expectations and concerns of employees, managers and business owners. Positive expectations lead to more efficient performance for all. According to Eschenbach (2004),

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motivation and building up trust are significant. Without these, it would not be possible to convince the groups of stakeholders about possible change. Moreover, they could refuse or sabotage the given tool.

Controlling does not only act as a tool which supports planning, coordination and control of activities (external influence), but also acts as the internal process that affects the behaviour and actions of all people in the enterprise (Fischer and Sawczyn, 2013). As Seemann (2016) states, psychology makes it possible to understand the perception, thinking, emotions, learning, and the activation of processes. Therefore, it can be said that psychology becomes one of the most important components of controlling because they have a common object of influence. The subject of influence is a person whose business activity is purpose-built. As Eschenbach (2004) points out, 6 rules apply in terms of psychology in workplace relationships between controllers and their "customers". These include motivation, feedback, co-operation, building trust, change and implementation.

Based on the above, psychology examines a person in an enterprise and the role of controlling is to adjust the conditions in view of this finding. A person and the established goals, visions and corporate culture are thus interconnected. Controlling originates in psychology, and on the other hand, psychology determines its effect. Psychology is determined by people as emotional beings, and on this all the activities of an enterprise are based. The decision to examine the psychological aspects of controlling comes from this inseparable context. The context is understood as a precondition to the implementation and effectiveness of functions of controlling.

2. MATERIAL AND METHODS

The aim of the paper is to determine the decision-making psychological factors that affect the internal stakeholders of the company in the phase of implementation and enforcement of controlling in micro and small enterprises in Slovakia.

The research was conducted in four key phases. In the first phase, an analysis of secondary sources was performed, on basis of which a research of scientific and professional journals of both domestic and foreign sources was carried out. Various methods of scientific work were used, namely summarizing, analysis and synthesis of knowledge, in order to compare the views of different authors on the given subject. In the second phase, an independent empirical survey was conducted on a sample of micro and small enterprises operating in Central Slovakia. The representativeness of the sample of respondents was ensured through the use of the statistical method, where the relationship (1) was used to determine the minimum sample of respondents (Kozel, 2006):

$$n \geq \frac{(z^2 \times p \times q)}{\Delta^2} \quad (1)$$

Since the selection of respondents was purely random, the ratio of respondents who are familiar with the researched issue was divided into 50%. The probability of the hypothesis was set to 2, which gives us a more complex view with 95.4% of the reliability of the statement. After placing the maximum allowable error in the level of 5% into the relationship (1), the minimum sample of respondents was determined at 400. A questionnaire was used as the means of the survey method in order to collect primary data. The selection file consisted of 1,500 business subjects. The return rate of the questionnaire was 28% and 420 questionnaires were filled up correctly. Out of all, 43% were micro businesses and 57% were small. Data from the empirical survey were evaluated on the basis of descriptive and graphical analysis.

In the third stage, the positive and the negative psychological factors were identified. These are key to the implementation of controlling for the individual stakeholders. Following this, a model of implementation of controlling in practice for micro and small enterprises was proposed. In the final phase, the achieved results for theory and practice of micro and small enterprises were evaluated, and the benefits for further scientific research were defined, using the summarization method.

3. RESULTS AND DISCUSSION

3.1 Analysis of the current situation in small and medium sized businesses

In the beginning, the survey was designed to find out how many micro and small enterprises had already implemented controlling or (and if) they plan to implement it. The data show that 30% of respondents work in enterprises where controlling is implemented, the other 35% are planning to implement it, and 35% of respondents provided a negative response to the question. As far as micro and small businesses are concerned, the issue of an external controller has been addressed in the research, as it is more cost-effective for most of these enterprises.

Respondents were asked what should precede the actual implementation of controlling. Up to 86.3% of respondents said that prior to the introduction of controlling into an enterprise, the competent persons should inform the employees about this, 84.6% see the need to analyse the work tasks of employees, 83.5% assume that there should be some sort of training before the implementation, where employees would learn about theoretical and practical information in the field of controlling. On the other hand, 44.6% of respondents stated that implementation should be preceded by market analysis for hiring an expert, and 40% think that the analysis of the possibility of hiring of an external expert is not necessary. The survey results confirm that, on average, nearly 75% of respondents consider all of the above mentioned facts to be essential and necessary prior to the introduction of controlling into an enterprise.

In the next section, we examined how the psychological factors affect the implementation and enforcement of control. Figure 1 shows that on average 85% of respondents consider all of the factors mentioned as very significant and think they have a great impact on implementation. Up to 92.5% of the respondents think that communication is very important in the implementation and has the greatest impact. Motivation is slightly less important than communication (88.5%). Only 21.7% of respondents think that preparing for change has little impact on the promotion and implementation of controlling. To sum up the obtained results, respondents consider all psychological factors to be essential, and they think these factors have a great influence on the implementation of controlling.

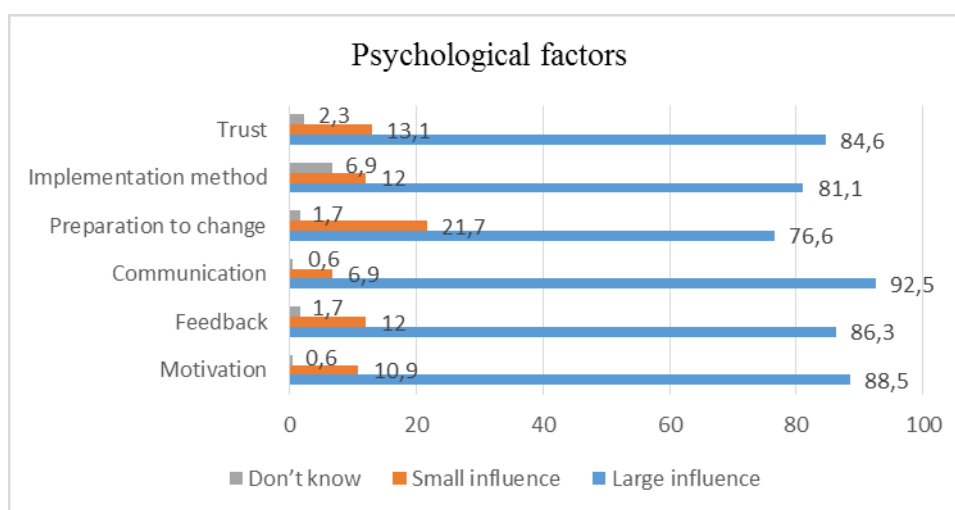


Figure 1 Influence of psychological factors on enforcement of control in%

Source: authors

In the next part of the research, concerns related to implementation of controlling in the enterprise were checked, and each internal group of stakeholders was examined separately. Each group has different competencies, status, responsibility, and thus there are different concerns raised about the introduced changes. The results of the survey and concerns of employees, managers, and the enterprise owners are reported in the following lines. Figure 2 shows that employees are most concerned about the excessive control of their performance (20%) and that they are under the spotlight of their superiors (15%). 18% of respondents claim that they have no concerns at all. Only 2% of respondents are inclined to fear the lack of awareness of new activities and deterioration of corporate culture. Other concerns of the employees relate to non-compliance to norms, lower earnings, or the arrival of new employees who may be represent competition for them.

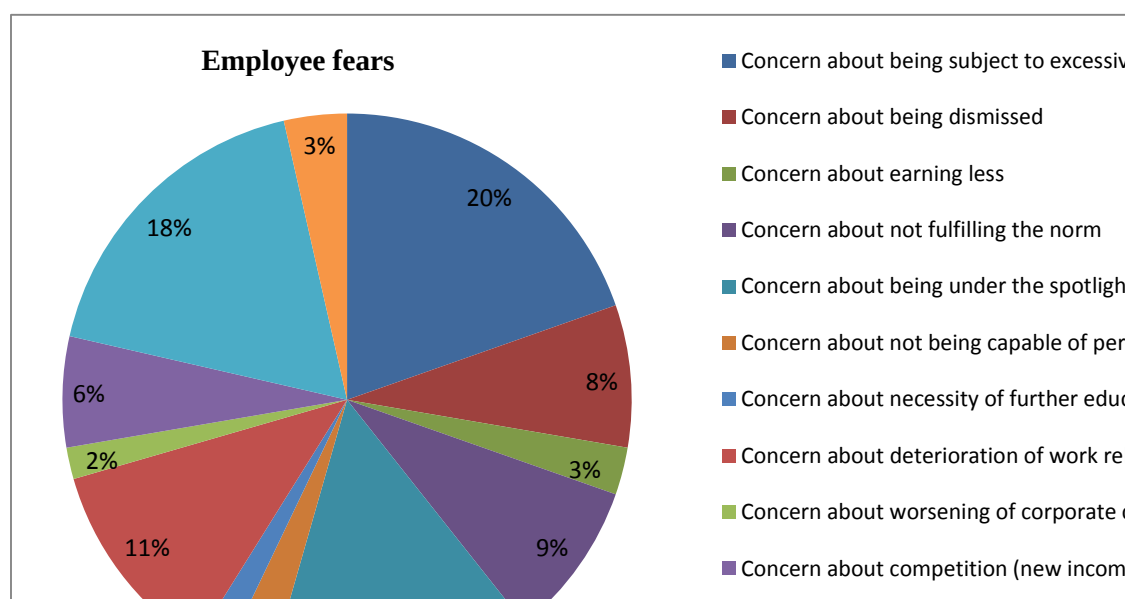


Figure 2 Employee fears of implementing controlling

Source: authors

Based on the analysis of the results among managers, it was found out that managers are mostly concerned about controlling not being accepted by employees (21%), while 19% had no concerns and 13% are afraid of potential conflicts with the controller. Ten percent of managers worry that employees will sabotage this tool. The lowest score was given to concerns about lower earnings, job loss, or excessive control. Other managers' concerns are presented in Figure 3.

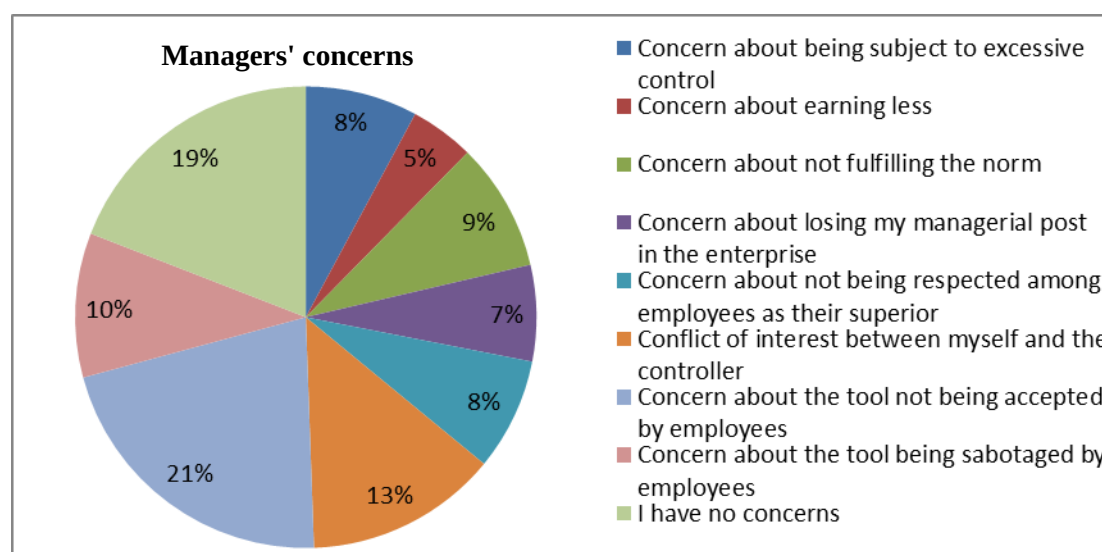


Figure 3 Managers' concerns about the implementation of controlling

Source: authors

The greatest concerns among owners, as well as managers, are that the tool will not be accepted by employees (18%). Sixteen percent of owners are concerned about financial resources spent on implementation of controlling in the enterprise being useless, and 13% worry that employees will sabotage it. The same amount of concern was expressed about potential conflict between the controller and the enterprise's manager, 10% fears that implementation will not produce the expected effects and that the costs will be greater than the benefits. Only 8% of respondents are afraid that this may create confusion in managing the enterprise, 7% have no concerns, and 2% say they are worried about lower earnings. All the results are shown in Figure 4.

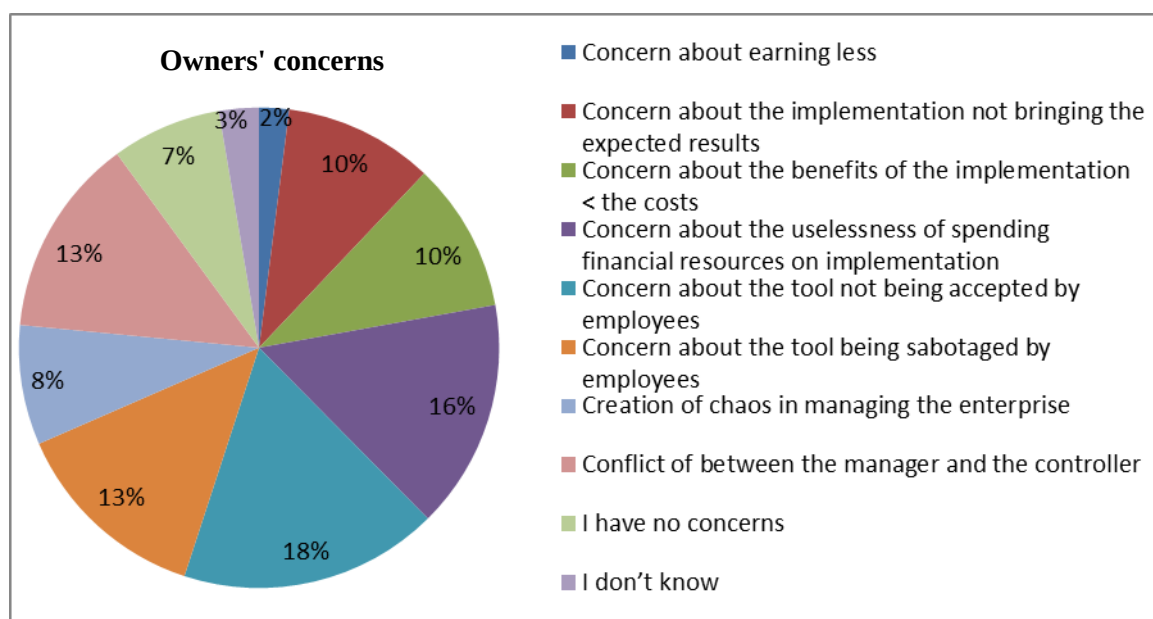


Figure 4 Owners' concerns from Implementation of Control

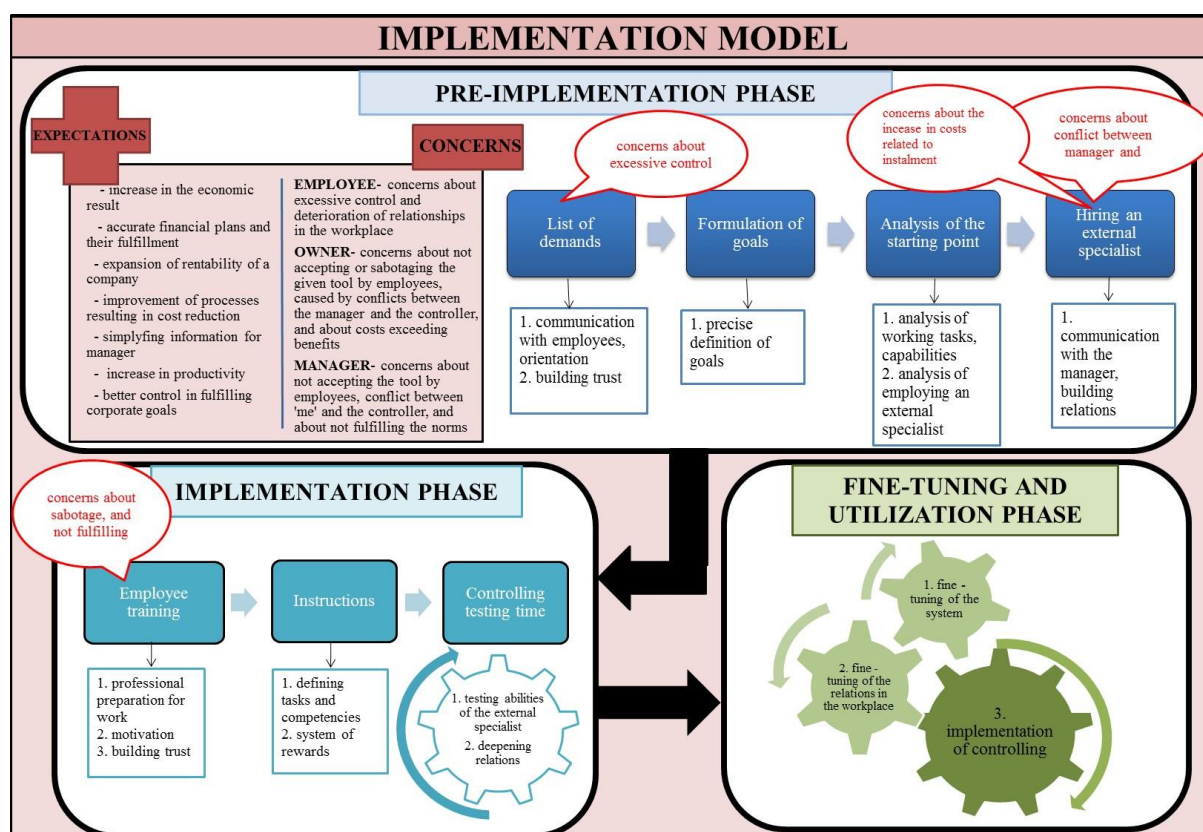
Source: authors

On the basis of the findings, the following conclusions can be drawn from the results of the research. Before introducing controlling in micro and small enterprises, it is more important to familiarize employees with the tool, analyse the work tasks, perform the necessary training, analyze the organizational structure, as well as the working skills. The stakeholders assign great importance to communication and motivation, but also giving feedback. Individual internal stakeholders think that controlling positively affects employee performance, relevance of information, and motivation. The same conclusions were reached by Urigshardt (2008).

Employees perceive controlling negatively in terms of working relationships and the possibility of creating more pressure in the workplace. At the same time, they think that controlling does not affect career promotion, or the number of job positions. Employees are mostly concerned about excessive control by the employer, and are worried about deterioration of their working relationships. These findings are also confirmed by the authors. Owners are worried that employees will not accept the tool, or will sabotage it. They also worry about the conflict between the manager and the controller. Managers have similar concerns as owners (Feldbauer-Durstmüller and Mühlböck, 2009).

3.2 Proposal of the implementation model of controlling in micro and small enterprises

Based on the results of the research, a model of the implementation of controlling in micro and small businesses has been proposed, emphasizing the psychological aspects, in order to make the model fully functional. The objective is for controlling to be accepted by all internal stakeholders in micro and small enterprises. As mentioned by Feldbauer-Durstmüller and Mühlböck (2009), small and micro-enterprises have a low number of employees, which means the establishment of a new position of a controller would be costly for them. As a result, the model is designed for outsourcing the controlling function in small and micro enterprises. However, it is necessary to mention that in many micro and small enterprises, the position of a controller is held by the owner or a manager in the enterprise. Picture 1 shows a detailed guide to implementing controlling, divided into three phases.



Picture 1 Implementing controlling in micro and small businesses

Source: authors

The pre-implementation phase identifies the benefits and the barriers of the individual stakeholders. Priority is given to communicating between internal stakeholders and building trust between them. As presented by Musa, Stroková and Musová (2016), micro and small businesses are recommended to favor direct communication. Employees' biggest concern appears to be the excessive control. This barrier can be gradually removed by building mutual trust. It is important to clearly define goals and monitor their fulfillment. Hiring an external employee (controller) resolves the owners' fears associated with costs. The thought that a good partner-relationship with the manager is a prerequisite to the successful implementation of external controlling is also confirmed by the authors (Feldbauer-Durstmüller and Mühlböck, 2009). It is essential to analyze the starting conditions in the enterprise, the role of employees and their capabilities, as well as to determine where the enterprise is coming from and where it is aiming to go.

The implementation phase represents the most demanding and the longest time period (Fischer, Moller and Schultze, 2012). At the beginning, it is important, in terms of correct understanding and acceptance of control, to provide training for employees, familiarize them with the course of implementation, and to obtain theoretical and practical knowledge in this area. This eliminates the fears of owners and managers of the tool being sabotaged or not accepted. Training is often provided by the external controller. It is essential for the controller to build trust and a good relationship with employees during training. His further meetings will mostly be with the manager and the owner of the enterprise. During the training, the controller also acts as a motivator for the employees. Training is followed by defining the tasks and assigning competencies. Using verified software, the external controller carries out a sample collection of information about the enterprise. According to Sedláčková et al. (2016), the external lecturer will create financial plans and process the information about the enterprise. The trial period follows, where the owner tests the capabilities of the external controller and monitors changes resulting from the implementation of controlling.

The adjustment and the utilization phase represents the adjustment of details in the controlling system. According to Küpper (2008), the phase is dependent on the deviations between the expectations and the real benefits. If deviations occur, it is necessary to remove them. Feedback is

essential. If controlling meets positive expectations, working productivity and business morale is growing. In case of bad relationships and increasing negative pressure in the workplace, it is necessary to communicate and analyze the problems. Removing systemic errors and problematic relationships eliminates possible barriers in the workplace. Controlling can be implemented in the enterprise with the perspective of being fully functional and utilized. At all stages, communication between the controller and the internal stakeholders is essential and should be built upon trust.

According to Steiger and Lippmann (2012), the "healthy" staffing in an enterprise is based on the knowledge of its employees. Therefore, prior to introducing controlling, it is crucial to recognize the expectations and concerns of the internal stakeholders. From the conducted research, the following conclusions and recommendations for theory and practice can be formulated:

- a clear definition of the psychological aspects affecting the implementation and promotion of controlling in micro and small enterprises,
- improving knowledge in the field of controlling among all internal stakeholders of the enterprise,
- creating internal guidelines along the implementation of the tool in the enterprise,
- paying attention to employees and creating positive working relationships,
- developing a system of motivation with regard to the needs of the individual internal stakeholders,
- using positive staff evaluation to further develop trust,
- communicating and monitoring the feelings and reactions of internal stakeholders in relation to the implementation of controlling.

4. CONCLUSION

The implementation of controlling in micro and small businesses has been increasing recently, which has also been confirmed by the results of the analysis. This group of enterprises is already aware of the benefits that controlling can bring to an enterprise and its management. It is economically more advantageous for them to use an outsourcing form. Implementation and use of controlling in an enterprise requires preparation of all stakeholder groups, as well as respect to the perception of barriers and benefits of this management tool. Perception of psychological factors is essential, mainly for employees, managers and the owners of enterprises. Based on the discovered concerns about the new incoming tool and the changes, it is crucial for a company to eliminate these fears and barriers by appropriate communication. For the needs of the practice, a plan of implementing controlling was proposed, with the emphasis on the psychological aspects of managers, owners and employees, in small and micro enterprises. The model shows that successful implementation of controlling into an enterprise is accompanied by psychological aspects, which are related to motivation, communication, feedback, building trust in the given tool, but also in the controller himself, and the way of enforcing change and preparing for it. With respect to the proposed procedure, and with regard to psychological factors, the implementation of controlling should be easier for all stakeholders. The positive direction of employees is crucial, and leads to more efficient performance, growth in the economic results, and fulfilment of the financial plans.

Acknowledgements

This contribution is a partial result of grant solutions: VEGA MŠ SR č. 1/0010/17, č. 1/0934/16 and APVV-14-0506.

References

- Eschenbach, R. et al., 2004. Controlling. ASPI Publishing, Praha. pp. 816.
- Eschenbach, R., Siller, H., 2011. Controlling Professionally: Conception and Tools, Schäffer-Poeschel Verlag für Wirtschaft Steuern Recht GmbH, Stuttgart. pp. 381.
- Feldbauer-Durstmüller, B. Mühlböck, S., 2009. Konzeption des externen Controllings für Kleinst- und Kleinunternehmen. In: LINGNAU, V. Mittelstandscontrolling 2009. JOSEF EUL Verlag GmbH, Köln, p. 53-74.
- Fischer, T. M., Sawczyn, A., 2013. The relationship between corporate social performance and corporate financial performance and the role of innovation: Evidence from German listed firms. *Journal of Management Control* 24(1): 27-52.
- Fischer, T. M., Möller, K., Schultze, W., 2012. Controlling-Fundamentals, Instruments, Perspectives. Schäffer-Poeschel, Stuttgart. pp. 321.
- Foltínová, Z., 2013. Controlling ľudského kapitálu. Vydavateľstvo EKONÓM Bratislava. pp. 88.

- Fui-Hoon Nah, F. et al., 2001. Critical factors for successful implementation of enterprise systems. *Business Process Management Journal* 2001(7): 285-296.
- Havlíček, K., 2011. *Management and Controlling: Small Business*. Vysoká škola finanční a správní, Prague, pp. 210.
- Horvath, P., 2003. *Controlling*. 9. vydanie. Verlag Valen, München, pp. 838.
- Chodasová, Z., 2012. Podnikový controlling – nástroj manažmentu. *STATIS Bratislava*, pp. 162.
- Ismail, I., 2011. The ability of EVA attributes in predicting company performance. *African Journal of Business Management* 5(12): 4993-5000.
- Kozel, R., 2006. *Moderní marketingový výzkum*. Grada Publishing Praha, pp. 280.
- Küpper, H. U., 2008. *Controlling: Konzeption, Aufgaben, Instrumente*. Verlag Schäffer-Poeschel Stuttgart, pp. 398.
- Musa, H., Strokova, Z., Musova, Z., 2016. Financing Of Slovak Small And Medium Sized Enterprises In Globalising Environment. In: *Globalization and Its Socio-Economic Consequences*, 16th International Scientific Conference Proceedings, Pts I-V. Rajecke Teplice, Slovakia, p. 1458-1465.
- Sedliačiková, M. et al., 2016. Improving the Performance of Small and Medium Wood - Processing Enterprises. *BioResources* 2016(11): 439 - 450.
- Sedliačiková, M., Šatanová, A., Foltínová, A., 2012. Financial controlling in theory and praxis of small and medium-size enterprises. *Journal of Economics* 52(9): 148-159.
- Seemann, P., 2016. *Psychológia v práci manažéra*. Žilinská univerzita v Žiline, EDIS-vydavateľské centrum ŽU, pp. 170.
- Steigert, T., Lippmann, E., 2012. *Psychologie pro manažery: jak ovládnout umění vést*. BizBooks Brno, pp. 371.
- Urigshardt, T., 2008. Externes Controlling als Ansatz für Kleinst- und Kleinunternehmen? In: LINGNAU, V. *Die Rolle des Controllers im Mittelstand: funktionale, institutionale und instrumentelle Ausgestaltung*. JOSEF EUL Verlag GmbH Köln, p. 23-31.

MOBILE BANKING APPLICATIONS AND SLOVAK CONSUMERS

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ABSTRACT

The development of information and communication technologies has brought many opportunities to simplify communication between the company and the customer. One sector that benefits from this development is also the banking sector. With the development of e-banking, banks are more oriented on customer, quality of services and speed in providing them. One of the latest trends in electronic banking are mobile banking applications. Despite the indisputable benefits mentioned in the paper, their use still causes some mistrust in some customers. The aim of the paper is to find out, via primary research, the extent to which bank applications are used by consumers in Slovakia and their satisfaction with the features that mobile banking applications offer. The paper also includes an analysis of the current state of mobile banking in the Slovak Republic and the theoretical framework of the solved issue.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: mobile banking, Slovak consumer, research.

1. INTRODUCTION

Constantly improving of modern technology is changing the way we manage and control our finances. The gradual trend of globalization in the banking sector has led to a shift from traditional Internet banking to banking mobile applications. It was caused by expansion of smartphones that include various functions. One of them is bank finance management through bank mobile application. Currently, most banks have already created their own mobile app. The bank provides added value to the customer and maintains its competitiveness via its mobile app. Mobile applications are a modern trend in electronic banking. Electronic banking enables communication between a commercial bank and a client without personal contact. Communication is based on non-anonymous communications that require a certain degree of person identification under predetermined bank conditions. The identified and verified client can then perform bank operations according to their needs. Electronic banking services reduce costs and save customer time. (Schaechter, 2017)

Mobile banking is a form of electronic banking, and its advantage is all-day client access to account. The client can dispose of your account anywhere, anytime. It is enough for the client to be equipped with the appropriate technology to use of mobile banking. In recent years, a new way of mobile services has begun in banking in Slovakia. The use of mobile devices in banking brings many benefits. One of them is lower service fees such as fees charged directly in banks. Mobile banking (also called GSM banking) is a general term used to make passive or active banking operations via a mobile phone. Data exchanged between the bank and the GSM operator is encrypted. Each mobile phone is equipped with security chip, which in combination with a PIN code uniquely identifies the customer. (Bucko, Mihók, 2008)

Mobile banking is a means to carry out active or passive banking operations through a mobile device. The customer works directly with funds or changes to his/her account when performing active operations. For passive operations, the customer monitors information that is offered by the bank. Table 1 summarizes passive and active mobile banking operations.

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Table 1 Passive and active mobile banking operations

Passive banking operations	Active banking operations
- Tracking exchange rate, account balance, account movements - Payment and credit card information, bank and new products information - Overview of interest rates and fees - Search for a list of nearest branches/ATMs	- Transfer of funds between accounts - Set, change and cancel of transfer order or direct debit - Setting up payment limits - Cancel payment card or credit card - Changing access passwords - Possibility to draw pre-approved loan

Source: (Boušková, 2009)

Mobile apps in smartphones are a modern form of mobile banking. The mobile application can be defined as software with different functions, which was developed for the needs of smartphones and tablets and other small wireless technology. (<http://whatis.techtarget.com>) The mobile app owner decides how the app will be used, whether it will be available for free, paid or charged only for a part of it. In terms of development, we distinguish three types of mobile apps:

- *Native Apps* – program designed for a special computer environment and for a special platform (Android, iOS, Windows Mobile). They allow distributing applications designed specifically for the market. Apps are installed directly on a mobile device or can be reinstalled. Compared to web applications, native applications are considered safer. Depending on the character, they may or may not require an internet connection. Each market requires a custom application that is compatible with the operating system. Individual data associated with native apps is stored directly on the smartphone or data can be stored remotely and accessed by other devices. (<http://www.itspravy.com>)
- *Web Apps* – web application architecture consists of several layers. Most commonly, this is a three-layer architecture that consists of a client layer (web client, browser), a server layer (web server), and a database server layer. These classic web apps appear in your mobile browser. It does not require a special installation or a specific type of operating system. In many cases, web apps look like a classic website. In contrast, they are able to perform more challenging tasks, using different databases and interconnecting with others. (<https://millennium.sk>)
- *Hybrid apps* – a combination of previous types of applications. They allow developers to create native applications while accessing native device features even though they run within a browser. They are available through marketplaces with mobile apps and are installed on devices as well as native applications. They do not need to connect to the Internet, which means they work offline, unlike web applications. Hybrid applications consist of a native package (wrapper), which in itself contains a web application. When the application is launched, the wrapper creates an instance of the web browser and loads the web application itself. (<http://www.itspravy.com>)

The use of mobile apps brings not only advantages but also disadvantages (see Table 2).

Table 2 Advantages and disadvantages of mobile banking applications

Advantages	Disadvantages
Available round the clock 24/7/365	Threats of SMS phishing
More secure than internet Banking	Only for smartphone owners
Cost effective for customer and also bank	Internet connection needed

Source: Authors

1.1 Current state of the issues in Slovakia

Table 3 Features of mobile bank applications in Slovakia

	ČSOB	VÚB	Slovenská sporiteľňa	TatraBanka	mBank	PrimaBanka	UnicreditBank
Platform	Android, iOS, Windows Phone	Android, iOS, Windows Phone	Android, iOS	Android, iOS, Windows Phone, Blackberry	Android, iOS	Android, iOS	Android, iOS
Account Overview	yes	yes	yes	yes	yes	yes	yes
Account movements	yes	yes	yes	yes	yes	yes	yes
Overview of card payments	yes	yes	yes	yes	yes	yes	yes
Account balance	yes	yes	yes	yes	yes	yes	yes
Transfer order	yes	yes	yes	yes	yes	yes	yes
Overview of pending payments	yes	yes	yes	yes	yes	yes	yes
Overview of Term Deposits	yes	yes	yes	no	yes	yes	yes
Credit cards	Overview, detail, movements, payment of debt	Overview, detail, movements, payment of debt	Overview, detail, movements	Overview, detail, movements, payment of debt	Overview, detail, movements, payment of debt	no	Overview, detail, movements
Loans	Pre-approved consumer loan, Overview and detail of loans	Pre-approved consumer loan, Overview and detail of loans	Pre-approved consumer loan, Overview and detail of loans	Pre-approved consumer loan, Overview and detail of loans	Pre-approved consumer loan, Overview and detail of loans	no	Overview and detail of loans
Notifications	no	yes	no	yes	no	no	yes
Scanner of barcodes or QR codes	yes	yes	yes	yes	no	yes	yes
List of branches / ATMs	yes	yes	yes	yes	yes	yes	yes
Exchange rate	yes	no	no	yes	no	no	yes
More features and information	News, product calculator, travel insurance, mobile credit, personal consultancy, overview of expenses, payment card settings	Notification settings, Overview of investments, Mutual funds	Overview of spending, credit on mobile, generated payment code QR, possibility to store recipients	Mobile Payments, NFC Account Overview, Demo, TPP Report, Recipient Save, News, DSS Retirement, Overview of Expenditures	Mutual Funds, Payment Notifications, Payments by Phone Number, Overview of Investments, Mutual Funds, Payment Card Settings	Overview of expenses, personal budget, payment reminders	Conversion calculator, saving recipients

Source: (<http://www.smartbanka.sk>)

2. MATERIAL AND METHODS

For fulfilment of the article goal, we needed to conduct a primary research focused on mobile bank applications. We created a questionnaire with 12 questions, oriented on satisfaction of respondents. 77 respondents of various ages participated in survey via Internet. For theoretical framework and current state of issue, we studied used secondary data from literature and Internet.

3. RESULTS AND DISCUSSION

The following figures show the results of the questionnaire survey.

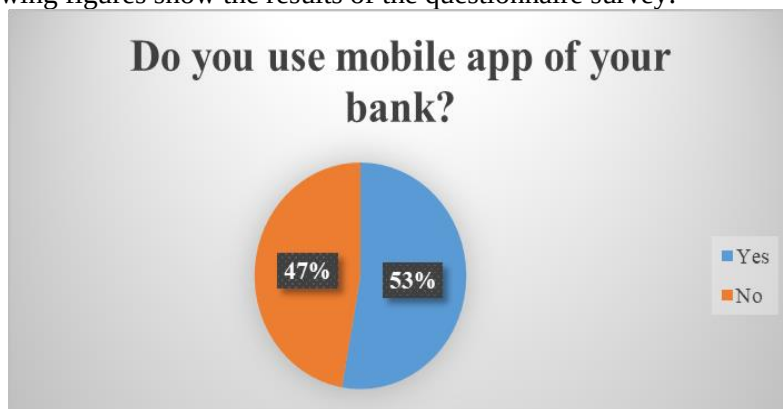


Figure 1 Do you use mobile app of your bank?

Source: Authors

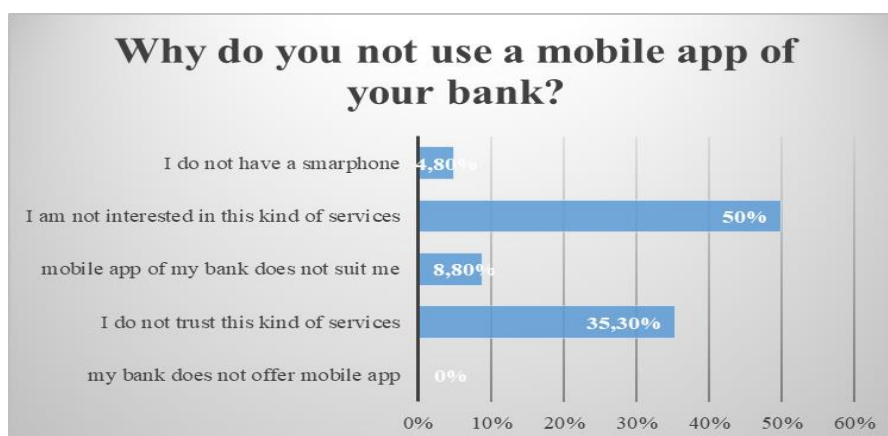


Figure 2 Why do you not use a mobile app of your bank?

Source: Authors

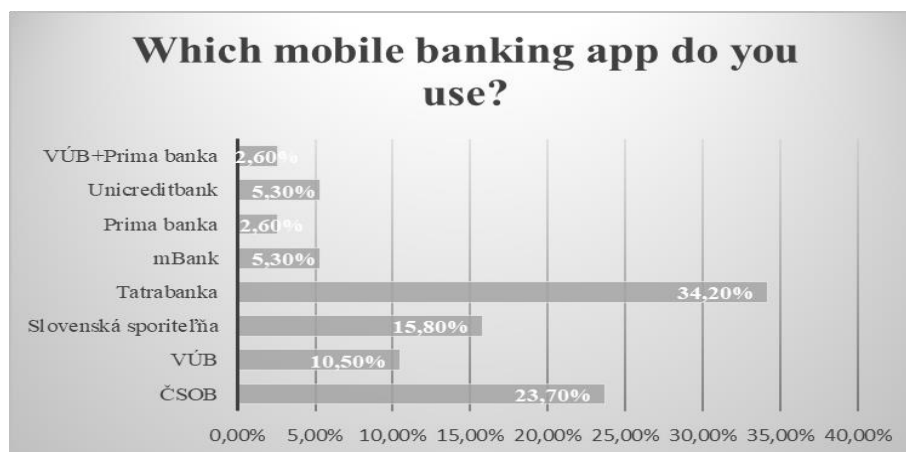


Figure 3 Which mobile banking app do you use?

Source: Authors



Figure 4 How often do you use your mobile banking app?

Source: Authors



Figure 5 What are your most usual operations?

Source: Authors

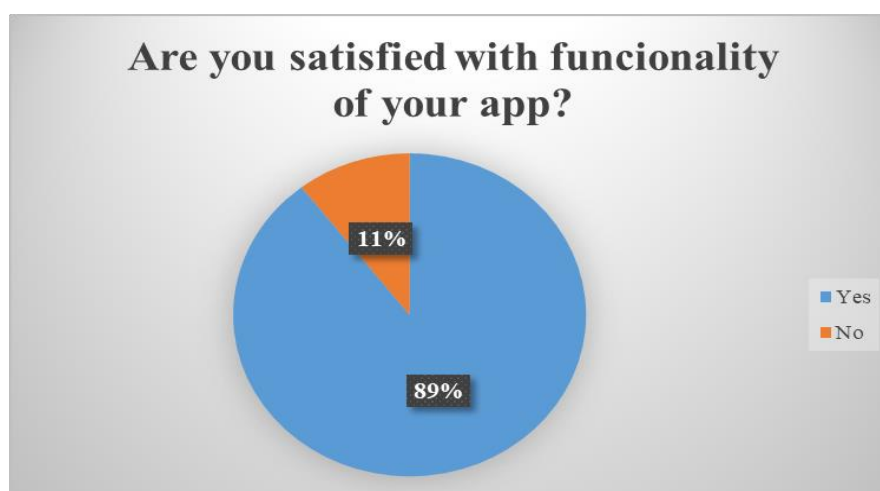


Figure 6 Are you satisfied with functionality of your app?

Source: Authors

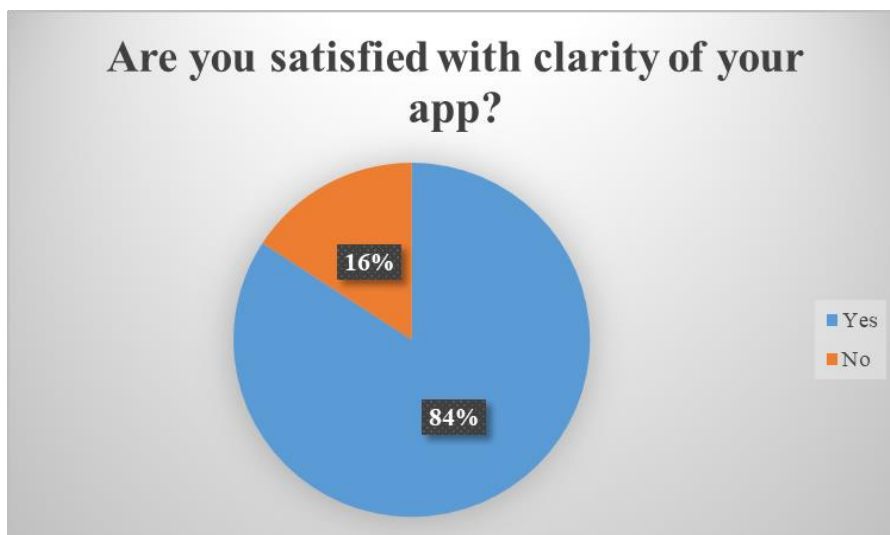


Figure 7 Are you satisfied with clarity of your app?

Source: Authors

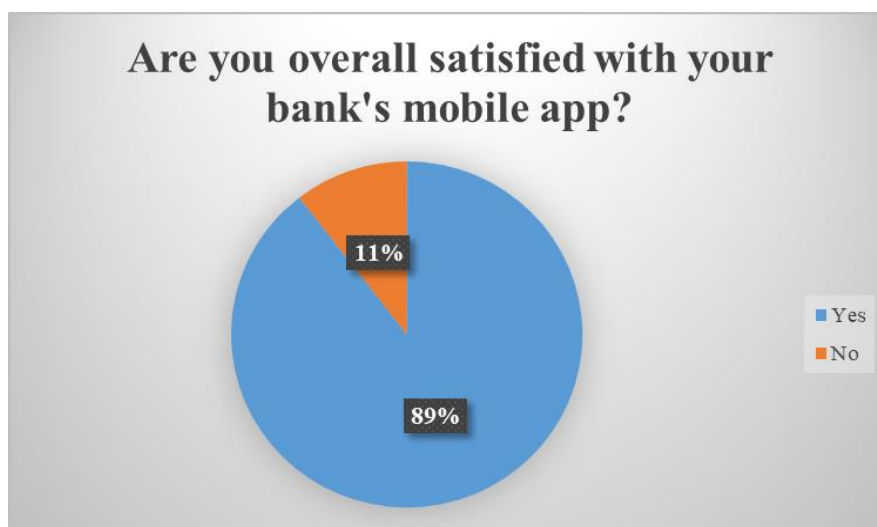


Figure 8 Are you overall satisfied with your bank's mobile app?

Source: Authors

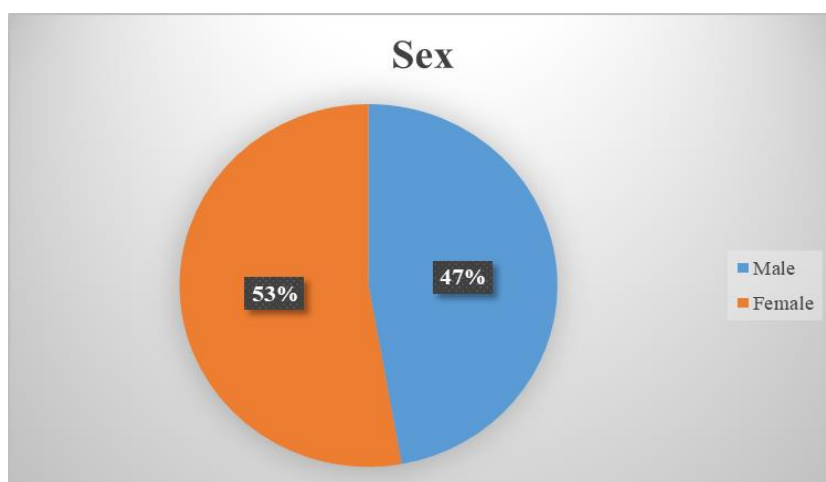


Figure 9 Sex of respondents

Source: Authors

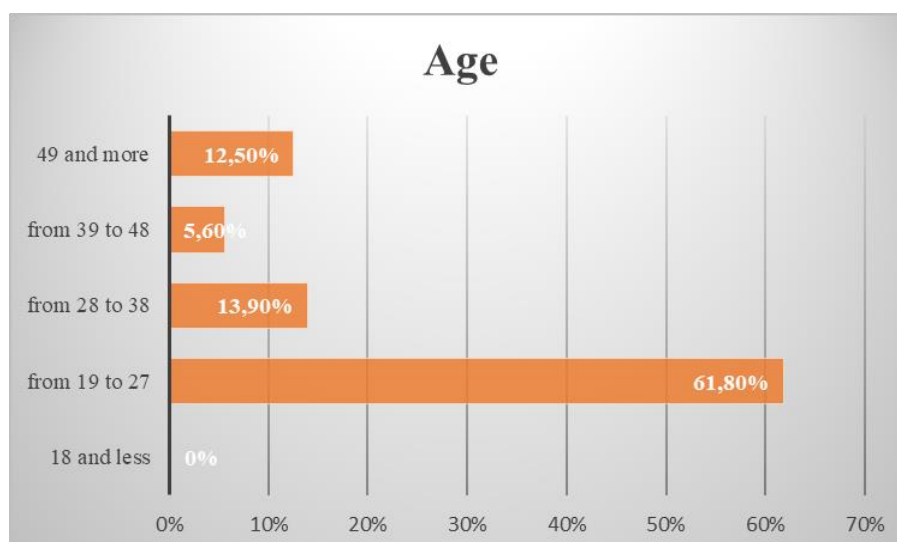


Figure 10 Age of respondents

Source: Authors

People have quickly adapted to new technologies and have enjoyed not only internet banking. They have become used to mobile banking, which is now available at every bank. Most of the respondents (53%) use their bank's mobile app. Most clients use mobile app of these banks: Tatra Bank, Prima Bank and Slovenská sporiteľňa. Clients are satisfied with the functionality and visibility of mobile applications of its banks. 89% of respondents are generally satisfied with them. The survey of the www.mojandroid.sk portal from 2017 shows that approximately 19.6% of bank clients in Slovakia use a mobile banking application every month. ([https://www.mojandroid.sk](http://www.mojandroid.sk)) The results of our research show that 36.8% of respondents use their mobile application several times a week and 34.2% use it daily. They most often use a mobile banking application to track account movements and make payments. The significantly less used banking operations include ATM cash withdrawals (18.4%) and transfer orders (10.5%).

Most of the users of mobile banking applications are a young segment of clients aged 19-27 (61.8%), as we assumed. However, clients older than 49 years (12.5%) are also interested in this new form of mobile banking.

The results of our research show the interest of clients in mobile banking applications and highlight the popular banking operations which clients perform on their mobile app.

Although more than half of respondents use the application, up to 47% of clients do not use their bank mobile application. These clients are not interested in and do not trust this form of banking services. These two reasons were most frequently cited by the respondents. It would be appropriate to find out what would persuade this relatively large group of clients to mobile banking applications will gain their trust. It may be subject to further research that would help increase the interest of clients in this currently very practical form of mobile banking.

4. CONCLUSION

Mobile bank applications present big challenge for banks. Despite their usefulness, easiness and comfortability, they are not enough spread between the bank clients. Bank needs to raise up awareness of mobile bank applications among clients and present all their positive sides. Those clients whom started to use mobile application of their bank are mostly very satisfied with its functions, which suggests that mobile bank applications could be widely spread in the future.

Acknowledgements

This paper is an output of the science project VEGA 1/0693/16.

References

- Schaechter, A. *Issues in electronic banking: An Overview*, accessed on 04/09/2017 from <https://www.imf.org/external/pubs/ft/pdp/2002/pdp06.pdf>.
- Bucko, J.- Mihók, P. 2008. *Elektronické služby v bankovníctve*. Košice: TU – EkF, 2008. pp. 121. ISBN 987-80-553-0052-8.
- Boušková, D. 2009. *Bankové operácie*, Bratislava: Ekonóm, 2009. pp. 234. ISBN 978-80-225-2859-7.
- Kovacikova, M., Stofkova Repková, K. 2016. Impact of globalization on access to process businesses management. *Globalization and its socio-economic consequences: 16th international scientific conference proceedings*. R. Teplice, Slovakia, pp. 1022-1030.
- Millennium, *Webové a mobilné aplikácie*, accessed on 05/09/2017 from <https://millennium.sk/sluzby/webove-a-mobilne-aplikacie/>.
- Whatis, accessed on 05/09/2017 from <http://whatis.techtarget.com/definition/mobile-app>.
- Môjandroid, accessed on 07/09/2017 from <https://www.mojandroid.sk/prieskum-banky-internet-banking-mobile-banking/>.
- Virtual studio, accessed on 05/09/2017 from <http://www.smartbanka.sk/porovnanie-bankove-aplikacie/>.
- IT správy, accessed on 06/09/2017 from <http://www.itspravy.com/porovnanie-nativneho-weboveho-a-hybridneho-vyvoja-aplikacii/p28/c73/a220>.

THE GROCERY E-COMMERCE IN SLOVAK REPUBLIC

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ABSTRACT

The grocery e-commerce is currently still a relatively underdeveloped retail channel globally. However, it is nevertheless an area that in all probability will offer considerable growth potential for food producers and retailers moving into 2016 and beyond. According to many researches, more than a third of online shoppers expect to buy their groceries online in 2016 and this is what could be the next big opportunity for e-commerce. This large market potential of the e-grocery business promises high growth rates and online food retailing will emerge as a highly innovative distribution channel. The article summarizes results of numerous surveys for the purpose of demonstrating the huge potential of grocery e-commerce. The article presents the results of the survey realized in the Slovak Republic aimed at gathering the views, attitudes and experiences of customer with internet grocery shopping, as well as opinions, experiences and recommendations themselves grocery e-retailers.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: E-commerce, E-grocery, Marketing, Consumer buying behaviour, Marketing on internet.

1. INTRODUCTION

Internet is a world-wide medium and has a global impact on companies and customers. Physical boundaries have disappeared and the virtual boundaries are relative unknown. Boundaries now only exist in people's minds and the possible applications have had an effect behaviour of people and on business function. This is the right place for application of specialised marketing strategies in companies that are in online space. This combination of global online space (Internet), specific marketing strategies and proper marketing communication tools leads to the changes of the customer buying behaviour and the changes in business model of the companies (Madlenak et al., 2016).

Online grocery shopping is a relatively young field of e-commerce which quickly gaining popularity among customers all over the world, especially in technologically advanced countries. For example, according to ShopperVista (2013), about one-fifth of households in United Kingdom are buying groceries through the Internet every month. For about one third of them is this way of buying grocery via Internet a major way of procurement of food. The remaining two thirds of households combine online shopping with a shopping in classics store. (Ranking, 2013)

In United Kingdom, for instance, 5.1 % of spending on groceries in 2013 was transacted online, an increase from 3.8 % in 2010. For an overview, in 2003, this level amounted to 3.8 %. Based on a study conducted in United Kingdom it was found that shopping basket characteristics (types of products being purchased) were significantly linked with channel choice – online versus in-store. (Suel et al., 2015) Besides the United Kingdom, Germany and France are the largest European distance selling markets, worth respectively €63.4 billion and €51.1 billion, of which about 46 % prefer to services and 54 % to goods (Ecommerce Europe, 2014). These three countries are also the three biggest European food markets. In 2013, leadership belonged to France, with € 183bn, followed by Germany with € 175bn and United Kingdom with £ 175,5bn (IGD, 2014). Online sales of grocery compared to total sales of food are relatively small but are expected to double by 2016. For example, in France should occur an increase in current turnover forecast and in online food retailing from the original € 5bn in 2012 to € 10,6bn in 2016, in UK from € 7,1bn to € 13,7bn and in Germany from € 1,1bn to € 2,5bn (IGD, 2013). The online grocery development in Germany and France started later than in the United Kingdom, where an offer of e-grocery by traditional supermarkets started at the beginning of the year 2000 (Linder and Rennhak, 2012). United Kingdom can be seen as the European

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pioneer in e-grocery, because in this time Ocado and Tesco introduced e-groceries and other major store chains followed a few years later. (O'Farrel, 2014)

2. MATERIAL AND METHODS

Online shopping of grocery has a number of benefits, but physical stores still have strong key advantages over e-commerce, especially for fast-moving goods. Despite this fact it can be argued that the line between the physical and digital world is blurring. According to Nielsen Global Survey of E-commerce (Nielsen Company, 2005), conducted between February 17, 2014 and March 7, 2014, one-quarter of 30 000 online respondents from 60 countries, order grocery products online and more than half (55 %) are willing to do in the future. Customers increasingly expect benefits from the use of digital technologies in the retail environment and begin to expect more and more within the grocery shopping. The growth of e-grocery has been driven in part by the maturation of digital natives, the customers who grew up with digital technology (15 – 34 years). These youngest respondents are the most willing to use all of the e-commerce options in the future. For example, 30 % of respondents aged 21-34 years and 28 % of ages 15-20 respondents say they're ordering groceries online for home delivery, compared with 22 % of respondents aged 35-49 years, 17 % of ages 50-64 and 9 % of ages 65 and more. With the increasing penetration of mobile phones and broadband penetration increases also the online grocery sales. The Asia-Pacific region consistently exceeds the global average of all online retailing options. 37 % of respondents from this area use an online ordering and delivery service (even more in China – 46 %). It is mainly due high population density, rapid urbanization of the region and increasing smartphone ownership. Willingness to use digital retailing options in the future is highest in the developing country such as Asia-Pacific and Latin America (60 % on average), Africa/Middle East regions (59 %)m Europe (45 %) and North America (52 %). Product of stock-up categories like household products or personal care are prime selections for e-commerce, while immediate use items like fresh and frozen foods will be slower in adoption. However just here is a big opportunity for categories like a healthy food, than may be more difficult to find on in-store shelves. Nielsen research shows that today's shoppers are seeking fresh, natural and minimally processed food. This is great potential for online retailers that offer a wide variety of good-for-you foods, for niche consumer segments. On-line retailers can do well by fulfilling unique customer needs. Morgan Stanley Research was conducted online in October 2015, on a sample of 10 000 consumers in 10 countries. According to AlphaWise survey from Morgan Stanley Research, more than a third of online shoppers (34 %) in the world expect to buy their groceries online in 2016. For comparison, in 2015 it was 21 %. This increase could be the next big opportunity for e-commerce in the feature. This survey also demonstrates the fact that grocery via Internet buy mostly younger generation of consumer so-called mobile generation. This business model can be successful after overcoming logistical and consumer-behavioural barriers. Market share of grocery sales in the United States is around 2 % and in Europe 6 %. Despite the fact that this share is low, this form of selling grocery has a great potential for growth. The survey found that in globally, 21 % of respondents bought groceries (fresh food) online in the past 12 months. Based on this experience 34 % of them expect to purchase online grocery in the next 12 month. It is the largest expected increase representing 13 %, compared to any category of product in the survey, such as baby food product (12 %), pet food and supplies (10 %), auto parts and accessories (9 %), home improvement items and tools (9 %), jewellery (7 %), large home appliances (7 %), packaged food (5 %), office and school supplies for home use (4 %), sporting goods (3 %), children's toys and durables (3 %) and personal care and household product (2 %).

Most purchased commodities in the past 12 month globally was personal care and household products (30 %), packaged food (29 %), children's toys and durables (25 %) and fresh food (21 %). At least were purchased over the Internet was baby food products and infant formulas (10 %), pet food and pat supplies and auto parts and accessories (17 %). It is assumed increase US grocery market by \$26 billion in 2016, to more than \$42 billion. The greatest potential for online grocery sales to grow is for urban markets, non-perishable products and pick-up-at-store offerings. In United States, e-grocery penetration expected to increase from 8 % to 26 % (18 %) and for packaged foods from 16 % to 28 % (12 %). It is the largest expected increase compared to other types of products, as it has been on a global scale. This was followed by category pet food and pet supplies (7 %), baby food products (7 %), auto parts and accessories (6 %), large home appliances (5 %), home improvement items and tools

(4 %), personal care and household products (2 %), office and school supplies for home use (2 %), children's toys and durables (3 %), home furnishings and accessories (1 %) and handbags and accessories (1 %).

Overall most purchased commodities in the past 12 month in US was personal care and household products (24 %), home furnishing and accessories (22 %), office and school supplies for home use (20 %) and pet food and pet supplies (18 %). At least were purchased over the Internet was baby food product and infant formulas (6 %), fresh food (8 %) a large home appliances (9 %). In fast growing e-commerce markets, such as China, this form of trading still faces challenges to greater adoption, in particular for fresh foods. According to lead China Internet analyst Robert Lin, the reason is slow development of cold-chain delivery infrastructure and shipping standards. E-grocery has great potential in other European countries such as Germany, where e-grocery penetration expected to increase from 10 % to 36 % (increase of 26 % in 2016). Hill-Wood, head of European Internet research says, that online grocery are already relatively main stream in France and the United Kingdom. The expected increase of the initial 13 % to 25 % in France (12 %) and in United Kingdom about 1 %. In France and Germany, the rise of e-grocery has arrived almost at the same time although with considerable differences. (Saskia et al., 2016)

Increasingly vital role in e-grocery are playing mobile strategies. Web access and e-commerce transactions today depend on mobile rather than traditional desktop access, mainly in emerging markets, such as China. Despite technological innovation e-grocery still encounters obstacles. The main reason why some respondents never bought groceries via internet was their preference to pick the food they want themselves (67 %). The other common reasons are the pleasure of shopping in a brick store (33 %), more convenient store on way home from work (27%), too high shipping costs (26 %), the lack of trust in the quality of products purchased online (25 %) and fears of damaged during shipping (19%). Less referred reasons are more choices of products in stores than online (14 %), long delivery time (13 %), some other reasons (7 %), availability deals in the area (5 %), product not available online (4 %) and difficult search for products online (4 %).

In a traditional groceries market, various business models have been implemented and most of these models failed due to e-grocery retailing process. Today's e-grocery models are based on the consumer making purchase via the Internet and delivering the ordered products to the household. However, in the light of technological developments are appearing newer and more innovative services and delivery methods. Examples include, Vendor managed inventory (VMI) in the household a new type of e-grocery related service, based on the opportunities offered by bar code and radio frequency identification technology (RFID). A third-part logistics provider can also be involved to make sure that the buyer has the required level of inventory by adjusting the demand and supply gaps. The development of new value offering such as VMI is critical if e-grocery businesses are ever to again a competitive advantage over traditional retail formats. (Smáros et al., 2000)

3. RESULTS AND DISCUSSION

This part of the article presents the results of the survey realized in the Slovak Republic aimed at gathering the views, attitudes and experiences of customer with internet grocery shopping, as well as opinions, experiences and recommendations themselves grocery e-retailers.

The research project consists of two separate parts focusing on selected target groups – the first target groups are consumers and the second target group consists of e-grocery retailers. The research was carried out in Slovak Republic, in the first quarter of 2016. As a method of data collection was chosen method of electronic questioning.

The exploration was aimed to determine the criteria which are most important for customers buying grocery via Internet, identify which kinds of grocery are most often purchased and those which are bought a lesser extent, what discourages the consumers from purchasing grocery online and reveal the tendencies of their purchase behaviour in the future. On the other side, the aim was to find out the most common types of grocery offered by e-grocery retailers, reveal the barriers to trade with e-grocery and get their recommendations for success in this type of business.

3.1 The survey aimed on consumers

In the calculation of target population was assumed more than 100,000 respondents. The sample size was calculated with the maximum permissible margin of error 10 % and reliability 95 %. The data collection was conducted on the sample of 67 respondents aged over 18 years, during the period from 11.4.2016 to 16.04.2016.

The first part of the questionnaire, was aimed at detecting the social and demographic data of respondents. This identification section includes a set of questions that were intended to determine the sex, age and social status of consumers. The survey covered a total of 97 respondents, of which 64 % were women and 36 % were man. The vast majority of respondents belongs to the age group 18 – 25 years (68 % of total). The group of respondents from 26 to 35 years was represented by 12 %, from 36 to 45 years 16 % and from 46 to 55 only 4 %. Most represented in the survey were students of secondary schools and universities (49 %) and employed people (38 %). The remaining 13 % were entrepreneurs, the unemployed and women on maternity leave.

The second part of questionnaire contained open-ended and closed-ended questions. The respondents had the opportunity to select multiple answers in many cases.

On the question - which of criteria are for consumers, who buy grocery through the Internet, most important, 78 % of them answered that quality of grocery. As the second most important factor respondents indicated the price of grocery (75 %), followed by the freshness of product (69 %), ingredients of product (40 %) and product durability (26%). The least important is the availability of product, choosing to only 11 % of respondents and producer of product (9 %).

The next question was filter and its aim was determine whether the respondents have an experience with food purchased on the Internet. Surprising finding was that 68 % of respondents, don't have any experience with buying the grocery via Internet. 7 % of respondents (especially women) buys groceries over the internet regularly and 25 % of respondents occasionally. The reasons why respondents don't buy grocery over the Internet are different. The most common reason is that most of them want to consider the quality and freshness personally. Some of them notice that shopping in traditional shops is for them a way of relax or even that online shopping is for them unnecessary.

Among the most frequently purchased groceries via the Internet include health food supplements, which buy up to 61 % respondents, organic food (42 %) and confectionery (32 %). Other frequently purchased products are alcoholic beverages, pasta and spices (26 %). 23 % of respondents buy online oils, fresh bakery products, semi-finished products and ready meals (13 %). To a lesser extent purchased are soft drinks, fruit and vegetables (10 %). At least bought are the fish and fish products and meat and meat products (3 %). Respondents don't buy through the Internet frozen food and dairy products. In answer to the question – 'What kinds of food you have never buy via the Internet?' 87 % respondents answered that meat and meat products, 71 % fish and fish products and 61 % dairy products. These responses confirmed their earlier arguments. Further follow - fruit and vegetables (48 %), frozen food (39 %) and fresh bakery products (32 %).

As the most important criterion, that should be included in e-shop for incentives to purchase, respondents identified following options: detailed description of ingredients (81 %), expiration date (74 %), photo of products (74 %) and the country of origin (61 %). Important for them are also information about general business conditions (58 %), fast loading and visibility web page (45 %), opportunities to obtain discounts (42 %) and reviews from other consumer (36%).

The satisfaction with the price for delivery of ordered goods, respondents perceived as follows – 13 % of respondents are completely satisfied and 77 % of them are satisfied. Dissatisfaction of the price for delivery expressed the 7 % of respondents. 3 % of the people surveyed are very dissatisfied.

The greatest contribution of online grocery shopping via Internet according to respondents is opportunity to shop from the comfort of the home, which is easier and more practical for them, because this way of purchase saves their costs and time. This option to mark 74 % of respondents. For 34 % of respondent is a benefit a wide assortment of available goods, for 33 % of them is crucial that they do not have to wait in the line at the cash desk and 30 % of respondents considered an advantage lower prices of grocery. Other benefits of Internet shopping include for example possibility to compare products (27 %), exclusive food availability of products in the online stores (24 %) or shopping without the hassle of searching a parking space (20 %). The survey was also aimed at detecting reasons and drawbacks perceived by consumers that discourage them from buying grocery

electronically. The biggest obstacle to shopping via Internet is for the respondents the fact that they cannot see the products and compare it personally (62 %). 40 % of respondents are afraid that food will be out of warranty and that their durability will be over. The price for delivery of grocery discourages to 33 % of respondents who consider it to be an excessively high. Interesting is that 19 % of respondents are afraid that the ordered food will not be delivered. This is probably caused by the fact that customers still have lower levels of experience with the purchase with buying of this type of commodity. As the other reasons have been given, for example no interest for this kind of purchase of grocery (17 %), absence of counselling (6 %) and failure to ensure delivery the products to the given locality by the e-shop (5 %). The survey found that 15 % of respondents in the future will definitely buy grocery via Internet and 17 % of respondents probably, which is very positive finding. On the other side, 27 % of respondents said that they will not buy the grocery via Internet most likely and 8 % of respondents will not buy in this way definitely. 33 % of respondents were unable to take a position on the issue.

3.2 The survey aimed on at e-grocery retailers

The data collection was conducted on the sample of 85 e-grocery retailers, during the period from 11.4.2016 to 16.04.2016. The selection of retailers was conducted on the basis of empirical selection, subjective discretion. Representative selection method takes into account the respondents representative for the parent population.

The second part of the survey focused on e-grocery retailers consisted of the identification questions and questions aimed at finding their opinions, experiences and recommendations regarding the e-grocery. The aim of the survey was to identify the kinds of preferred grocery traded online, the reasons and motives of e-grocery retailers, advantages and disadvantages of their business and identify the main barriers and problems.

The e-grocery retailers conduct their business mainly as a trading company (44 %) or on the basis of a trade license (44 %). Only 12 % of them trades as a cooperative. The major part of the grocery e-shop is operating on the market between 1-5 years (62 %). It is therefore a mostly young firms, which is not surprising for this line of business. 19 % of e-shops has been operating in the range from 6 to 10 years and the same percentage belongs of e-shops which operate on the market more than 11 years.

In terms of geographical area of activity, the majority of grocery e-shops provides its services and products throughout the territory of Slovakia (44 %). 19 % of e-shops operates in Slovak Republic as well as abroad. Their effort is to penetrate on the new markets and gain more customer. Another 31 % of e-shops is active solely in a particular region. The reason for the selection of particular locality is that the locality is their place of birth. In addition, this regional traders believe that is need to encourage the sale of Slovak products primarily. 6% of e-grocery retailers are focused on selling their goods solely abroad.

The second part of the survey was aimed at ascertain opinions, experience and recommendations of the owners of e-shop with grocery. The e-grocery retailers had the opportunity to select multiple answers in many cases.

E-grocery retailers most commonly sold candy and soft drinks (in both cases 38 %). Another much sold product is organic food, with 31 %. Very often offered are also health food supplements, dairy products, meat and meat products (each category with 25 %) and alcoholic drinks with 19 %. To a lesser extent are offered frozen food, oil, spices, fruits and vegetables and fish and fishery products (average at about 13 %). At least offered are fresh bakery products, semi-finished and finished food (average at about 6 %).

As the main reasons and the motives to start trading with e-grocery are previous experience and interest in business with this commodity online and continuous development of the Internet and the growing potential for its use in business. The traders indicated that the interest of young people to shop over the Internet is continuously growing and they are also in agreement that this form of selling grocery has clear potential in the future.

The next question was focused to ascertain whether the e-grocery retailers recorded success in the form of an increase in revenues and number of customers, since the start of business. 62 % of them

this success achieved. A negative response was reported by 19 % of traders and the remaining 19 % of them were unable to express their opinion unequivocally.

According to dealers, in purchasing over the Internet the customers would appreciate especially free delivery (69 %). This option was most often given by companies operating on the market less than 5 years (inclusive). The common responses were also the better prices of products such in physical store (63 %) and the convenience that brings online shopping (50 %). The retailers further assume that customers would appreciate online counselling (38 %), the unique of offered products (38 %), wide selection of range, possibility of delivery throughout Slovakia and detailed information on the composition of the product (average at about 31 %). According to the majority of e-retailers operating in the market more than 11 years, customers especially appreciate better and detailed information on the composition of the product.

E-commerce is currently already quite common, but as every type of business, this way of trading has its characteristic advantages and disadvantages too. For Slovak retailer with e-grocery is the greatest benefit of this type of business – the opportunity work from the comfort of the home (75 %), especially for traders operating nationwide. They can also see the benefits in the possibility of constant communication with customers and lower operating costs compared to conventional trade (average at about 44 %). The lower operating costs most frequently mentioned companies which operate locally. Appealing for them is also the possibility to operate both on the domestic and foreign markets and opportunity to find new partners and suppliers (average at about 38 %).

As the main disadvantage has been marked missing of personal contact with the customers (63 %). E-grocery retailers also see a problem in underdeveloped legislation (50 %) and the fact that e-commerce with grocery is still not a stable source of income at present (44 %). Some of them identified as a disadvantage the high cost of establishing and running the business (31 %) and insufficiently developed infrastructure (19 %). 13 % of them don't see any obstacle in this type of business.

The survey also revealed the barriers and the problems of e-grocery retailers related to founding of e-shops. Many retailers agree that the biggest barrier in this type of business is the lack respectively minimal experience with business via Internet (44 %). Another significant barriers are e. g. low interest from customers (38 %), lack of funds for starting a business (31 %), minimum experience of technical solution of e-shop (31 %), unsuitably chosen business and marketing strategy (13 %) and the risk of selection unreliable supplier (6 %). Only 25 % of retailers see no barriers to start a business on Internet.

Based on previous experiences, 19 % of retailers would start their business with e-grocery again. Half of them (50 %) incline towards answer – rather yes and 12 % of them to possibilities - rather not. 19 % of retailers were unable to express their opinion. However, none of the respondents did not exclude this possibility explicitly. E-grocery traders had the opportunity to make recommendations for those who plan to do business with grocery online. In most cases, they recommend to be patient and not be afraid to failure. In their opinion is also necessary to constantly work on yourself and technologically educate yourself.

4. CONCLUSION

Based on the results of the survey focused on e-grocery in Slovak Republic and many other secondary researches conducted in the world, we can conclude that Slovak e-grocery is not so advanced in comparison with the developed countries in the world. We can conclude that despite all the technological options Slovak consumers still need to see the product personally, to verify the freshness and quality, as well as compare different products among themselves and decide on their own personal preferences. However, the situation is significantly changing in Slovakia, albeit slowly then in developed countries that the possibility of buying grocery via Internet used much earlier. With certainty it may be presumed that the Slovak e-grocery has good perspective for growth in the future. The future and success of business in this area are affected by global trends associated primarily with the advent of digital technologies and their use within the purchasing process as well as with the changing in shopping preferences of customers around the world, that are in this article mentioned.

Acknowledgements

These research grants supported this paper:

- 2/KS/2017 Labour market and employment policy in Slovakia and the EU,
- VEGA 1/0725/17 Startup company lifecycle research as the basis of a business startup business model,
- VEGA 1/0515/15 Endogenous factors of the IPR intensive Industries in the regional enterprise environment in Slovak Republic.

References

- Achimska, V., Kramarova, K. (2016) *Information as a base of information and communication technologies*, International scientific days 2016: The agri-food value chain: challenges for natural resources management and society. Nitra, Slovakia, p. 732-738.
- Bensinger G., Stevens, L. (2014) *Amazon, in threat to UPS, tries its own deliveries*. The Wall Street Journal. Available at: <http://online.wsj.com/news/articles/SB10001424052702304788404579521522792859890>. (11.7.2016).
- Corejova, T., Holla Bachanova, P., Mockova, M. (2015). *Industry and Business Study of Architecture in Terms of the Zilina Region*. CERS 2014: 5th central European conference in regional science, international conference proceedings. Slovakia, p. 125-135.
- Ecommerce Europe. (2014). *European B2C E-commerce Report 2014*. Available at: <https://www.adigital.org/media/2014/06/european-b2c-e-commerce-report-2014.pdf>.
- Farag S. (2006). *E-shopping and its interactions with in-store shopping*. Utrecht University. Available at: <http://igitur-archive.library.uu.nl/dissertations/2008-0603-200316/UUindex.html> (16.07.2015).
- IGD. (2014). *UK Grocery Retailing*. Available at: <http://www.igd.com/Research/Retail/retail-outlook/3371/UK-Grocery-Retailing/> (10.01.2016).
- IGD. (2013). *Online grocery retailing in France and Germany to double by 2016*. Available at: <http://www.igd.com/About-us/Media/IGD-news-and-press-releases/Online-Grocery-Retailing-in-France-and-Germany-to-Double-by-2016/> (08.12.2015).
- Linder, M., Rennhak, C. (2012). *Lebensmittel-Onlinehandel in Deutschland*. Reutlingen Working Papers on Marketing & Management.
- Kovacikova, M., Stofkova Repkova, K. (2016). *Impact of globalization on access to process businesses management*. Globalization and its socio-economic consequences, 16th International scientific conference proceedings, PTS I-V. Slovakia, p. 1022-1030.
- Madlenak, R., Madlenakova, L. (2016). *The global impact of e-marketing strategies on SME in the segment of touristic services*. Globalization and its socio-economic consequences, 16th International scientific conference proceedings, PTS I-V. Slovakia, p. 1235-1243.
- Morgan Stanley. (2016, January 22.). *Are Groceries the Next Big Driver of Global eCommerce?* Retrieved from <http://www.morganstanley.com/ideas/online-groceries-could-be-next-big-e-commerce-driver>.
- O'Farrel, S. (2014). *Online Grocery Order Fulfillment – Drive. Click & Collect or Home Delivery*. Supply Chain Conference. Orlando.
- Rankin, J. (2013, March 8). *Online grocery shopping. When will Morrisons come in from the cold?* Available at: <http://www.theguardian.com/business/2013/mar/08/morrisons-online-grocery-shopping> (25.06.2016).
- Suel, E. et al. (2015). *Empirical Application of Expenditure Diary Instrument to Quantify Relationships Between In-Store and Online Grocery Shopping Case Study of Greater London*. Transportation research record. Issue: 2496 Pages: 45-54. ISSN: 0361-1981. eISSN: 2169-4052.
- Saskia, S. et al. (2015). *Innovations in e-grocery and logistics solutions for cities*. RG Conference: 9th International Conference on City Logistics Location: Tenerife, SPAIN Date: JUN 17-19, 2015. Book Series: Transportation Research Procedia. Volume: 12, Pages: 825-835. Doi: 10.1016/j.trpro.2016.02.035.
- ShopperVista. (2013). *Online grocery shoppers*. Factsheet. IGD. Available at: <http://www.igd.com/our-expertise/Shopper-Insight/shopper-outlook/13229/Online-grocery-shoppers/> (22.07.16).
- Smáros, J., Holmström, J. (2000) *Viewpoint: reaching the consumer through e-grocery VMI*. International Journal of Retail & Distribution Management, Vol. 28 Iss: 2, pp.55 – 61.
- Strenitzerova, M., Garbarova, M. (2016). *Impact of globalization on human resource management in the information and communication sector*. Globalization and its socio-economic consequences, 16th International scientific conference proceedings, PTS I-V. Slovakia, p. 2143-2150.
- The Nielsen Company. (2005, April). *The Future of Grocery E-commerce, Digital Technology and Changing Shopping References around the World*. Retrieved from [http://www.nielsen.com/content/dam/nielsen/vn/docs/Reports/2015/Nielsen%20Global%20E-Commerce%20and%20The%20New%20Retail%20Report%20APRIL%202015%20\(Digital\).pdf](http://www.nielsen.com/content/dam/nielsen/vn/docs/Reports/2015/Nielsen%20Global%20E-Commerce%20and%20The%20New%20Retail%20Report%20APRIL%202015%20(Digital).pdf).

WOMEN ON BOARDS OF THE TOP 50 NON-FINANCIAL COMPANIES IN SLOVAKIA

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ABSTRACT

The aim of the paper is to provide the empirical evidence on the issue of underrepresentation of women in decision-making bodies of the largest business companies in Slovakia. Limited participation of women in the business sector decision making is one of the factors contributing to the low score of Slovakia in the EU Gender Equality Index (2015). However, the Index only covers the data from the largest publicly listed companies that are members of the primary blue-chip index in the respective country and only 10 companies from Slovakia are included in the analysis. This paper therefore complements this evidence by focusing on the representation of women in the statutory and supervisory management bodies and top executive level positions of 50 largest non-financial companies, included in the Trend top 200 list for the year 2015. Additionally, the paper also examines how different factors, such as type of the company ownership, type of the decision-making body or number of its members, influence the representation of women in decision-making positions. The results of the analysis confirm the strong underrepresentation of women in the decision-making bodies of the largest companies in Slovakia and are consistent with the conclusions of the EU Gender Equality Index for Slovakia.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: gender, management, executive, equality, board member.

1. INTRODUCTION

The participation of women in the corporate decision making is a topic that has been broadly researched over the last decades. The extent of this research is well illustrated in the study of Joshi et al. (2015) offering an overview of how its thematic orientation gradually developed and became more nuanced over the last fifty years. While in seventies, the focus was on more general questions such as discrimination of women in the workforce or different leadership styles, phenomenon such as pay gap, promotion, tokenism, glass ceiling, career development and mentoring attracted the attention of researchers throughout the eighties and nineties. The current discourse shifted to diversity and intersectionality in management, work-life balance and, what is of most relevance for this paper, a broadly discussed topic of boards' composition and its effect on the company's performance.

The interest in the boards' gender diversity was reflected not only in the increasing number of research studies but also in the emergence of projects systematically collecting empirical data on the representation of women in the top decision-making positions such as the Female FTSE Board Project, Catalyst Census or the European Commission Database on Women in Decision Making. The data collected through these projects clearly show that boards and top decision-making positions are not "no-women land" anymore. The share of women in the boards of the largest publicly listed companies in the EU28 reached 23.3% in 2016 according to the European Commission (2016). 19.9% of the board seats in the S&P 500 companies were occupied by women. Even though only 5.8% of these companies had a female CEO's, the share of senior level executives was 25.1% (Catalyst 2016, 2017). Data from PwC's Survey show that directors perceive diversity (both gender and racial) as very important attribute that needs to be pursued (PwC, 2016).

However, the presence of women in decision making does not automatically mean more gender equality and therefore these numbers do not allow for too much optimism: only when the share of women reaches certain critical level, the organisational change occurs. Without reaching the gender balanced zone (40-60%) described by Kanter (1993) it is difficult to disrupt the existing "old boy's

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networks” and challenge the existing, strongly gendered organisational structures. If the share of women is lower than this critical threshold, phenomenon such as tokenism and queen bees might occur. The so called “queen bee phenomenon” (Derks, Ellemers, van Laar, & de Groot, 2011; Derks, Van Laar, & Ellemers, 2016) describes the behaviour of a woman (or other marginalized group member) who distances herself from other women and adopts a more masculine behaviour while moving up the career ladder. Such behaviour can be linked to the previously experienced gender discrimination and can be perceived as a strategy that women use to pursue their ambitions in the sexist organizational culture settings in which to “think manager” still means to “think male” (Schein, 2007; Schein, Mueller, Lituchy, & Liu, 1996).

The slow progress from gendered organisational cultures towards more inclusive models of organisations led to an introduction of different measures and policies that should accelerate this transformation. These measures range from the organisational instruments such as empowerment and mentoring programmes for female leaders to voluntary or mandatory quotas determining the share of women in the decision-making bodies. The studies analysing the effect of quotas in France, Spain and Norway mostly report cautiously optimistic results (Singh, Point, & Moulin 2015, Wang & Kelan 2013). Empirical results indicate that the gender quotas result not only in the higher representation of women on boards but lead also to higher number of female directors and provide a fertile ground for women to take top leadership positions (Wang & Kelan 2013).

These developments have been so far only partially reflected in the management practice in Slovakia. Low share of women in decision making position (both economic and political) strongly contribute to the comparatively lower level of gender equality in society as measured e. g. by Gender Equality Index set up by the European Institute for Gender Equality (EIGE). The value of overall index for Slovakia in 2015 was 36.5% (100% represents the state of gender equality) which is 16.4% behind the EU average (EIGE, 2015). Difference is even bigger in the dimension of power, where Slovakia only scores 14% points compared to 31.7% for the EU-28 and is one of the countries with the lowest scores in this area. The EIGE Index covers the data from the largest publicly listed companies that are members of the primary blue-chip index in the respective country and only 10 companies from Slovakia fulfil this criterion. This paper therefore complements this evidence by extending this sample to the 50 largest non-financial companies, included in the Trend top 200 list for the year 2015. The paper follows earlier contribution by the authors analysing the data from the year 2014 (Mitková & Kottulová, 2016b).

2. MATERIAL AND METHODS

The main goal of the analysis is to provide an additional empirical evidence about the level of representation of women in the top management positions in the largest business companies in Slovakia in 2015. Trend Top 200 list of the largest non-financial companies in Slovakia for the financial year 2015 (Trend, 2016) was used to select the companies included in the analysis. The sample consists of fifty companies with the largest volume of sales in 2015, regardless of their legal form or other characteristics. Data on two types of management positions were collected for the paper. Dataset includes information on (1) members of statutory and supervisory bodies and (2) members of executive management (chief officers responsible for different areas). Data on the members of statutory and supervisory bodies and on the type of ownership were obtained from the Business Register of Slovakia (Ministry of Justice of the SR, 2016). Data about the executives were collected from the web pages and/or annual reports of the selected companies. Not all companies included in the sample publish the names of their executive managers and therefore this information could only be obtained for twenty-seven (54%) from the selected companies. Altogether the sample of 533 positions in the boards and executive management (if available) was analysed. In case that one person holds both a position in the statutory body and a position in the executive management, he or she is only counted in the sample once (there are 533 positions that are held by 466 individuals). Simple descriptive statistics is used to analyse the collected data.

3. RESULTS AND DISCUSSION

Women were strongly underrepresented in the management bodies of the companies included in the analysed sample. They constituted only 7% (N=13) of the statutory bodies members, 17.1%

(N=28) of supervisory bodies members and 12.9% (N=60) of the total number of top managers included in the sample (see Figure 1). This share is even lower than in the case of companies considered for the EIGE Gender Equality Index. According to the EIGE data, less than 14% of members of the boards of the largest companies in Slovakia listed in the blue-chip index were women in 2016 (EIGE, 2016), which places Slovakia among the countries with the very low economic power of women. Our findings support this conclusion. The critical mass of 30% of female members in the management bodies is only achieved in 12% of analysed companies and the single company has more than 50% of female board members (Ikea). Contrary to this, 65% of Fortune 100 and almost 50% of Fortune 500 companies have larger than 30% share of women in their management bodies (Deloitte & Alliance For Board Diversity, 2017). We also had a look at the so called “golden skirt” phenomenon, which is often mentioned in relation to Norway, where the pressure to increase the share of women in the decision-making positions resulted in the occurrence of the female “multiboard members” (Huse 2011, 2016). However, there is no evidence for the existence of such phenomenon in Slovakia at this point. There was only one case of two interlinked manufacturing companies, with the male managers holding the top positions in both companies in our sample.

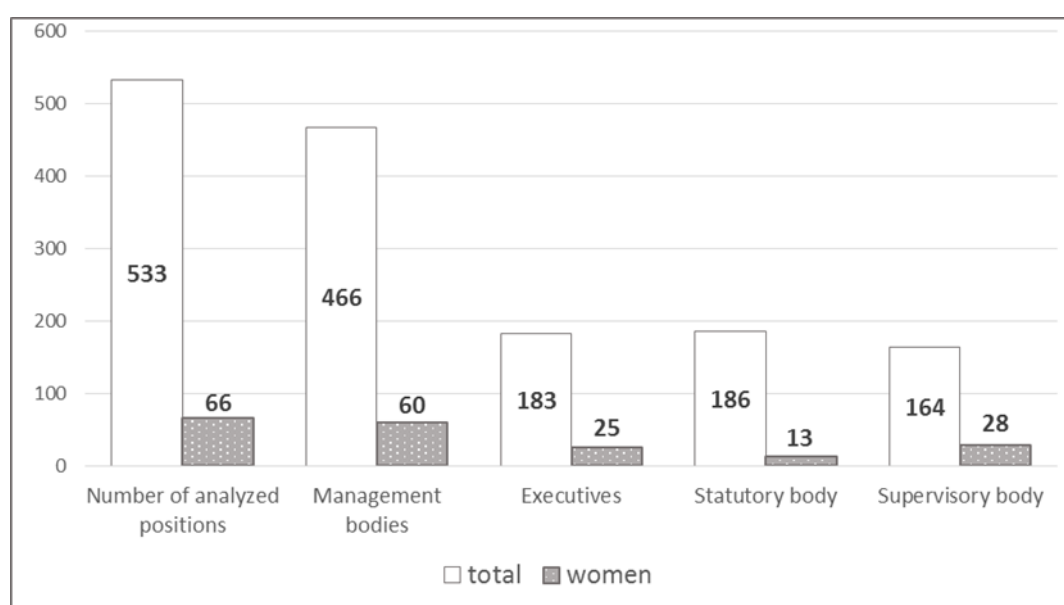


Figure 1 Share of women in the decision-making positions of the analysed companies according to the type of management body

Source: by authors, based on data from Business Register of Slovakia (Ministry of Justice of the SR, 2016) and information on the web pages or from annual reports of the companies

We were also interested in how does the share of women differ according to the sector in which analysed companies operate. The existing literature investigates the correlation between industry sectors and share of female board members, focusing especially on the industries with high share of female employment such as e.g., retail, finance, media, banking, and health care on the one side and male dominated industries such as transport or energy on the other (see e. g. Isidro & Sobral 2015; Carlsson-Kanyama, Juliá, & Röhr 2010; Mateos de Cabo, Gimeno, & Nieto 2009). The size of our sample does not enable to draw generalised conclusions on this issue, however it might point out some trends. The share of female managers was highest in the companies dealing with the “Wholesale and retail trade”, “Information and communication” (both 15%) and in “Manufacturing” (14%). On the other hand, it only reached 9% for the sector of “Electricity, gas, steam and air conditioning supply” and 7% for the “Transportation and storage sector”. No clear pattern that would confirm the distribution of female managers according to the overall share of women in the sector can be identified based on these data. On the other hand, distribution of female executives according to their functional responsibility reflects the occupational segregation in the labour market quite well. Most of the female executives were responsible for the areas such as human resources, customer services, audit, legal

services, marketing, controlling, etc. Only two out of 27 companies for which the information was publicly available had a female CEO.

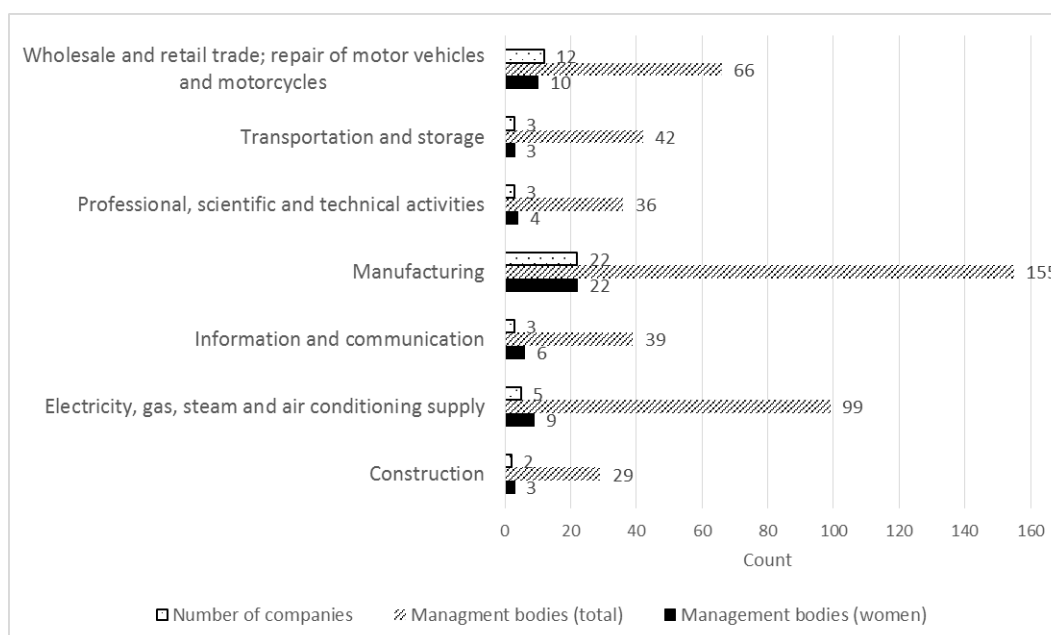


Figure 2 Number of women in the management bodies according to NACE Rev2 classification

Source: by authors, based on data from Business Register of Slovakia (Ministry of Justice of the SR, 2016) and information on the web pages or from annual reports of the companies

Table 1 provides a closer look at the number of women in the management bodies according to their size. The probability that the women will be represented in the decision-making body increases with the size of these bodies. Only 27% companies with up to 5 members in their management bodies have at least one woman represented in them. The women are represented in the management bodies of 33% of companies with 6 to 10 board members and this number increases to over a 50% for the companies with more than 11 members.

Table 1 Number of women in management bodies according to their size (count and %)

Management bodies (groups by number of members)		Number of women in Management bodies			Total
		None	One	more than one	
1 to 5	Count	16	6	0	22
	%	73%	27%	0%	100%
6 to 10	Count	5	3	1	9
	%	56%	33%	11%	100%
11 to 15	Count	0	4	4	8
	%	0%	50%	50%	100%
more than 15	Count	2	7	11	11
	%	18%	18%	64%	100%
Total	Count	23	15	12	50
	% of Total	46%	30%	24%	100%

Source: by authors, based on data from Business Register of Slovakia (Ministry of Justice of the SR, 2016) and information on the web pages or from annual reports of the companies.

The last step of the analysis was to find out whether there are differences in the representation of women between domestic and foreign owned companies. 54% of all companies in the whole sample have at least one women in their management bodies. However, only 45% of companies with foreign

ownership (N=27) have a female board member. The number increases to 50% for domestic companies (N=17). This is in line with our earlier findings that foreign owned companies do not outperform the domestic ones in the field of gender equality (Mitková & Kottulová, 2016a) even though they do import diversity or equal opportunities policies. To further develop this argument additional analysis according the sectors would be necessary (it might be expected that foreign owned companies in the service sector have a higher representation of women than both foreign owned companies in other sectors and domestic companies) however the sample is not large enough to allow for generalised conclusions on this.

Table 2 Number of women in the management bodies by the type of the company ownership

Company ownership		Number of women in Management bodies			Total
		None	One	more than one	
State-owned	Count	1	2	1	4
International – private	Count	1	2	1	4
International with prevailing private sector	Count	2	1	4	7
Private domestic	Count	4	1	3	8
Foreign	Count	15	9	3	27
Total	Count	23	15	12	50
	% of Total	46%	30%	24%	100%

Source: by authors, based on data from Business Register of Slovakia (Ministry of Justice of the SR, 2016)

4. CONCLUSION

The aim of the paper was to provide an additional empirical evidence on the representation of women in decision-making bodies of the largest business companies in Slovakia and to confront the results with the conclusions of the EIGE Gender Equality Index for 2015. Our findings support the claim, that the limited access of women to economic power remains one of the most important barriers to gender equality in Slovakia. The fact that 45% of analysed companies do not have a single woman in their top management bodies and that only in 12% of the companies the share of women reaches the critical mass of 30% should be of concern to both business representatives and policy makers. Křečková (2013) points out that Slovak business sector will only be able to reach a gender balance in decision making by 2050 if the current trend does not change. Until then we will witness the underutilisation of talent and skills that no economy that wants to increase its growth potential should allow.

References

- Carlsson-Kanyama, A., Juliá, I. R., & Röhr, U. (2010). Unequal representation of women and men in energy company boards and management groups: Are there implications for mitigation? *Energy Policy*, 38(8), 4737-4740.
- Catalyst. (2016). *2015 Catalyst Census: Women and Men Board Directors*. New York: Catalyst. Retrieved from <http://www.catalyst.org/knowledge/2015-catalyst-census-women-and-men-board-directors>
- Catalyst. (2017). *Pyramid: Women in S&P 500 Companies*. New York: Catalyst. Retrieved from <http://www.catalyst.org/knowledge/women-sp-500-companies>
- Deloitte, & Alliance For Board Diversity. (2017). *Missing Pieces Report: The 2016 Board Diversity Census of Women and Minorities on Fortune 500 Boards*. Deloitte. Retrieved from <http://www.catalyst.org/knowledge/missing-pieces-report-2016-board-diversity-census-women-and-minorities-fortune-500-boards>
- Derks, B., Ellemers, N., van Laar, C., & de Groot, K. (2011). Do sexist organizational cultures create the Queen Bee? *British Journal of Social Psychology*, 50(3), 519-535. <https://doi.org/10.1348/014466610X525280>
- Derks, B., Van Laar, C., & Ellemers, N. (2016). The queen bee phenomenon: Why women leaders distance themselves from junior women. *The Leadership Quarterly*, 27(3), 456-469. <https://doi.org/10.1016/j.leaqua.2015.12.007>

- EIGE. (2015). *Slovakia - Gender Equality Index 2015*. Retrieved from <http://eige.europa.eu/sites/default/files/documents/slovakia-gender-equality-index-2015.pdf>
- European Commission. (2016). *Gender balance on corporate boards - Europe is cracking the glass ceiling*. European Commission. Retrieved from http://ec.europa.eu/justice/gender-equality/files/gender_balance_decision_making/1607_factsheet_final_wob_data_en.pdf
- Huse, M. (2011). The "Golden Skirts": Changes in board composition following gender quotas on corporate boards. In *Australian and New Zealand Academy Meeting, Wellington, NZ*. Retrieved from http://www.anzam.org/wp-content/uploads/pdf-manager/473_ANZAM2011-148.PDF
- Huse, M. (2016). The "Golden Skirts": Lessons from Norway about Women on Corporate Boards of Directors. In S. Groschl & J. Takagi (Eds.), *Diversity Quotas, Diverse Perspectives: The Case of Gender* (pp. 11–24). New York, NY: Routledge.
- Isidro, H., & Sobral, M. (2015). The effects of women on corporate boards on firm value, financial performance, and ethical and social compliance. *Journal of Business Ethics*, 132(1), 1-19.
- Joshi, A., Neely, B., Emrich, C., Griffiths, D., & George, G. (2015). Gender Research in AMJ: AN Overview of Five Decades of Empirical Research and Calls to Action Thematic Issue on Gender in Management Research. *Academy of Management Journal*, 58(5), 1459–1475. <https://doi.org/10.5465/amj.2015.4011>
- Kanter, R. M. (1993). *Men and Women of the Corporation*. Basic books.
- Křečková, Z. (2013). Women on Boards: The Perspective of Czech and Slovak Republics within European Context. *Management: Science and Education*, 1(1), 40–42.
- Mateos de Cabo, R., Gimeno, R., & Nieto, M. (2009). *Gender Diversity on European Banks' Board of Directors: Traces of Discrimination*.
- Ministry of Justice of the SR. (2016). *Business Register the Slovak Republic*. Retrieved from http://orsr.sk/search_ico.asp?lan=en
- Mitková, L., Kottulová, J. (2016a). Globally valued, locally irrelevant? Gender equality in the multinational companies operating in Slovakia. In T. Klietík (Ed.), *Globalization and its socio-economic consequences, 16th International Scientific Conference Proceedings (Part III)* (pp. 1411–1418). Rajecke Teplice, Slovakia: University of Zilina. Faculty of Operation and Economics of Transport and Communications. Zilina.
- Mitková, L., Kottulová, J. (2016b). Women on boards of top companies in Slovakia: Still under the glass ceiling? In *Management in theory and practice, 15th International Scientific Conference for PhD Students and Young Researchers*. Bratislava, p. 50-55
- PwC. (2016). *PwC's 2016 Annual Corporate Directors Survey. The swinging pendulum: Board governance in the age of shareholder empowerment*. PricewaterhouseCoopers. Retrieved from <http://www.pwc.com/us/en/corporate-governance/annual-corporate-directors-survey/assets/pwc-2016-annual-corporate--directors--survey.pdf>
- Schein, V. E. (2007). Women in management: reflections and projections. *Women in Management Review*; 22(1), 6.
- Schein, V. E., Mueller, R., Lituchy, T., & Liu, J. (1996). Think Manager - Think Male: A Global Phenomenon? *Journal of Organizational Behavior*, 17(1), 33–41.
- Singh, V., Point, S., Moulin Y. (2015). French Supervisory Board Gender Composition and Quota Threat: Changes from 2008 to 2010. *Gender in Management: An International Journal* 30 (7): 551–71. doi:10.1108/GM-07-2015-0065.
- Trend. (2016). Trend Top 200. *Trend Top 200 - Priloha*, 26(26), 8–12.
- Vinnicombe, S., Doldor, E., Sealy, R. (2015). *The Female FTSE Board Report 2015*. Retrieved from <https://dspace.lib.cranfield.ac.uk/handle/1826/9182>.
- Wang, M., Kelan E. (2013). The Gender Quota and Female Leadership: Effects of the Norwegian Gender Quota on Board Chairs and CEOs. *Journal of Business Ethics* 117 (3): 449–66. <https://doi.org/10.1007/s10551-012-1546-5>.

BENEFITS VERSUS BARRIERS OF CONTROLLING IN MEDIUM ENTERPRISES

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ABSTRACT

The aim of the paper was to determine the key benefits and barriers of controlling related to the implementation and use of controlling in medium-sized enterprises. This issue was examined through empirical quantitative research using the questionnaire method, from the perspective of individual groups of internal shareholders which are the owners, managers and employees of medium-sized enterprises. The methods of analysis, synthesis, deduction, analogy, comparison, summarisation and generalisation of knowledge were used in the processing of secondary sources. The results of the own research were evaluated by means of descriptive statistics using table and graphical presentations. A model was proposed based on the results of the analysis of primary and secondary sources intended to determine the monetary and non-monetary benefits and barriers that have a key impact on the process of decision-making regarding the implementation of controlling in practice. The model will be beneficial for the owners and managers of medium-sized enterprises as the basis for deciding whether to implement this tool in their enterprise.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: controlling, benefits versus barriers, medium enterprises.

1. INTRODUCTION

Dynamic development of small and medium enterprises is one of the basic presumptions of country's healthy economic development. Just as in the European Union also in Slovakia an important part of economy are the small and medium-sized enterprises representing 99.9 % on the total number of business entities, they provide job opportunities for almost three quarters of workforce (73.6 %) and participate by more than a half (52.8 %) on added value creation. The size-based categorisation of enterprises is not unified in all criteria, according to the Recommendation of the European Commission No. 2003/361/EC the small and medium-sized enterprises (SME) are enterprises employing less than 250 people and having the annual turnover not exceeding EUR 43 mil. Within the SME category the following are differentiated:

- **Micro-enterprise** as an enterprise employing less than 10 people and having the annual turnover not exceeding EUR 2 mil.
- **Small-enterprise** as an enterprise employing less than 50 people and having the annual turnover not exceeding EUR 10 mil.
- **Medium-sized enterprise** as an enterprise employing less than 250 people and having the annual turnover not exceeding EUR 50 mil.

In recent years, the business industry has been developing in the conditions of growing performance of the Slovak economy. The trend of economic growth acceleration corresponds with the growth of economic activity of business entities *Havlíček (2016)*. Slovakia keeps its position in the group of the most rapidly growing economies in the EU. The achieved dynamics of the economic growth is positively influenced by the acceleration of the foreign and domestic demand. The growth in complexity and dynamics leads to constantly more turbulent business environment. The growing turbulence results in growing competitive pressure, higher risks and big uncertainty. For the enterprises to be able to react flexibly to changes in external and internal environment they are forced to use state-of-art management techniques to set and achieve enterprise's objectives *Wagner (2017)*. According to *Janská (2017)* an enterprise management in general is its activity focusing on

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influencing an enterprise's business activities. *Wagner (2017)* stresses that the content of an enterprise management is developing its business function, i.e. deciding what initiative is to be taken, what measures should be adopted in various areas of activities to achieve an enterprise's objectives. An important role in the system of the enterprise management is played by controlling *Volčko (2005)*. As stated by *Havlíček (2011)*, controlling is implemented by almost all big enterprises as a support tool of enterprise management. However, the category of small and medium-sized enterprises still does not identify itself with the necessity of the tool for the enterprise. With growing scope of managerial decisions just the category of medium-sized enterprises should focus more on the implementation of this managerial tool, which is also analysed hereunder. The aim of the paper was to determine the key benefits and barriers of controlling related to the implementation and use of controlling in medium-sized enterprises.

2. MATERIAL AND METHODS

Controlling in the economic theory and practice was used for the first time by the end of the 19th century in the U.S.A. *Sedliačiková (2015)*. The theory and practice provide more than 50 alternative meanings of the term controlling, however, according to the statement made by *Foltínová (2009)* we can summarise them all in three basic categories

- *managing, controlling, regulating,*
- *governing, administrating,*
- *checking, governing, verifying.*

When summarising the scientific knowledge in the field of controlling we can define controlling as an efficient tool of managing the enterprise's future *Sedliačiková (2011)*, the duty of which is to prepare an adequate environment for enterprise's managers to make decisions, quality information in real time and with high informing value *Foltínová (2009)*. *Potkány, Sedliačiková et al. (2011)* defines basic duties of controlling:

- Support of planning and determining of enterprise's objectives.
- Continuous obtaining and processing of information for the support of decision-making.
- Support of check with the focus on deviations analysis.
- Processing information for reports and overviews.
- Participation and involvement at the selection and preparation of management workers.

At the current period of controlling implementation in Slovak medium enterprises this function is ensured by a financial manager or controller analysing financial features of the business activity with the aim to provide for long-term enterprise prosperity *Potkány, Sedliačiková et al. (2011)*. In small and medium enterprises controlling is mainly up to the workers with other economic functions e.g. accountant or enterprise owner, which is not seen as the most appropriate solution. In enterprises with more than 200 employees the number of independent controllers in charge of management duties is growing *Kosmider (1994)*. In Slovak enterprises the position of a controller started to occur with the arrival of foreign investors. As stated by *Eschenbach et al.(2004)* and *Šatánová, 2004*), there is no valid guideline for controlling implementation in an enterprise. However, the practice has provided certain proven tendencies at implementing controlling into the organisational structure.

Controlling implementation in an enterprise means activities playing major role in its efficient and successful functioning *Sedliačiková et al.(2015)*. According to *Sedliačiková et al.(2015)*, *Jánská (2017)* the financial benefits of controlling implementation include mainly the growth of profit, enterprises ROI growth, and increased enterprise value. *Havlíček (2016)* and *Ratanová et al.(2011)* highlight the non-financial benefits of controlling implementation such as improvement of processes performance with the effect on costs reduction. *Sedliačiková, Volčko (2012)* summarised the most important benefits of controlling management system implementation as follows:

- complex recording of all economic, financial, expense-related events in an enterprise,
- implementation of objective and unambiguous principles at information evaluation,
- interrelation of information flows,
- improvement of strategic decisions,
- ensuring efficient spending of sources.

The term controlling implementation usually means creating an appropriate organisational structure and processes performance organisation *Kruml(2016)*. Creating a controlling organisation establishes the whole controlling system, constantly growing and opened to new requirements of an enterprise *Ratanová (2011)*. When implementing controlling in enterprise is needed to consider also the impact of psychological aspects on individual internal groups *Sedliačikova et al. (2015)*. *Huseinbasic (2016)*, *Kruml (2016)* presented fact of requisite staff training and analysis of work duties. *Sedliačiková (2011, Kruml (2016) and Janská (2017)* accent that the barriers arising from controlling implementation must be seen from the point of internal interest groups which are managers, owners and employees of an enterpris. They also say that within implementation process is needed to perform several activities such as software implementation, Assinging duties, competencies to individual employees, coordinating controlling duties and activities. Controlling system is based on specific requirements and features of an enterprise *Horvath & Partners (2004)*.The profile of requirement is a response to the question: What should the enterprise provide? When preparing the requirements profile it is recommended to set a team consisting of controlling services users and controlling services providers, which will provide for a balance between the requirements on controlling and its implementation possibilities.

2.1 Methodology

From methodological point, the paper was divided into four parts. In the first part of the paper it was needed to search the literature from domestic and foreign scientific resources with the use of scientific methods such as description, synthesis, summarisation, analogy and deduction. The other part of the paper comprises of the empirical research based on the questioning method. The questionnaire was focused on finding financial and non-financial benefits of controlling implementation in medium-sized enterprises from the point of three internal groups involved which are employees, managers and enterprise owners. With the help of empirical questionnaire we identified controlling implementation benefits and barriers in medium-sized enterprises. The research results were evaluated using a descriptive method. In the third part of the paper, with the help of comparison, synthesis and analogy method we propose a standardised model of controlling implementation, championing and use in enterprise environment. The final part defines theoretical and practical benefits of the research performed.

The initial questionnaire was sent to enterprises with the registered office in Slovakia. It was contacted 4,935 respondents and the return rate was 412 questionnaires, which is 8.35 %. The filled-in questionnaires related to 99 micro enterprises, which is 24 %; 76 small enterprises, which is 18.4 %; 120 medium-sized enterprises, which is 29.1 % and 117 big enterprises, which is 28.6 %. The paper analyses in more detail only the medium-sized enterprises, i.e. our sample represented 120 enterprises (29.1 %).

3. RESULTS AND DISCUSSION

3.1 Results of empirical research

To obtain the required data for the information collection was used the questioning method by means of a questionnaire. The questionnaire was sent to the respondents electronically via Google questionnaire. It consisted of two parts. The first part represented sorting questions focusing on the enterprise description. The other part of it focused on financial and non-financial benefits of controlling implementation in an enterprise and enterprise controlling implementation barriers from the point of three involved groups which are employees, managers and enterprise owners.

The following facts were found by an empirical research using the questioning method by means of a questionnaire.

The most important financial benefits of controlling implementation in an enterprise from the point of internal interest groups are as follows:

- for more than 51 % of respondents it is the profit growth
- 45 % believe that controlling will bring better financial plans and their fulfilment
- 28 % think controlling is a tool to improve the enterprise value
- according to 25 % of respondents controlling will result in enterprise's ROI growth

- 22 % considers the enterprise cash flow growth to be a benefit
- 16 % of respondents believe that controlling implementation will result in an average wage growth
- 10 % of respondents do not have a standpoint
- for 8 % of respondents controlling implementation means the enterprise's liquidity growth
- only 1 % believe that controlling has no benefit for them

The respondents see the following factors as the most important non-financial benefits of controlling implementation:

- 48 % of respondents considers the improvement of processes performance with the impact on costs reduction and making the information supporting optimum managerial decisions more transparent as a non-financial benefit
- 43 % believe that non-financial benefits include improving the efficiency of processes quality and inspection of achieving the enterprise's objectives and objectives at lower management levels
- 30 % believe that it will result in work productivity growth
- 28 % revealing deviations by means of measureable indicators
- 27 % stated compliance of all types of plans with objectives
- 7 % could not respond
- 1 % believe that it has no non-financial benefit

Other questions focused on benefits or barriers of controlling implementation in an enterprise from the point of three internal interest groups.

From the point of employees the biggest barriers of controlling implementation in an enterprise are the following factors:

- 21 % of employees are not afraid of controlling implementation
- 18 % are afraid that they will be excessively checked
- 16 % of employees worries that they will be under scrutiny
- 12 % are afraid they would not meet the standards
- 10 % are afraid of deterioration of relations at the working place
- 9 % are afraid of losing their job
- 7 % see the deterioration of an enterprise culture as the barrier
- 6 % worry about wage decrease
- 3 % see the arrival of new employees to the enterprise and further education as the barrier
- 2 % worry they will not be able to do their new duties
- 2 % could not respond

Enterprise managers see the following most important barriers emerging in the process of controlling implementation in an enterprise:

- 13 % of managers are not afraid of controlling implementation at all
- 12 % worry that controlling will not be adopted by employees
- 8 % see the conflict between a manager and controller as a barrier
- 7 % are worried they will be excessively checked
- 5 % see a sabotage of the tool by the employees and worries about losing their position in an enterprise as a barrier
- 3 % worry they will not meet the determined standards, they will earn less and also they will not be respected by employees as superiors
- 3 % could not respond.

Enterprise owners see the following factors as the most important barriers in the process of controlling implementation:

- for 3 % of owners the most important barrier is the worry that the financial resources will be uselessly spent on controlling implementation,
- 2 % stated not adopting the tool by the employees as the most important barrier
- 2 % of owners have no worries
- 1 % of owners see conflicts between a manager and controller, chaos in enterprise

management, the tool sabotage by the employees and worries that the implementation will not have expected benefits as the barriers.

After summarising the questionnaire-based research, the following conclusions were made.

The sample of medium-sized enterprises was divided according to the purpose of their business in a ratio of 52 % production companies, and 48 % non-production companies. As the most important financial benefits of controlling implementation in an enterprise they see the profit growth and improvement of enterprise's financial plans and their fulfilment, which corresponds to the theory by *Sedliačiková and Volčko (2012)*. According to the respondents, the main non-financial benefit of controlling implementation in an enterprise is the improvement of performed processes with the effect of costs reduction, more transparent information supporting managerial decisions, improving the processes quality efficiency and checking of achieving the enterprise objectives as presented by *Jung (2007)* and *Eschenbach et al.(2004)*.

According to *Horváth (2003)* the enterprise controlling implementation is influenced by external and internal environment of the enterprise. The internal environment of the enterprise is represented by three interest groups: employees, managers and enterprise owners. Majority of respondents from all three interest groups is not afraid of controlling implementation in an enterprise. However, 18 % of employees are afraid they will be checked excessively just like 7 % of enterprise managers. 16 % of employees are worried about being under scrutiny, 12% of managers are worried that controlling will not be adopted by employees, 3 % of enterprise owners see the useless spending of financial means as the biggest barrier of controlling implementation. Just this variety confirms the *Kosmider's* theory (1994) that controlling system is based on specific requirements and features of an enterprise.

3.2. Model of controlling implementation, championing and building in medium-sized enterprises

Following the analysis of secondary resources and results of questionnaire-based empirical research focusing on monetary and non-monetary benefits and barriers of controlling implementation in enterprises was prepared a framework model of controlling implementation and championing in medium enterprises. It shows that when implementing controlling in medium enterprises it is also needed to consider the impact of psychological aspects on individual interest groups and highlight its financial and non-financial benefits and potential barriers, so that the individual interest groups adopt this tool in an enterprise more easily. The model represents a general procedure of controlling implementation in an enterprise and it may be modified according to specific requirements.

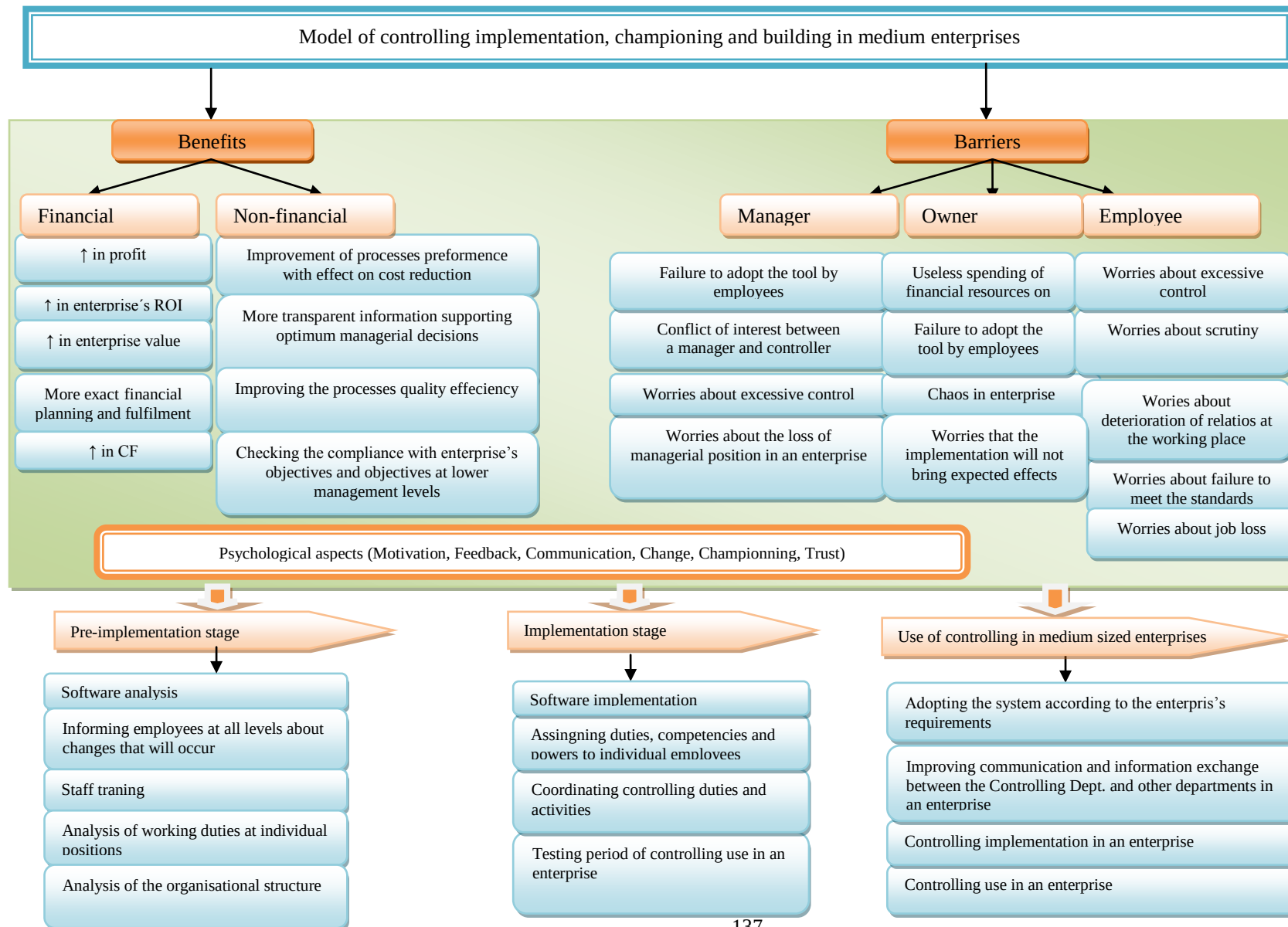
The model itself has two parts, the first one focuses on financial and non-financial benefits, barriers occurring in the process of controlling implementation in an enterprise from the point of individual internal interest groups which are managers, owners and employees and psychological aspects having impact on controlling implementation in an enterprise. The other part of the model focuses on controlling implementation in an enterprise, which has three phases, namely pre-implementation, implementation and use. According to *Sedliačiková et al.(2015)* the financial benefits of controlling implementation, championing and building in medium enterprises include mainly the growth of profit, enterprise's ROI growth, increased enterprise value, more accurate financial plans and their fulfilment and cash flow growth. *Havlíček (2016)* and *Ratanova et al. (2011)* believe that the non-financial benefits of controlling implementation in medium enterprises include the improvement of processes performance with the effect on costs reduction, more transparent information supporting optimum managerial decisions, more efficient production, checking of achieving enterprise's objectives and objectives at lower management levels. As says *Sedliačiková (2011)* and *Janská (2017)* barriers arising from controlling implementation, championing and building in medium enterprises must be seen from the point of internal interest groups which are managers, owners and employees of an enterprise. When implementing controlling in an enterprise it is needed to consider also the impact of psychological aspects on individual internal interest groups. With the help of psychological aspects according to *Sedliačiková et al. (2015)* the enterprise may reduce or eliminate the worries of individual interest groups about controlling implementation, championing and building in an enterprise. The psychological aspects that should be considered include mainly motivation, feedback, communication, change, championing and trust.

The second part of the model is divided into three phases. Individual phases consist of activities that need to be performed so that the implementation is efficient and considers the benefits, barriers and impact of psychological aspects on internal interest groups. The first one is pre-implementation phase. Before controlling implementation in medium enterprises it is needed to perform several activities, so that the implementation itself is efficient and has the expected effect. The pre-implementation part included five activities started by software analyses. Before buying the suitable software, which is the most appropriate for the relevant enterprise, it is needed to analyse the softwares so that the enterprise chooses and buys the most appropriate one that will be used and will be suitable for its needs. Before controlling implementation in an enterprise, the managers should inform and explain to employees what tool has to be implemented in the enterprise and what effect it will have on individual parts of the enterprise. These activities belong to the next step of the pre-implementation phase. Based on *Huseinbasic (2016)*, *Kruml (2016)* and empirical research were proposed next steps – Staff training and Analysis of work duties. For the staff in an enterprise where controlling has to be implemented it is needed that the enterprise management trains them, so that they can use the tool and bring the required benefit for the enterprise. Management should analyse the work duties at individual positions which will help the management to obtain information about current employees and their capabilities and skills, so that they can evaluate who could work at controlling department. According to *Sedliačiková (2011)* if the analysis reveals that the enterprise does not have employees suitable for the controlling department, it is needed to consider using an external specialist. Presented by *Horvath & Partners (2004)* was full up last steps in first phase where is needed to analyse the organisational structure before controlling implementation so that the enterprise management could properly include controlling department in the enterprise.

With consideration on thoughts *Janská (2014)*, *Kruml (2016)*, *Sedliačiková, Volčko (2012)* and empirical research was assembled second phase of the model. The second phase is composed of four stages and generally speaking about controlling implementation. This phase is one of the most important stages of controlling championing. Within the implementation process it is needed to perform several activities necessary to achieve that the relevant tool provides the enterprise with the required results. One of basic activities in process of controlling implementation is software implementation. By proper controlling implementation the enterprise can gain a lot, whereas wrong steps at the beginning may have an adverse effect. In the next step management should assign the work duties, competencies and powers to individual employees. This activity is very important because of the fact that after the software implementation managers should assign individual duties, competences and powers to employees appointed in advance in pre-implementation stage. Improper assigning of duties, competencies and powers to employees could result in the fact that controlling implementation in an enterprise does not have the expected effect. Duties of every employee in charge of controlling implementation in an enterprise are clearly defined in the stage of coordinating duties and activities of controlling. At the end of second phase the enterprise has the possibility to try the tool before its implementation, tune it or solve arising issues immediately at the beginning and thus to acquire the use of the tool, so that during use of controlling the employees can fully use the tool and thus provide the enterprise with expected results.

Using knowledge of *Sedliačiková et al. (2015)*, *Horvath & partners (2004)* and *Scagnelli (2013)* was proposed last phase of the model. Controlling use phase represent situation when the enterprise and its employees are sufficiently ready to start using controlling. However, for the use to be efficient and providing the expected benefit it is needed to perform several tuning duties as well as adjusting the system according to enterprise's requirements, improving communication and information exchange between Controlling Department and other departments in an enterprise and controlling implementation in an enterprise. During the controlling implementation it is needed that especially psychological aspects having impact on this process are observed. In the implementation process the enterprise has to check whether all the settings are correctly done and whether is ready to fully use the tool. Last and very important point in this stage is controlling using in an enterprise. In this stage, the enterprise starts using controlling. It is very important for the enterprise not to forget to consider the psychological aspects of individual internal interest groups when using controlling. The impact is very important mainly when using the relevant tool in an enterprise because a positive impact of the factors will provide the enterprise with what it expected before its implementation.

Table 1 Model of controlling implementation, championing and building in medium enterprises



4. CONCLUSION

Controlling is the efficient tool of managing the enterprise's future combining several management and information subsystems the duty of which is the creation of basis for determining the enterprise's objectives, planning, checking the plan fulfilment, revealing of deviations, examination and proposal of measures. To reach all objectives was proposed model of controlling implementation, building and championing in medium enterprises with consideration on psychological aspects. Proposals comprised in the paper may be used as a basis of controlling implementation in medium-sized enterprises in Slovakia. It is needed to state that every enterprise is unique, so it will be needed for every enterprise to adjust certain measures.. The proposed model can be used in practice because the paper analyses and processes the results of a wide range of enterprises examined.

Acknowledgements

This paper has been written as a result of partial research within the following projects: VEGA MŠ SR No. 1/0010/17, No. 1/0934/16 and APVV-14-0506.

References

- Eschenbach, R. et al. 2004. *Controlling*. pp. 816.
- Foltínová, A. 2009. *Nákladový controlling*. IURA EDITION. pp.160.
- Havlíček, K. 2011. *Management & controlling*. EUPRESS. pp.210.
- Havlíček, K. 2016. *The Main Parameters of controlling an Small or Medium-Sized Enterprises*. Newton Coll AS.p 66-74.
- Huseinbasic, L. 2016. *The characteristics and dynamics of management controls in small and medium enterprises: Measuring performance according to employee stimulation*. International conference on economic and social studies (ICESoS). pp. 181-191.
- Horvath & Partners. 2004. *Nová koncepcie controllingu*. Profess Consulting. pp.288.
- Jánská, M., Celer, C., Žabochová, M. 2017. *Application of corporate controlling in the Czech Republic*. Scientific Papers of the University of Pardubice, Series D: Faculty of Economics and Administration 24(40), pp. 61-70.
- Kosmider, A. 1994. *Controlling im Mittelstand*. 2. Auflage. Stuttgart.
- Kruml, L., Cincalová, S. 2016. *Use of Controlling in business practice – EMPRIICAL SURVEY*. Proceedings of 8th Annual International Scientific Competition. pp.208-218.
- Lopez, L. 2015. *Management Accounting in Small and Medium-Sized Enterprises: Current Knowledge and Avenues for Further Research*. pp. 81-119.
- Potkány, M., Sedliačiková, M. et al. 2011. *Moderné trendy v riadení malých a stredných podnikov*. Technická univerzita vo Zvolene. pp. 79.
- Ratanova, I., Zhukovskaya. C.2011. *Controlling as a tool for increasing the efficiency of Business management of Smal and Mediumm-sized Enterprises in Latvia*. NEW SOCIO-ECONOMIC CHALLENGES OF DEVELOPMENT IN EUROPE. pp. 233-239.
- Scagnelli, SD. et al. 2013. *How SMEs dislose their Sustanability performance which variables influence the choice of reporting guidelines?*. Accounting and Control for Sustainability. pp. 77-114.
- Sedliačiková, M. 2011. *Implementácia kontroingu vo vybranom podniku*. Vedecký časopis Ekonomickej fakulty UMB v Banskej Bystrici. p.45-53.
- Sedliačiková, M. 2015. *Finančný kontroling v malých a stradných podnikoch – Teória a prax*. Technická univerzita vo Zvolene. pp.115.
- Sedliačiková, M., Vaček, V., Sopková, E., 2015. *How Slovak small and medium enterprises perceive financial controlling*. pp. 82-85.
- Šatánová, A., Potkány, M. 2004. *Controlling – moderný nástroj riadenia podniku*. Ekonomický časopis. Pp. 148-165.
- Volčko, I., 2005. *Finančný kontroling*. Technická univerzita vo Zvolene. pp. 105.
- Wagner, J. 2017. *Multiple Import Sourcing. First Evidence for German Enterprises from Manufacturing Industries*. Open Economies Review pp. 1-11.

THE MARKET ORIENTATION AND BUSINESS PERFORMANCE RELATIONSHIP: STUDY OF FOODSTUFF BUSINESSES AWARDED BY QUALITY MARK

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ABSTRACT

The concept of market orientation represents a significant determinant of marketing strategy development. The implementation of this concept leads to achieving competitive advantage and improved performance. The aim of this research is to examine the market orientation and business performance relationship of two types of food producers in Slovakia. In our paper, we examine the relationship between market orientation and business performance of food producers who hold the quality mark ZNAČKA KVALITY SK. We also compare the intensity of this relationship with the relationship between market orientation and business performance of food producers who do not hold the quality mark. ZNAČKA KVALITY SK is a certificate awarded by Ministry of Agriculture and Rural Development of the Slovak Republic. In this paper, we would like to find out the difference between the market orientation and business performance relationship of two types of businesses. We assume that leaders in food quality awarded by quality mark ZNAČKA KVALITY SK indicate stronger relationship between market orientation and business performance. In this research were used statistical tests. These results represent part of the findings of complex research focused on investigating the relationship between market orientation and business performance.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: Market orientation. Market-oriented behaviour. Foodstuff industry. Quality mark. Food quality.

1. INTRODUCTION

In increasingly intensive competitive business environment, the market-oriented behaviour could become the competitive advantage for all kinds of businesses. The purpose of this paper is to compare the market orientation and business performance relationship of two types of food producers in Slovakia. We would like to find out the difference between the market orientation and business performance relationship of food producers who hold the quality mark ZNAČKA KVALITY SK and food producers who do not. We assume that leaders in food quality awarded by quality mark ZNAČKA KVALITY SK would indicate stronger relationship between market orientation and business performance. We measured the market orientation of businesses using the MARKOR scale. We used statistical t-tests, non-parametric Mann-Whitney test, and Spearman correlation coefficient for data processing. The results of this research could be used by food producers during the implementation of market orientation concept.

1.1 Market orientation and business performance

The concept of market orientation is a centre of studies for more than 30 years (Parasuraman, 1983; Naidu and Narayana, 1991, Kohli and Jaworski, 1993, Caruana 1999). The positive impact of market orientation on business performance is the subject of many researches (Day and Nedungadi, 1994; Ngai and Ellis, 1998; Deshpandé and Farley, 1999). Avlonitis and Gounaris (1997, p. 385) used the definition of Hooley, Lynch, and Shepherd (1990) who define market orientation as a set of beliefs that shapes particular attitudes and culture of business which was constructed.

Market orientation has been developed from two perspectives, which are market orientation as behaviour and market orientation as philosophy (Cadogan and Diamantopoulos, 1995). Kohli and

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Jaworski (1990, p. 6) defined market orientation from behavioural perspective as an “organization-wide generation of market intelligence, pertaining to current and future customer needs, dissemination of the intelligence across departments, and organization-wide responsiveness to it”. According to the Kohli et al. (1993) who understand the market intelligence generation as the set of consumer needs and their evaluation, added with the effects that influence evolution and improvement of those needs (Dong et al., 2013). Extension of market intelligence means fast information transport and integration of each part of business unit into the broader conversation about competitors and customers, what is the most efficient way how to boost the value of obtained information, in addition market intelligence perceptiveness is understood as employment of all actions tied together with market intelligence, while planning the whole supply in accordance with the wants and needs of their customers (Varela and Río, 2003). Narver and Slater’s original research determines market orientation as “organizational culture that most effectively and efficiently creates the necessary behaviours for the creation of superior value for buyers and, thus, continuous superior performance for the business” from cultural perspective (1990, p. 21). Regarding to the cultural perspective, we should point out on its three elements – competitor orientation, internal functional coordination and customer orientation (Ngai and Ellis, 1998). Moreover, Gadimi et al. (2013, p. 3495) sums up all opinions to customer orientation and come to the conclusion that “it definitely involves a focus on customers by identifying, analysing, understanding, and answering their needs, demands, and expectations, and generating, creating and increasing their satisfaction, acceptance and reliability.” Narver and Slater (1990) understand competitor orientation as insight to rivals short term weaknesses and strengths and also knowledge about their future plans and competences. Secondly, when company reaches environment in which individual functional departments are willing to participate and cooperate together in order to accomplish given objectives we can talk about internal functional coordination, which grows to better performance, competitive advantage and higher effectiveness (Woodside, 2005; In: Gadimi et al., 2013).

The market orientation is examined individually only occasionally. Most often, researchers investigate this concept and its impact on business performance. Business performance represents the ability of the company to reach required outcomes in measurable units (Lesáková, 2004). Business performance is measured through the key performance indicators, which are constructed to evaluate current development of business in comparison to its aims (Kabát et al., 2013). Several authors (Rajnoha et al., 2013; Kabát et al., 2013; Marinič, 2008) agreed that approaches to business performance evaluation are based on two sets of indicators – financial and non-financial. Usage of financial indicators represents the most common way how to evaluate the business performance (Marinič, 2008). On the other hand, theory and practice assign an increasing importance to non-financial indicators.

1.2 Market orientation and quality context in foodstuff industry

Research focused on the linkage between market orientation and quality is not extended in scientific literature. Lam et al. (2012), who examined TQM, market orientation, and service quality, stated that both, market orientation and TQM, are plainly fixed on satisfying customer needs, so there is a possibility of linkage between them. Raju and Lonial (2001) identify the market orientation and quality context as two major factors that affect business performance. Ramayah et al. (2011) also consider market orientation and service quality as determinants of performance. In our research, we analyse the market orientation and quality in the conditions of foodstuff industry. Slovak foodstuff industry is a part of European business environment. Gellynck et al. (2012) summarize two current characteristics of European agro-food market. The first one is globalization, which caused that increasing competition from transnational corporation and trade liberalization led to the decrease of market protection. The second characteristic, which was strengthen over the past ten years, is that consumers are increasingly interested in quality of food in the terms of health, safety, and the country of origin. This phenomenon is typical also for Slovak consumers, as described Musová (2013) who investigated that the majority of Slovak consumer would like to be better informed about the food products from Slovakia. Also Táborecká-Petrovičová, Ďado, Zajková (2014) examined the ethnocentric behaviour of consumers and claimed that there is close relationship between ethnocentric

behaviour and country of origin. From this point of view, quality mark ZNAČKA KVALITY SK represents a guarantee of quality and origin of the Slovak food products.

ZNAČKA KVALITY SK represents a tool of Ministry of Agriculture and Rural Development of the Slovak Republic for promotion of domestic quality products and thus strengthening their competitiveness in the domestic market. It is used as a certificate of quality for food products of Slovak producers. This certificate was put into practice in 2004 when the programme of a national quality mark for Slovak agricultural products and foodstuffs was established. This programme was established in order to promote domestic quality products and thus strengthen their competitiveness in the domestic market, and also to differentiate domestic products from foreign products and provide to customers better orientation in food products. This quality mark represent a guarantee for the consumer that product was produced in compliance with requirements of legislation of Slovak republic and legislation of the European Union, while the determined technological process was followed during the production. The businesses who want to hold the certificate “ZNAČKA KVALITY SK” has to accomplish several conditions:

- products have to be produced from domestic raw material,
- businesses have to maintain the declared technology process parameters of quality and food safety,
- at the same time required the declaration of raw materials, i.e. from the total raw material consumption by at least 75% must be consumption of domestic raw materials,
- all stages of the production process must take place in the Slovak Republic (Ministry of Agriculture and Rural Development of the Slovak Republic, 2017).

The quality mark is awarded by expert commission which is appointed by the Minister of Agriculture and Rural Development of the Slovak Republic.



Figure 1 Logo of quality mark ZNAČKA KVALITY SK

Source: Ministry of Agriculture and Rural Development of the Slovak Republic

2. MATERIAL AND METHODS

In previous research (Šályová et al., 2015) was examined and confirmed positive and direct relationship between market orientation and business performance of foodstuff businesses in Slovakia. We used the data from previous research, while we extracted food manufacturing businesses as research sample. We conducted the research on the research sample of Slovak food producers. 33 food producers participated in our research. 45.45 % of them (i.e. 15) hold the quality mark ZNAČKA KVALITY SK and 54.55 % of food producers (i.e. 18) do not hold the quality mark ZNAČKA KVALITY SK. The research sample consists of companies of all sizes with the different number of employees. The method of data gathering was questioning. The technique of data gathering was the online questionnaire, which was sent via email. For measuring market orientation we used MARKOR scale (Kohli and Jaworski, 1993). The original 32-item MARKOR scale was reduced to 20-item scale according to the results from pilot questioning and feedback from food producers. We followed authors (Pitt et al., 1996; Puledran et al., 2003; Hooley et al., 2003) who used 7-degree Likert scale. In our research, we would like to find out the difference between the market orientation and business performance relationship of food producers who hold the quality mark ZNAČKA KVALITY SK and food producers who do not. We assume that leaders in food quality awarded by quality mark ZNAČKA KVALITY SK indicate stronger relationship between market orientation and business performance. Thus, we have formulated the following research questions:

RQ₁: Is there relationship between market orientation and business performance of food producers?

RQ₂: Is the market orientation and business performance relationship of holders of quality mark ZNAČKA KVALITY SK stronger than of non-holders?

We provided statistical verification in order to answer research question. We used statistical t-tests, non-parametric Mann-Whitney test, and Spearman correlation coefficient for data processing in statistical programme SPSS 19.0. We used the significance level $\alpha = 0.05$.

3. RESULTS AND DISCUSSION

In our research, we were interested in and we examined the differences in the level of market orientation and business performance indicators of two groups of businesses (holders and non-holders of quality mark ZNAČKA KVALITY SK). Business performance was measured through the three financial indicators and three non-financial indicators. As financial indicators we chose the sales, profit, and ROA (return on assets). Employees' commitment, customer satisfaction, and overall performance were examined as non-financial indicators. Firstly, we examined the statistical difference in the level of individual variables. We provided Kolmogorov-Smirnov and Shapiro-Wilk tests of normality. According to these tests, we found out that only variables market orientation, employees' commitment, and customer satisfaction are normally distributed. Thus, we verified statistical significance through the t-test for these variables. In following table 1 are shown results of t-test.

Table 1 Independent samples test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
MO	Equal variances assumed	2,077	,160	1,211	31	,235	,400413	,330644	-,273941	1,074766
	Equal variances not assumed			1,252	30,094	,220	,400413	,319916	-,252858	1,053683
EMPCOM	Equal variances assumed	5,799	,022	-,170	31	,866	-,0746	,4393	-,9706	,8214
	Equal variances not assumed			-,179	27,287	,860	-,0746	,4179	-,9317	,7825
CUSTSAT	Equal variances assumed	2,965	,095	,771	31	,447	,2460	,3191	-,4048	,8969
	Equal variances not assumed			,802	29,243	,429	,2460	,3068	-,3813	,8733

Source: SPSS output.

According to the t-test, there is not statistically significant difference in the level of market orientation (MO, Sig. = 0.220), employees' commitment (EMPCOM, Sig. = 0.860), and customer satisfaction (CUSTSAT, Sig. = 0.429). Continuously, we tested statistical difference in the level of overall performance, sales, profit, and ROA. Table 2 presents the results of Mann-Whitney test.

Table 2 Mann-Whitney test

	OVERPER	SALES	PROFIT	ROA
Mann-Whitney U	124,000	108,000	118,000	94,000
Wilcoxon W	229,000	213,000	223,000	199,000
Z	-,082	-,717	-,320	-1,266
Asymp. Sig. (2-tailed)	,935	,473	,749	,205
Exact Sig. [2*(1-tailed Sig.)]	,955 ^b	,512 ^b	,779 ^b	,235 ^b

a. Grouping Variable: značka; b. Not corrected for ties.

Source: SPSS output.

As results from the table 2, there is not statistically significant difference in the level of overall performance (OVERPER, Sig. = 0.995), sales (SALES, Sig. = 0.512), profit (PROFIT, Sig. = 0.779), and ROA (Sig. = 0.235) of businesses who are holders of ZNAČKA KVALITY SK and who are non-holders of ZNAČKA KVALITY SK.

Next, we examined the market orientation and business performance relationship of the research sample of food producers. The market orientation (MO) is independent variable. As results from table 3 there is statistically significant relationship between market orientation (MO) and employees commitment (EMPCOM, Sig. = 0.010), customer satisfaction (CUSTSAT, Sig. = 0.017), overall performance (OVERPER, Sig. = 0.008), sales (SALES, Sig. = 0.005), profit (PROFIT, Sig. = 0.004), and ROA (Sig. = 0.001) at significance level $\alpha = 0.05$. We used the Spearman correlation coefficient for investigation the strength of relationship between market orientation and individual financial and non-financial indicators. Thus, we can positively answer the research question RQ₁, because there is statistically significant relationship between market orientation and business performance. There is medium strong positive relationship between market orientation and all four variables. Increase of the level of market orientation causes the increase in the level of business performance indicators.

Table 3 Market orientation and business performance relationship

			MO	EMPCOM	CUSTSAT	OVERPER	SALES	PROFIT	ROA
Spearman's rho	MO	Correlation Coefficient	1,000	,441*	,412*	,463**	,481**	,490**	,573**
		Sig. (2-tailed)	.	,010	,017	,008	,005	,004	,001
		N	33	33	33	32	32	32	32

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Source: SPSS output.

Next, we divided research sample into two groups. The first group consists of non-holders and the second group of holders of quality mark ZNAČKA KVALITY SK. Table 4 present the results of statistical tests. Surprisingly, there is no statistically significant relationship between market orientation and non-financial indicators – employees' commitment, customer satisfaction, and overall performance of holders of quality mark ZNAČKA KVALITY SK. It could be probably caused by small range of research sample. On the other hand, the values of correlation coefficients of relationship between MO and SALES (0.562), PROFIT (0.559), and ROA (0.725) of holders of quality mark are higher than of non-holders. It means that we can answer the research question RQ₂. Examined relationship is stronger in the terms of financial indicators – sales, profit and ROA.

Table 4 Comparison of strength of the MO – BP relationship

Table 4. Comparison of Strength of the MO – ZK SK Relationship										
	ZK SK			MO	EMPCOM	CUSTSAT	OVERPER	SALES	PROFIT	ROA
Spearman's rho	0	MO	Correlation Coefficient	1,000	,526*	,481*	,486*	,494*	,478*	,507*
			Sig. (2-tailed)	.	,025	,043	,041	,037	,045	,032
			N	18	18	18	18	18	18	18
	1	MO	Correlation Coefficient	1,000	,395	,401	,453	,562*	,559*	,725**
			Sig. (2-tailed)	.	,145	,139	,104	,036	,038	,003
			N	15	15	15	14	14	14	14

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

Source: SPSS output.

4. CONCLUSION

The aim of this research was to examine the market orientation and business performance relationship of two types of food producers in Slovakia. Firstly, we were interested in the statistical difference between the level of market orientation and business performance indicators of two examined groups of businesses. We found out that there is not statistical difference in individual characteristics. This fact might be caused by small range of research sample. Next, we set the following research question *RQ₁: Is there relationship between market orientation and business performance of food producers?* According to our results we can conclude that there is positive and direct relationship between market orientation and all financial and non-financial indicators. The second research question was *RQ₂: Is the market orientation and business performance relationship of holders of quality mark ZNAČKA KVALITY SK stronger than of non-holders?* According to the research results, we can conclude that the relationship between market orientation and non-financial indicators of holders of quality mark is not stronger than of non-holders. Contrary, the relationship between market orientation and financial indicators of holders of quality mark is stronger than of non-holders. Following the results, it seems that ZNAČKA KVALITY SK could affect the financial performance. Thus, we propose some managerial implications for developing market-oriented behaviour. The market orientation consists of three main activities connected with costumers, competitors and market, which are gaining information, distributing information and reacting to information. Firstly, it is important to regularly meet with the customers and investigate their needs and wants. Businesses should realize their own market research in order to gain useful information. The next important activity is quickly revealing the changes in customers' preferences and market environment. In the terms of quality, businesses should use the assessment of the products' quality from the end-users. Secondly, it is necessary to distribute gained information within the business. It means that information about customers, competitors, and market should be distributed within the all departments in the company. Realization of meetings among departments in order to discuss changes in market and actual trends is further important activity. Thirdly, after generation and dissemination the market information business should appropriately react to the information. The requirements of customers have to be implemented into the products or services. Indeed, business should use the information for creating the value for customers, because in the other cases all activities would become ineffective. Marketing specialists in business should flexibly respond to the competitors' marketing campaigns and be prepared to adapt their own marketing plans according to the situation in the market. Likewise is necessary to reflect market situation and react adequately and in time on current market trends. Especially, in the terms of holders of ZNAČKA KVALITY SK, these activities might reflect in the financial indicators of business performance. This research is very specific to the Slovak business conditions and economics. In marketing literature, we found studies focused on the examination of market orientation of foodstuff businesses (Nwokah, 2008; Gellynck et al., 2012) and also several studies investigating the connection between market orientation and the quality. For example, Ramayah et al. (2011) investigated the mediating role of service quality in relationship between market orientation and organizational performance. The results proved only partial mediating

role of service quality in examined relationship. Raju and Lonial (2001) investigated market orientation and quality context within the hospital industry. The results show that both market orientation and quality context have significant effect on business performance. However, described researches examined the market orientation and quality from the difference point of view.

Our research has several limitations. The main limitation of our research is the size of research sample, which were only 33 foodstuff businesses. In future research we could ask more businesses. Examination of market orientation was realized from the behavioural approach through the MARKOR scale developed by Kohli and Jaworski (1993). There is also possibility to use MKTOR scale which refers to the cultural approach. The next limitation could be the method of obtaining the values of financial indicators of business performance. We used the subjective (self-reported) measures which could be affected by human element. We have decided to use these subjective measures similarly like the other authors (Pitt et al., 1996; Puledran et al., 2003; Hooley et al., 2003). Hooley et al. (2003, p. 96) appoints several reasons why this method is widely used. The first reason is that to obtain this kind of information from wide range of businesses is complicated, because managers are usually very unwilling to answer this kind of questions. The second reason is that achieving of absolute values is irrelevant, because it is impossible to compare them between businesses of different characteristics (In: Šályová, et al., 2015). Thus, in further research it would be possible to use also objective measures.

Acknowledgements

This paper is funded from the resources of VEGA project 1/0686/16, "Marketing Orientation of Businesses as a Tool of Increasing Business Competitiveness and Performance", duration of the project from 1.1.2016 to 31.12.2018, chief researcher: doc. Ing. Janka Tábořecká-Petrovičová, PhD.

References

- Abiodun, S. T., Mahmood, R. (2015). Fostering Export Performance in SMEs : The Roles of Export Market Orientation and Learning Orientation in Turbulent Environment. *International Journal of Economic Perspectives*, 9(2). Available at: <<http://search.proquest.com.ezproxy.umb.sk:8080/docview/1776143791?accountid=17223>>.
- Avlonitis, G. J., Gounaris, S. P. (1997). Marketing Orientation and Company Performance: Industrial vs. Consumer Goods Companies. *Industrial Marketing Management*, 26(5), 385-402. <http://dx.doi.org/10.1108/EUM0000000005779>.
- Bodlaj, M., Rojšek, I. (2010). The market orientation of Slovenian companies : two-group comparisons. *Economic and Business Review for Central and South-Eastern Europe* , 12(2), 89-108. Retrieved form: <http://www.ebrjournal.net/ojs/index.php/eb/article/view/54>.
- Cadogan, J. W., Diamantopoulos, A. (1995). Narver and Slater, Kohli and Jaworski and the market orientation construct: integration and internationalization. *Journal of Strategic Marketing*, 30(4), 41-60. <http://dx.doi.org/10.1080/09652549500000003>.
- Caruana, A. 1999. An Assessment of the Dimensions and the Stability of Items in the MARKOR Scale. In *Marketing Intelligence & Planning*, Vol. 17, No. 5, pp. 248-253.
- Day, G., Nedungadi, P. 1994. Managerial Representations of Competitive Advantage. In *Journal of Marketing*, 58 (April), pp. 31-44.
- Deshpandé, R., Farley, J. U. (1999). Executive Insights: Corporate Culture and Market Orientation: Comparing Indian and Japanese Firms. *Journal of International Marketing*, 7(4), pp.111-127.
- Dong, X., Hinsch, C. A., Zou, S., Fu, H. (2013). The effect of market orientation dimensions on multinational SBU's strategic performance. *International Marketing Review* , 30(6), 591-616. DOI 10.1108/IMR-12-2011-0284.
- Gadimi, D., Hasanzadeh, M., Ajirloo, M. B. (2013), Relationship between Market Orientation Dimensions and Business Performance Dimensions. *International Journal of Management Research and Review*, 3(9), 3493-3500. <http://search.proquest.com/openview/43d75ca0264ed7bc8b823575e3be29bb/1?pq-origsite=gscholar>.
- Gellynck, X., Benterle, A., Kühne, B., Carraresi, L., Stranieri, S. (2012). Market orientation and marketing management of traditional food producers in the EU. *British Food Journal*, 114(4), 481-499. DOI 10.1108/00070701211219513.
- Hooley, G., Fahy, J., Greenley, G., Beracs, J., Fonfara, K., Snoj, B. (2003), Market Orientation in the Service Sector of the Transition Economies of the Central Europe. *European Journal of Marketing*, 37(1/2), 86-106. Available at: <http://dx.doi.org/10.1108/03090560310453975>.
- Kabát, L., Sobeková Majková, M., Vincúrová, Z. (2013). Hodnotenie podniku a analýza jeho finančného zdravia, Iura Edition, Bratislava.
- Kohli, A. K., Jaworski, B. J. (1990). Market Orientation: The Construct, Propositions, and Managerial Implications. *Journal of Marketing*, 54(2), 1-18.

- Kohli, A. K., Jaworski, B. J., & Kumar, B. (1993). MARKOR: A Measure of Market Orientation. *Journal of Marketing Research*, 30 (2), 467-771. DOI: 10.2307/3172691
- Lam, S.-Y., Lee, V.-H., Ooi, K.-B., Phusavat, K. (2012). A structural equation model of TQM, market orientation and service quality. *Managing service quality*, 22(3), 289-303. DOI 10.1108/09604521211230996.
- Lesáková, Ľ. (2004). *Metódy hodnotenia výkonnosti malých a stredných podnikov*, Univerzita Mateja Bela, Ekonomická fakulta, Banská Bystrica
- Marinič, P. (2008). *Plánování a tvorba hodnoty firmy*, Grada, Praha.
- Ministry of Agriculture and Rural Development of the Slovak Republic, 2017, <http://www.mpsr.sk/en/index.php?navID=28>.
- Musová, Z. (2013). *Spoločenská zodpovednosť v marketingovej praxi podnikov*. Banská Bystrica : Univerzita Mateja Bela, Ekonomická fakulta.
- Naidu, G.M., Narayana, C. L. 1991. How Marketing Oriented Are Hospitals in a Declining Market? In *Journal of Health Care Marketing*, 11 (March). pp. 23-30.
- Narver, J. C., Slater, S. F. (1990). The Effect of a Market Orientation on Business Profitability. *Journal of Marketing*, 54(4), 20-35. Available at: <http://www.jstor.org/stable/1251757>.
- Ngai, J. C. H., Ellis, P. (1998), Market Orientation and Business Performance: Some Evidence From Hong Kong. *International Marketing Review*, 15(2), 119-139. <http://dx.doi.org/10.1108/02651339810212502>.
- Nwokah, N. G., (2008). Strategic market orientation and business performance. The study of food and beverages organisations in Nigeria. *European Journal of Marketing*, 42(3/4), 279-286. DOI 10.1108/03090560810852922.
- Parasuraman, A. 1983. Marketing-Orientation of Industrial vs. Consumer Goods Firms, In *Akron Business And Economic Review*, 14(Summer), pp. 41-44.
- Piercy, N. (1992), *Market Led Strategic Change*, Butterworth-Heinemann, Oxford.
- Pitt, L., Caruana, A., Berthon, P. R. (1996), Market Orientation and Business Performance: Some European Evidence. *International Marketing Review*, 13(1), 5-18. Available at: <http://dx.doi.org/10.1108/02651339610111317>.
- Pulendran, S., Speed, R., Widing II, R. E. (2003), Marketing Planning, Market Orientation and Business Performance. *European Journal of Marketing*, 37(3/4), 476-497. Available at: <http://dx.doi.org/10.1108/03090560310459050>.
- Rajnoha, R. et al. 2013. *Meranie a riadenie výkonnosti podnikov*. Technická univerzita vo Zvolene, Zvolen.
- Raju, P.S., Lonial, S.C. (2001). The Impact of Quality Context and Market Orientation on Organizational Performance in a Service Environment. *Journal of Service Research*, 4(2), 140-154.
- Ramayah, T., Samat, N., Lo, M. (2011). Market orientation, service quality and organizational performance in service organizations in Malaysia. *Asia-Pacific Journal of Business Administration*, 3(1), 8-27. DOI 10.1108/17574321111116379.
- Šályová, S., Táborecká-Petrovičová, J., Daďo, J., & Nedelová, G. (2015). Effect of Marketing Orientation on Business Performance: A Study from Slovak Foodstuff Industry. *Procedia Economics and Finance* 34, (pp. 622-629). doi:10.1016/S2212-5671(15)01677-9.
- Táborecká-Petrovičová, Dado, Zajková (2014, October 30-31). *Aspekty spotrebiteľského etnocentrizmu v procese tvorby marketingovej stratégie*. Zborník príspevkov z medzinárodnej vedeckej konferencie Globalizácia a fenomén národnej kultúry konanej v Podhájskej, pp. 271-286. Retrieved from: <http://www.eeda.sk/default/publikacie/zborniky/zbornik-globalizacia-2014.pdf>.
- Varela, J. A., & Río, M. (2003), Market Orientation Behavior : An Empirical Investigation Using MARKOR. *Marketing Intelligence & Planning*, 21 (1), 6-15. doi: 10.1108/02634500310458108.

UTILIZATION OF LIFE CYCLE COSTING IN WOOD INDUSTRY

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ABSTRACT

The Life Cycle Costing is one of the modern methods, which allow better cost management, thus positively influencing business management. The aim of this paper is to highlight the possibilities of using Life Cycle Costing (LCC) in the wood industry, to analyze the opportunities and possibilities of the method and to present the results of the application in a particular enterprise. Part of the contribution is an analysis of the positives and negatives of the method and modification of the method in the selected company. The consistent identification of the processes running in the company makes possible to track costs and optimize their amount. Cost management is one of the competitive advantages that entrepreneurs dispose. The main results of the contribution include: summarization of knowledge from the subject area, presentation of the example of LCC implementation in pricing, analysis of relation between cost management and business performance focusing on the procedural character of the production activity.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: cost management, life cycle costing, competitiveness.

1. INTRODUCTION

Up-to-date trends in the use of modern cost management methods in the direction of increasing the competitiveness and performance of entrepreneurial subjects are an appropriate management tool to strengthen the position of the enterprise on the global market and to promote its sustainable development. The Life Cycle Costing is one of the modern methods, which allow better cost management, thus positively influencing business management.

Cost management is currently considered as an important area of financial management of business subjects. Costs which are present (directly / indirectly) in all fields of corporate activities provide optimal area for the identification of hard imitable competitive advantages (Kajanová, 2016).

Many entrepreneurial subjects lack experience and expertise in the field of modern cost management methods. Therefore, it is necessary to find a real, relatively simple and effective way of transferring new and important knowledge to the normal business environment in the Slovak Republic.

Modern methods of cost management solve the individual needs of business entities, for example, when dealing with tasks:

- costing and cost management,
- determining returns and performance indicators,
- a new information database on the causes and cost of the costs,
- display cost flows through business processes and activities,
- In-house pricing,
- creating plans and budgets,
- an analysis of return on equity investments, (discussed by Bondareva and Zatrochová, 2011),
- other problematic pitfalls encountered by businesses within an existing business environment.

It is necessary to ensure the effective spending of economic resources in all sub-activities leading to high quality and beneficial corporate performance with satisfied and trustworthy consumer. This implies the importance of the cost category and the need for systematic attention to its theoretical study and practical application.

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The aim of this paper is to analyze entrepreneurs' awareness of modern cost management methods, summarize basic knowledge of one of the modern cost management methods (Life Cycle Costing method), and present the possibilities of using this method in the wood processing industry.

The partial objectives of the paper include:

- to analyse current state of cost management by modern methods,
- to present the results of research focused on the willingness to implement modern methods of cost management in corporate management in selected entrepreneurial subjects in Slovakia,
- to formulate options of using Life Cycle Costing method in the wood industry,
- to point out the basic findings of Life Cycle Costing,
- to identify advantages and disadvantages of this method, and
- to present current knowledge on a specific example of economic practice.

2. MATERIAL AND METHODS

As Foltínová (2011) proved, the complexity of the real costs in the real process highlights the fact this is the flow variable related to the operations, business activity carried out within a specific time: it can be the overall activity of the enterprise, sub-activity or elementary operation (Foltínová, 2011). The importance of this category is in practice associated with economy, efficiency, achievement of the planned results and the objectives set of business entities and creation of competitive advantages.

Costs expressed in monetary terms of personal and materialized labour are an important part of the economic objectives of the company, which seeks to achieve the required profit level to ensure the financial stability of the company (Ölvecká, 2010) or (Plchová, 2013).

According to Hansen and Mowen, effectiveness and performance of SMEs depends on their ability to manage their internal processes, and to accept and take into consideration external factors affecting their activities and results. The efficiency capture the conversion efficiency of embedded resource - the cost of benefit or the effect, so the ratio between inputs and outputs of specific entrepreneurial activity in respect of their quantity and quality. "A critical indicator of efficiency is, however, costs" (Hansen and Mowen, 2009).

2.1 Modern methods of cost management in Slovak conditions

In the current business environment, the implementation and use of analysed methods of cost management importance especially at:

- a) efficiency improvement of corporate activities and processes,
- b) reducing costs,
- c) identification of reserves,
- d) process improvement,
- e) maintaining competitiveness,
- f) increasing overall profitability,
- g) increasing market share,
- h) increasing efficiency,
- i) acquisition the position of "cost leader".

Based on the results of a survey conducted among business subjects operating in Slovakia, which focused on identification of level of knowledge and use of traditional and modern methods of increasing the efficiency-based cost management we can conclude that Slovak business subjects, despite strong globalization influences and internationalization, remains faithful to the more traditional approach, such as the traditional calculation methods.

According to A. Lišková (2014), exactly the traditional calculation methods were identified among Slovak business subjects as most used - compared to other research method (Activity Based Costing, Target Costing, Life Cycle Costing) are used by almost half of respondents. The least known and used method of efficiency improvement is the life cycle method, which so far finds use only in 8% of Slovak businesses.

The positive result is, according to the survey, 84% of Slovak entities are addressed by increasing the efficiency and cost management, which represents the potential for the application of modern methods and approaches in the future. Half of the subjects rate their current level of effectiveness of cost management as average only. Three most common reasons of application of analysed methods designed to increase the effectiveness between interviewed Slovak business entities are necessity of cost reduction, effort to improve effectiveness of business processes and aiming to improve profitability which are identified in the survey, by more than 60% of respondents.

Often motivating factor of utilization above described approaches is referred the need to increase competitiveness, particularly at present dynamic global environment. Analysis methods preferences highlighted the fact, SMEs would prefer ABC method, followed by the Target Costing method, least interest businesses have manifested to implement the method of Life Cycle Costing (Lišková, 2014). Life Cycle Costing is less known method, but very useful.

2.2 Life Cycle Costing

The lifecycle method is considered as a strategic approach to cost management. In principle, it brings a new perspective on cost management and cost reduction possibilities. Unlike traditional calculations, it extends its focus from a specific defined period - the accounting period (month, year) over the entire life cycle of the product. The lifecycle method also takes into account the costs of R & D, the cost of the pre-production phase, the costs of after-sales service and the additional costs associated with the end of the production cycle.

At present, this method is at the spotlight mainly due to the shortening of product life cycles and the increase in pre-production costs (R&D) and the costs of termination of production. Exactly the lifecycle method gives the ability to make decisions about products, their costs and profitability from a life cycle perspective as an entity, allowing you to quantify the cost and revenue of the product from its design and planning to the end of its sales and the entire production cycle.

In spite of the use of this method at all stages of the life cycle, the most important part of the process takes on the pre-production stage of the life cycle when most of decisions are taken on the largest amount of costs (cost curve), and at the same time there is a possibility to greatly influence future costs - or to abandon it definitively (cost influence curve).

The implementation of the life cycle method is based on the identification of its basic elements. The first element is the life cycle duration, which is crucial in terms of the time horizon definition of the method implementation. It determines the product's life and how quickly it is replaced by a new one. The second element is the knowledge of sales volume in each phase of the life cycle, which is very difficult to determine in the pre-production phase because we cannot predict with certainty the development and changes of the environment. Another factor influencing the implementation is an assessment of the development of prices over the life cycle.

In this step, it is necessary to take into account the pricing strategy, but also a number of external factors such as demand, competition, consumer preferences or inflation which have a significant impact on price developments. An equally important factor is the quantification of the expected cost of the individual phases, which is closely linked to the creation of plans and budgets.

The life cycle costing method is a strategic cost controlling method, which unlike to traditional calculations expands its focus from one accounting period to the entire length of the product life cycle. Method life cycle costing thanks to this also considering the costs of research and development, pre-production phase costs, costs of sales service and the additional costs associated with the termination of the production cycle (Popesko, 2009).

Life cycle costing is a three-staged process. The first stage is life cost planning stage which includes planning LCC Analysis, Selecting and Developing LCC Model, applying LCC Model and finally recording and reviewing the LCC Results.

The Second Stage is Life Cost Analysis Preparation Stage followed by third stage Implementation and Monitoring Life Cost Analysis (Mohan, 2017). Life Cycle Costing process represents the figure1.

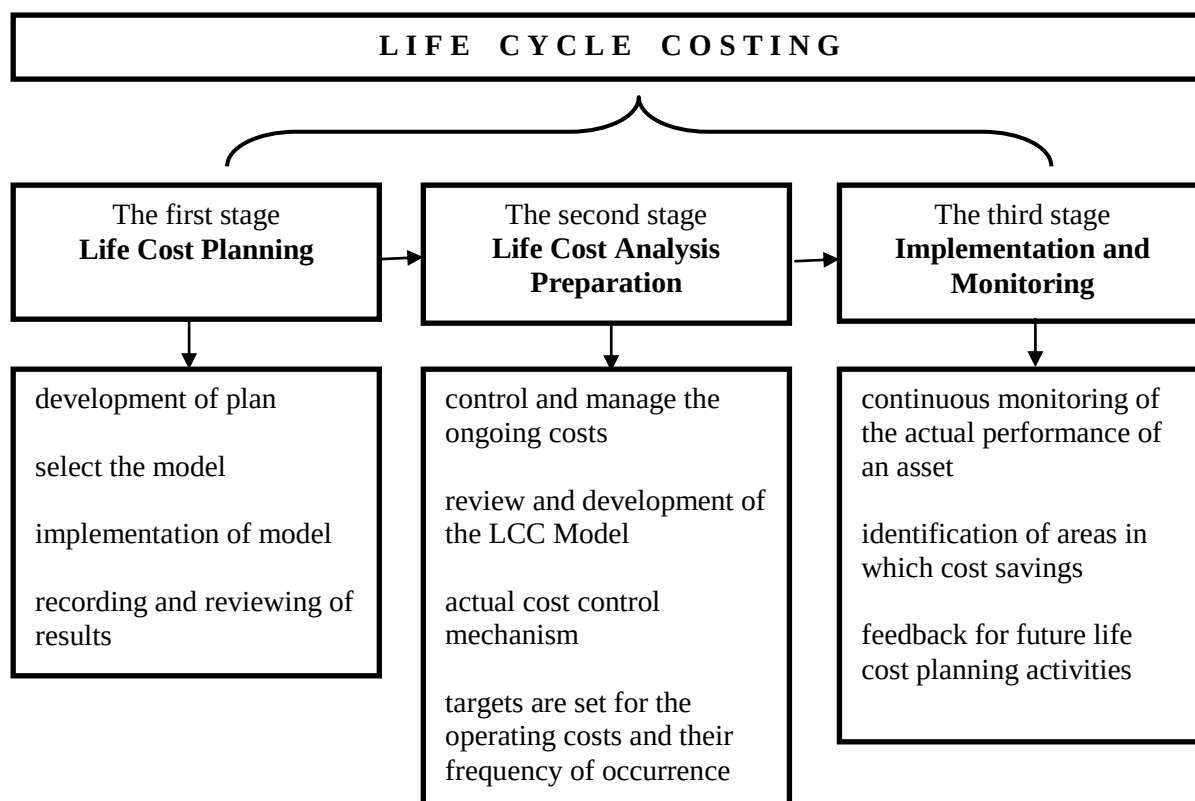


Figure 1 Life Cycle Costing Process

Source: own elaboration

The main benefit of the lifecycle method is:

- comprehensive assessment over their lifetime, assessment which takes into account the life cycle length, not assessing product costs at certain periods only, include the expected volume of sales and price developments, as well as the estimated cost of the life cycle phases;
- the possibility of controlling costs associated with phases such as R&D or production termination, which are not taken into consideration within traditional calculations;
- streamlining cost management throughout the product lifecycle.

2.3 Methods

In the course of research the following scientific methods were used: analysis, synthesis, deduction, comparison, and monitoring. In accordance with the principles of scientific work the structure of the paper is following: introduction, methods, results and discussion, conclusion, and references.

3. RESULTS AND DISCUSSION

In this paper we focus on a specific segment, the wood industry, respectively wood processing industry. The wood and wood processing industry is a typical representative of the processing industry. It is possible to include production and processing of pulp and paper, wood cutting and drying, furniture design, furniture production, woodworking, etc. This is a challenging industry, with high initial investment, with demanding production processes and technologies.

The wood industry has a specific position resulting from its comparative advantages. Its main characteristics include:

- wood industry is little dependent on the import of raw inputs,
- rising volume of processed wood,
- positive development of business results in the sector,
- the high volume of long-term assets necessary for operation,

- specifically trained staff,
- the need of protective equipment,
- obsolete technology,
- the growing problem with shortage of timber reserves in the country,
- less interest of foreign investors,
- decrease in average wood prices.

Major companies in pulp and paper industry include: Mondi Business Paper SCP, Smurfit Kappa Štúrovo, Bukocel Hencovce, SHP Group, Metsä Tissue, SCA Hygiene Products, Furniture manufacturers: Swedwood, Lind Mobler, Furni Finish, Ekoltech or Decodom, and last but not least wood products producers.

3.1 Life Cycle Costing and production of wood products

The lifecycle of a wood product (e.g. living room furniture - mass production) will be divided into the separate phases which generate the associated costs. These costs are not the same at each phase. They differ according to the stage of preparation and production of the product.

For clarity, we divide the whole process into shorter sections (parts) and assign the costs corresponding to the activity, respectively operation. In the first phase, it is necessary to define the lifecycle of the living room furniture and its individual phases:

- the pre-production phase,
- material-technical supply,
- production phase,
- product transport and installation,
- warranty and post-warranty service.

The problems of transport and costs on logistic are discussed by M. Kuperová (Kuperová, 2015). Identification of costs is also part of the process, costs belonging to the different mentioned phases. Examples of costs that arise in the case of the production of living walls are given in Table 1.

Table 1 Phases and costs in production of wood product

Phases	Costs
Pre-production phase	design and product targeting costs, R & D, payroll costs, material costs, overhead costs such as depreciation of software, computer, automobile, aliquot part of executive salary, aliquot part of depreciation of company assets, aliquot part of administrative overheads
Material and technical supplies	purchase and transportation of raw material, supplies, wages of employees, depreciation of assets, warehouses, provision of necessary technology, energy consumption, administrative overheads (aliquot part)
Production	auxiliary material, protective equipment, wages of workers, depreciation of machinery and equipment, energy & water costs
Product transport and installation	cleaning costs, protection and safety, compliance management costs auxiliary material, wages of workers, small tools, fuel, car depreciation, resp. external transport costs, administrative overheads (aliquot part)
Warranty and post-warranty service	material, employee wages, depreciation of machinery (aliquot part), energy consumption, administrative overheads (aliquot part)

Source: own elaboration

Specified costs are normally identified items, which are associated with the production of wood products, independently of the product life cycle stage. Its volume is the same as with traditional calculations. Subsequently, it is necessary to split down costs (cost items), which are different in each stage of the products life cycle.

The lifecycle within its five stages (product development, product marketing, growth, maturity and decline) creates space for a group of costs that is not necessarily utilized at all stages of the life cycle. E.g. product research and product development costs, prototype creation, product testing, sales promotion costs, advertising, investment, innovation, cost of communication with customers, etc.

These items need to be counted in the calculations, but their volume may vary at different stages in the life cycle of the product. To the individual phases is assigned a mark-up for the above

mentioned cost groups, according to the concern and preferences of the company's management. An example is given in Table 2.

Table 2 Costs and stages in the product life cycle

Stages in the product life cycle	Costs	Mark-up (% / €)
Product development	R & D, prototype creation, product testing, environment analysis, information for customers about the products	35%
Product marketing	sale support, advertising, communication with customers	15%
Growth	-	-
Maturity	investment, innovation, R & D, environment analysis	20%
Decline	sale support, communication with customers, R & D, environment analysis, costs of warranty and post-warranty service	15%

Source: own elaboration

The values of the increase depend on the strategy which the company has determined for the product. In the case of product withdrawal from the market, it is certainly not advisable to increase sales support or customer communications costs, but to increase R&D and provide a new product to the customer in the first phase of the product's life cycle. Contrariwise, at maturity, an appropriate investment in sales promotion and better communication with customers can influence the length of this life cycle of the product. All unforced costs are the result of the company's free resources, its intentions and goals. Financial health, investment opportunities and market position are key factors affecting the amount of cost the enterprise can spend to increase and secure revenue, business performance, and overall business performance.

By the above mentioned changes and responses to the product development stages, an enterprise is able to regulate the generation of the profit, to ensure the maximum, respectively to achieve planned profit and model the cost level according to the set goals.

Unbundling unforced costs will enable the enterprise to quickly and easily modify pricing and create space for price differentiation, create the space for higher profits.

4. CONCLUSION

The issue of cost management is current at all periods. New ideas, thoughts and approaches depend on current changes in the external and internal environment of business subjects, on technical and technological development, on the potential of the company.

Many competitive advantages used by enterprises belong to the cost management. Using Cost-Oriented Methods (Activity Based Costing, Target Costing, Life Cycle Costing, Balanced Score Card ...), which allows more consistent cost management, its optimization, control of the financial gain synchronously with support of customer relationship management, is a suitable strategic tool for management of business entities .

The aim of this paper was to point out the possibilities of using the LCC method in the conditions of the wood industry, which is not a frequent example of using this method. The main benefit can be identified in theoretical and practical fields.

In the field of theory, it is a summary of the LCC method and a specification of the use of the cost management method in the wood industry. Practical benefits can be noted as follows:

- using the LCC method for managing enterprise costs,
- presenting the possibilities of using price differentiation,
- presentation of cost management options by using modern methods,
- prescription of improvement the enterprise's calculation system.

Acknowledgements

The contribution was written within the research project VEGA 1/0218/16 on „The Model of the implementation of controlling as a management tool within medium enterprises in the engineering and electronics industries”.

References

- Bondareva, I., Zatrochová, M. 2011. *Podnikové financie. Teória a praktické aplikácie*. Bratislava: Vydavateľstvo STU. pp. 123.
- Foltínová, A., Budinský, M., Serina, P., Šagátová, S., Tóth, M. 2011. *Nákladový controlling*. Bratislava: Iura Edition, pp. 304.
- Hansen, D., Mowen, M. 2009. *Cost Management: Accounting and Controll*. (6th ed.). Mason: Cengage Learning. pp. 864.
- Kajanová, J. 2016. Cost Management in SMEs as a Tool of Company Performance Increasing. In Proceedings of the International Scientific Conference on Hradec Economic Days 2016. Hradec Králové, Czech Republic, p. 306-316.
- Kuperová, M. 2015. *Základy logistiky*. Bratislava: KARTPRINT, pp. 203.
- Lišková, A. 2014. Možnosti zvyšovania efektívnosti podnikateľských subjektov. In Proceedings of the International Scientific Conference on Horizons of Entrepreneurial Environment III. Bratislava, Slovakia, p. 85 – 93.
- Mohan, A. 2017. Accountingnotes. In Life Cycle Costing: Meaning, Characteristics and Everything Else [online]. [cit. 2017-05-10]. Dostupné na internete: <http://www.accountingnotes.net/cost-accounting/lifecycle-costing/life-cycle-costing-meaning-characteristics-and-everything-else/5783>
- Ölvecká, V. 2010. *Náklady vo finančnom riadení*. Bratislava: Kartprint. pp.112.
- Plchová, J. 2013. *Základy podnikania*. Bratislava: Vydavateľstvo STU, pp. 100
- Popesko, B. 2009. *Moderní metody řízení nákladu*. Praha: Grada Publishing. pp. 234.

IMPACT OF GENDER AND PERSONALITY TRAITS (BFI-10) ON OPINION LEADERSHIP

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ABSTRACT

The paper studies the influence of gender and personality traits on opinion leadership. It tries to partially replicate the study about effect of Big Five Inventory (BFI) personality traits on domain-specific opinion leadership mediated through objective knowledge and generalized opinion leadership conducted by Gnambs and Batonic (2012). A 10-item instrument was used to measure BFI instead of the 21-item one, and opinion leadership was measured using only one item. Our research partially confirmed their findings that generalized opinion leadership should be influenced by extraversion, neuroticism, and openness to experience. We have also found, that impact of gender is significant as well; namely, men reported higher opinion leadership.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: opinion leadership, Big Five Inventory, questionnaire survey, quantitative research.

1. INTRODUCTION

The paper investigates whether gender and/or personality traits could be used to guess existence of opinion leadership skills in observed individual. Opinion leadership is often perceived as a highly domain-specific trait but e.g. Marcus and Bauer (1964) already a half a century ago confirmed that it is multi-faceted, i.e. individuals are influential independent of a specific subject area. Therefore, opinion leadership is considered to be multi-faceted also in this paper. Katz and Lazarsfeld (1955) call it generalized opinion leadership and their research still attracts attention, e.g. (Kollar, 2015).

Electronic word of mouth communication is being more and more discussed in information systems/e-commerce venues and journals, extending the debate from marketing journals. And important way to influence eWOM communication is through opinion leaders.

Impact of the Big Five Inventory personality traits (Rammstedt and John, 2005) on domain-specific opinion leadership mediated through objective knowledge and generalized opinion leadership was investigated by Gnambs and Batonic (2012). They summarize that mixed findings have been reported in the past - some reported significant correlations (Brancaleone and Gountas, 2007; Mooradian, 1996), others did not (Goodey and East, 2008; Robinson, 1976). It should be noted, that probably different questions/constructs were used by different authors; which explains, why their findings slightly differ.

Generalized opinion leadership in Gnambs and Batonic's (2012) survey used their own operationalization Gnambs and Batonic (2011) which they describe as "a variant of opinion leadership that is independent from a specific content domain and is not exclusively limited to consumer behavior such as the market maven construct" (Gnambs and Batonic, 2012, p. 611). Gnambs and Batonic's (2011) generalized opinion leadership was significantly correlated with extraversion, neuroticism, consciousness, and openness to experiences. They provide a literature overview to support their hypotheses why generalized opinion leadership should be influenced by

- neuroticism - low level of neuroticism means higher security and self-confidence, these two characteristics were observed in people high in market mavenism (Bearden, Hardesty and Rose, 2001; Chelminski and Coulter, 2007; Clark and Goldsmith, 2005; Coulter, Feick and Price, 2002; John, Naumann, Soto, 2008),

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- openness to experiences - high level of openness to experiences means that a person is more interested in various things/ideas and also explores them (Coulter, Feick and Price, 2002; Goldsmith, Clark, Goldsmith, 2006; John, Naumann, Soto, 2008; Mittelstaedt, Grossbart, Curtis, and Devere, 1976; Ruvio and Shoham, 2007); having more experience allows one to share more of interesting and relevant information, thus allowing the person to become an opinion leader, and

- extraversion – it can be expected, that extroverts enjoy being with people and they are more likely to join clubs and similar organizations, moreover, extroverts are more talkative (Booth and Babchuk, 1972; Brancaleone and Gountas, 2007; John, Naumann, Soto, 2008; Mooradian, 1996; Robinson, 1976; Venkatraman, 1989; Weimann, 1991); so even if they do not intentionally try, they are likely to influence others.

Gnambs and Batinic (2012) do not hypothesize agreeableness and consciousness to influence generalized opinion leadership.

Sudzina (2016) in his paper “Do gender and personality traits (BFI-10) influence self-perceived opinion leadership?” also identified extraversion as a significant personality trait influencing opinion leadership, while neuroticism, and conscientiousness were (bivariately) significant when respondents were asked about the level of their opinion leadership in their own opinion.

The research presented in this paper can be considered a replication of the generalized opinion leadership part of Gnambs and Batinic's (2012) model (adding gender as a control variable and using fewer items to measure the Big Five Inventory and only one item to measure generalized opinion leadership), and of Sudzina (2016).

The structure of the paper is following: The second chapter “Material and Methods” describes the data collection and subsequent analysis, the third chapter contains results and discusses these results, while the last chapter concludes the findings.

2. MATERIAL AND METHODS

Data were collected in between December 2016 and January 2017 via an on-line questionnaire. There were 264 respondents – university students from the Czech Republic, of whom 117 were male and 147 female. SurveyXact was used for the questionnaire. Our sample was consistent with original authors Gnambs and Batinic's (2012), their sample also contained more females than males. They did not use gender in their model but the model presented in this paper will take gender into consideration.

We have divided the questionnaire into two pages and we have asked also some questions not used in the analysis presented in this paper. The first page focused on Independent variables, the second page contained dependent variable. Seven respondents stopped after the first page and one respondent provided random high numbers as answers for multiple open-ended questions - these rows were excluded from the analysis. So, the effective sample size was 256.

With regards to the dependent variables, Gnambs and Batinic (2012) used their own operationalization (Gnambs and Batinic, 2011) of opinion leadership consisting of the following statements:

1. Among my friends and acquaintances, I often decide which issues are current;
 2. My friends and acquaintances often discuss subjects that I brought up;
 3. I usually succeed if I want to convince someone about something;
 4. It is easy for me to influence other people;
 5. I am often the one among my friends and acquaintances who has to approve important decisions;
 6. I am often asked to make decisions for friends and acquaintances;
 7. People in my social circle frequently act upon my advice;
 8. I have the impression that I am regarded by my friends and acquaintances as a good source for tips and advice;
 9. I often use my persuasive powers during discussions to reach agreements quickly.
- Since then, they added a new item (Batinic, Appel, Gnambs, 2016):
10. It is important for me that my friends and acquaintances agree on basic things.

In our questionnaire, we have used only one statement to measure opinion leadership – same as in (Gimpel, Sudzina and Petrovcikova, 2014; Gimpel, Sudzina and Petrovcikova, 2016); they used the statement to measure opinion leadership as a part of a self-identity construct. The instruction was: “Please indicate to what degree you agree with the following statement”:

“I consider myself an opinion leader”. A 1-5 Likert scale was used where 1 meant strongly disagrees and 5 stood for strongly agree.

Gnambs and Batinic (2012) used original Rammstedt and John's (2005) instrument to measure the Big Five Inventory; the instrument contains four statements per character trait (five for openness). The research presented in this paper was however based on the newer version of the questionnaire (Rammstedt and John, 2007) – translated to Czech by Hřebíčková et al. (2016) - which contains two statements per every character trait. It shortens the instrument to less than a quarter of questions compared to John and Srivastava's (1999) questionnaire for the Big Five Inventory. The instruction was to rate “How well do the following statements describe your personality” with statements “I see myself as someone who...”

1. ... is reserved;
2. ... is generally trusting;
3. ... tends to be lazy;
4. ... is relaxed, handles stress well;
5. ... has few artistic interests;
6. ... is outgoing, sociable;
7. ... tends to find fault with others;
8. ... does a thorough job;
9. ... gets nervous easily;
10. ... has an active imagination.

on a 1-5 Likert scale where 1 meant strongly disagrees and 5 stood for strongly agree. Extraversion was calculated as an average of the 1st (reversed-scored) and the 6th answer, agreeableness as an average of the 2nd and the 7th (reversed-scored) answer, conscientiousness as an average of the 3rd (reversed-scored) and the 8th answer, neuroticism as an average of the 4th (reversed-scored) and the 9th answer, and openness to experience as an average of the 5th (reversed-scored) and the 10th answer. Cronbach alphas for personality traits will not be reported since the Big Five Inventory-10 (Rammstedt and John, 2007) was not constructed with this statistics in mind.

A multivariate approach to testing was used. Parameter estimates tables will be provided (instead of ANOVA-style tables) in order to be able to see signs of parameter estimates (not only p-values). The results should be equivalent to a multiple linear regression model estimates in case the dummy variable is set to 1 for male and to 0 for female. R^2 and R^2_{adj} are provided in order to be transparent about how much a model explains though it may be significant.

We have used a generalized linear model (GLM) to analyze impact of gender and of five personality traits (extraversion, agreeableness, conscientiousness, neuroticism, openness to experience) on opinion leadership.

To summarize the implications of the research setting, it is reasonable to expect a somewhat lower precision of measured constructs due to a lower number of questions, and the lower number of questions also means a lower granularity of values. Assuming that Gnambs and Batinic (2012) used also a 1-5 Likert scale (the information is not provided in the article), their opinion leadership has 37 possible values what resembles a continuous variable. So, explained variance of a model with a dependent variable with 5 possible values is likely to be worse compared to a dependent variable with 37 possible values given they precisely measure the reality. So, it is not possible to fully compare two models using R^2 .

All the tests have been conducted in SPSS software.

3. RESULTS AND DISCUSSION

Parameter estimates for the generalized linear model analyzing impact of gender and of personality traits on self-perceived opinion leadership are provided in Table 1.

Table 1 Parameter estimates for the full model

Parameter	B	Std. Error	t	Sig.
Intercept	1.279	.496	2.580	.010
Extraversion	.355	.057	6.205	.000
Agreeableness	.016	.066	.246	.806
Conscientiousness	.105	.063	1.654	.099
Neuroticism	-.114	.052	-2.171	.031
Openness to experience	.131	.059	2.216	.028
Gender = male	.305	.115	2.641	.009

Source: own computation

The model per se is significant ($p\text{-value} < .001$), $R^2 = .211$, $R^2_{\text{adj}} = .192$. Parameter estimates for a model without agreeableness, which as the only variable had a $p\text{-value}$ well over .1, are provided in Table 2.

Table 2 Parameter estimates for the streamlined model

Parameter	B	Std. Error	T	Sig.
Intercept	1.342	.425	3.157	.002
Extraversion	.354	.057	6.212	.000
Conscientiousness	.104	.063	1.644	.101
Neuroticism	-.114	.052	-2.191	.029
Openness to experience	.131	.059	2.234	.026
Gender = male	.302	.114	2.635	.009

Source: own computation

The streamlined model is also significant ($p\text{-value} < .001$), $R^2 = .211$, $R^2_{\text{adj}} = .195$. Parameter estimates for a model with all $p\text{-values}$ below .05 are provided in Table 3.

Table 3 Parameter estimates for the even more streamlined model

Parameter	B	Std. Error	T	Sig.
Intercept	1.712	.361	4.740	.000
Extraversion	.362	.057	6.355	.000
Neuroticism	-.118	.052	-2.261	.025
Openness to experience	.127	.059	2.158	.032
Gender = male	.270	.113	2.386	.018

Source: own computation

The even more streamlined model is also significant ($p\text{-value} < .001$), $R^2 = .202$, $R^2_{\text{adj}} = .189$.

To sum up, it seems that it is individuals high in extraversion, openness to experience, and emotional stability (opposite to neuroticism) who perceive themselves as opinion leaders. High openness to experience enables one to gain knowledge and experience. High extraversion may also allow one to gain additional knowledge from people one meets but it is crucial to sharing that knowledge, and thus establishing opinion leadership. Emotional stability may possibly also help to gain knowledge but it is more necessary to give one reputation as a prerequisite to becoming an opinion leader.

4. CONCLUSION

The goal of our study was to analyze impact of gender and of personality traits on self-perceived opinion leadership amongst university students in the Czech Republic. The study can be considered replication of (1) a part of a previously published model using constructs with fewer questions to measure both personality traits and opinion leadership, and (2) a research “Do gender and

personality traits (BFI-10) influence self-perceived opinion leadership?" (Sudzina, 2016) with only one variable - opinion leadership in one's own opinion.

In accordance to Gnambs and Batinic's (2012) who found extraversion, neuroticism, consciousness, and openness to experiences to significantly influence opinion leadership, our research fully supports three findings - extraversion, neuroticism, and openness to experiences at .05 significance level, and conscientiousness marginally above .1 significance level. Compared to Sudzina (2016) who found extraversion, neuroticism, and conscientiousness are significant (when tested bivariate), our research fully supports only two of his findings - extraversion, and neuroticism at .05 significance level, and conscientiousness marginally above .1 significance level.

As opposed to original research of Gnambs and Batinic's (2012), we have also tested for gender. Last year, gender was not found significant in Sudzina's (2016), however in the latest research gender has been found to be significant; men scored higher. Therefore, it can be recommended to use gender as a control variable in future research.

References

- Batinic, B., Appel, M., Gnambs, T. (2016). Examining Individual Differences in Interpersonal Influence: On the Psychometric Properties of the Generalized Opinion Leadership Scale (GOLS). *Journal of Psychology*, 150(1): 88-101.
- Bearden, W. O., Hardesty, D. M., Rose, R. L. (2001). Consumer self-confidence: Refinements in conceptualization and measurement. *Journal of Consumer Research*, 28(1): 121-134.
- Booth, A., Babchuk, N. (1972). Informal medical opinion leadership among the middle aged and elderly. *Public Opinion Quarterly*, 36(1): 87-94.
- Brancaleone, V. R., Gountas, J. (2007). Market mavens and their need for power. In M. Thyne, K. R. Deans, & J. Gnoth (Eds.), *Proceedings of the Australian and New Zealand marketing academy conference*. Dnedin: ANZMAC.
- Chelminski, P., Coulter, R. A. (2007). On market mavens and consumer self-confidence: A cross-cultural study. *Psychology & Marketing*, 24(1): 69-91.
- Clark, R. A., Goldsmith, R. E. (2005). Market mavens: Psychological influence. *Psychology & Marketing*, 22(4): 289-312.
- Coulter, R. A., Feick, L. F., Price, L. L. (2002). Changing faces: Cosmetics opinion leadership among women in the new Hungary. *European Journal of Marketing*, 36(11-12): 1287-1308.
- Gimpel, G., Sudzina, F., Petrovcikova, K. (2014). Mobile ICT acceptance in late adopter countries. In *Proceedings of 13th International Conference on Mobile Business 2014*. London.
- Gimpel, G., Sudzina, F., Petrovcikova, K. (2016). Mobile ICT use in early adopter vs. late majority countries. *International Journal of Mobile Communications*, 14(6): 610-631.
- Gnambs, T., Batinic, B. (2012). A personality-competence model of opinion leadership. *Psychology and Marketing*, 29(8): 606-621.
- Gnambs, T., Batinic, B. (2011). Evaluation of measurement precision with Rasch-type models: The case of the short Generalized Opinion leadership Scale. *Personality and Individual Differences*, 50(1): 53-58.
- Goldsmith, R. E., Clark, R. A., Goldsmith, E. B. (2006). Extending the psychological profile of market mavenism. *Journal of Consumer Behaviour*, 5(5): 411-419.
- Goodey, C., East, R. (2008). Testing the market maven concept. *Journal of Marketing Management*, 24(3-4): 265-282.
- Hřebíčková, M., Jelínek, M., Blatný, M., Brom, C., Burešová, I., Graf, S., Mejzlíková, T., Vazsonyi, A. T., Záborská, K. (2016). Big Five Inventory: Základní psychometrické charakteristiky české verze BFI-44 a BFI-10. *Československá Psychologie*, 60(6): 567-583.
- John, O. P., Naumann, L. P., Soto, C. J. (2008). Paradigm shift to the integrative Big Five trait taxonomy: History, measurement, and conceptual issues. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research*, 3rd edition (pp. 114-158). New York, NY: Guilford Press.
- John, O. P., Srivastava, S. (1999). The Big Five trait taxonomy: History, measurement, and theoretical perspectives. In Pervin, L. A. & John, O. P. (Eds.), *Handbook of personality: Theory and research*, 2nd edition (pp. 102-138). New York, NY: Guilford Press.
- Katz, E., Lazarsfeld, P.F. (1955). *Personal influence*, Glencoe, IL: Free Press.
- Kollar, R. (2015). Decatur: The research of Paul F. Lazarsfeld and Elihu Katz on opinion leadership in areas of marketing, fashion, public affairs and movie going. *Historická Sociologie*, 2015(1): 47-73.
- Marcus, A. S., Bauer, R. A. (1964). Yes: There are generalized opinion leaders. *Public Opinion Quarterly*, 28(4): 628-632.
- Mittelstaedt, R. A., Grossbart, S. L., Curtis, W. W., Devere, S. P. (1976). Optimal stimulation level and the adoption decision process. *Journal of Consumer Research*, 3(2): 84-94.
- Mooradian, T. A. (1996). The five factor model and market mavenism. *Advances in Consumer Research*, 23(1): 260-263.
- Nunnally, J. C. (1978). *Psychometric theory*, 2nd edition, New York, NY: McGraw-Hill.

- Rammstedt, B., John, O. P. (2005). Kurzversion des Big Five Inventory (BFI-K) [Short version of the Big Five Inventory (BFI-K)]. *Diagnostica*, 51(4): 195-206.
- Rammstedt, B., John, O. P. (2007). Measuring personality in one minute or less: A 10-item short version of the Big Five Inventory in English and German. *Journal of Research in Personality*, 41(1): 203-212.
- Sudzina, F. (2016). Do gender and personality traits (BFI-10) influence self-perceived opinion leadership? In 21st International Scientific Conference: Smart and Efficient Economy: Preparation for the Future Innovative Economy. Proceeding of selected papers. Brno: University of Technology Brno, 229-236.
- Robinson, J. P. (1976). Interpersonal influence in election campaigns: Two step-flow hypotheses. *Public Opinion Quarterly*, 40(3): 304-319.
- Ruvio, A., Shoham, A. (2007). Innovativeness, exploratory behavior, market mavenship, and opinion leadership: An empirical examination in the Asian context. *Psychology & Marketing*, 24(8): 703-722.
- Venkatraman, M. P. (1989). Opinion leaders, adopters, and communicative adopters: A role analysis. *Psychology & Marketing*, 6(1): 51-68.
- Weimann, G. (1991). The influentials: Back to the concept of opinion leaders? *Public Opinion Quarterly*, 55(2): 267-279.

PURCHASING BEHAVIOUR OF E-COMMERCE CUSTOMERS

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ABSTRACT

E-commerce has become an inherent part of life. Companies use a combination of stone stores and online stores which can bring a huge competitive advantage compared to others. When purchasing goods and services, potential customers compare such products according to several criteria, and e-commerce represents one of them. The paper aims to provide an overview of purchasing behaviour of Slovak e-commerce customers. To fulfil the aim, primary research, based on an electronic questionnaire, was utilised. Primary research was focused on purchasing reasons, purchasing frequency, purchased products, factors affecting e-commerce purchases, and more. As the main finding may be considered that, when purchasing through e-commerce, most of the respondents decide in pursuance of customers' reviews. As a result, other factors affecting e-commerce purchases are to be revealed, as well as purchasing reasons, purchasing frequency, and purchased products.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: E-commerce. Consumers. Purchase. Behaviour.

1. INTRODUCTION

Modern time brings several possibilities regarding using the Internet. The Internet used to be the source of information and a tool of communication, but the current use of the Internet offers new options, such as online shopping, products and services comparison, online banking, watching TV, videos, listening to music and much more. Online shopping is now an indispensable part of life. A company that does not sell goods through the Internet can't compete because many people prefer buying goods online. The biggest competitive advantage compared to others have companies that use a combination of stone stores and online shopping.

The promise of information technology and communication (ICT) to allow entrepreneurs to buy and sell their products over digital networks has been among the development priorities since the 1990s. E-commerce offers many benefits, such as enhanced participation in international value chains, increased market access, improved efficiency, and lower transaction costs (United Nations, 2015). E-commerce is a powerful concept and process that has fundamentally changed the current of human life. It is one of the main criteria of revolution of ICT in the field of economy. This style of trading has spread rapidly. Certainly, it can be claimed that e-commerce has cancelled many of the limitations of traditional business (Nanehkaran, 2013). E-commerce means the use of the Internet for purchase and sale of goods, services, including service and support after the sale. It brings new technology and new capabilities to entrepreneurship. According to Gao (2000), e-commerce includes not only buying and selling goods over the Internet but also various e-business processes. E-business processes are carried out using ICT equipment and applications. In this respect, e-business and e-commerce are components of ICT use (Fichter, 2003). Among all the different definitions of e-commerce, the most common definition is the one by OECD (Wirtz, 2001). It is divided into narrow and broad definition (OECD, 2001):

- **Narrow definition:** An Internet transaction is the sale or purchase of goods or services, whether between enterprises, households, individuals, governments, and other public or private organisations, conducted over the Internet. The goods and services are ordered over the Internet, but the payment and the ultimate delivery of the good or service may be conducted online or offline.
- **Broad definition:** An electronic transaction is the sale or purchase of goods or services, whether between enterprises, households, individuals, governments, and other public or private

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organisations, conducted over computer-mediated networks. The goods and services are ordered over those networks, but the payment and the ultimate delivery of the good or service may be conducted online or offline.

The paper aims to provide an overview of purchasing behaviour of Slovak e-commerce customers. The paper is divided into following four parts: introduction, material and methods, results and discussion, conclusion. Introduction represents input to the problem. It also summarises related terms, such as e-commerce and e-business. Material and methods part describes paper's creation process and methods used to fulfil the aim of the paper. Results of the primary research are included in the next part – results and discussion. Conclusion evaluates the results about fulfilling the aim of the paper.

2. MATERIAL AND METHODS

According to data on online purchases, provided by the Eurostat, Slovak e-commerce population is one of the fastest growing ones. The main motive for the selection of the paper's topic was influenced by the results of previous researches conducted by various Slovak authors who have dealt with e-commerce (Dudekova, 2014; Brozyna, Michalski, Blendinger, Ahmidat, 2016; Dorcak, Markovic, Pollak, 2016; Jankalova, Vartiak, 2016; Walker, Saffu, Mazurek, 2016; Fedorko, Bacik, Kerulova, 2017), e-business (Ko, Feher, Varga, 2011; Pollak, 2012) and e-marketing (Madlenak, Madlenakova, 2016; Nemec, Busina, Grega, Orviska, Sumpikova, 2016). The paper aims to provide an overview of purchasing behaviour of Slovak e-commerce customers. To fulfil the aim, primary research, based on an electronic questionnaire, was utilised. In the beginning, it was necessary to understand the principles of e-commerce and related terms. The next step is pursuing primary research focused on purchasing reasons, purchasing frequency, purchased products, factors affecting e-commerce purchases, and more. Primary research includes analysis, comparison and selection methods. Based on these methods, as the main finding may be considered that, when purchasing through e-commerce, most of the respondents decide in pursuance of customers' reviews. As a result, other factors affecting e-commerce purchases are to be revealed, as well as purchasing reasons, purchasing frequency, and purchased products.

3. RESULTS AND DISCUSSION

125 respondents attended a questionnaire survey. The data acquisition period lasted three weeks, from February 19, 2017, to March 12, 2017, and the research was conducted in electronic form. For selected questions, respondents were given the option of selecting multiple responses.

Research results showed that almost 88% of respondents shopped over the Internet, and the remaining 12% did not buy goods through the Internet. Women purchasing on the Internet accounted for 56.8% and men for 31.2% of the total sample.

As the main reason for shopping via e-commerce, respondents mainly mentioned time savings (76.4%), lower prices (62.7%), and unlimited shopping time. As a further reason to shop over the Internet, they provided a better description of goods, convenience and more choice, the ability to compare multiple offers via e-commerce.

36.4% of respondents make purchases in e-commerce 2 or more times a month (Figure 1). One purchase per month is made by 31.8% of the respondents. In the case of women, they mostly buy once a month (35.2% of all women who shop over the Internet). Men most often shop two or more times a month (41%). Internet purchases are mostly made by women aged from 18 to 45 and men aged from 18 to 55.

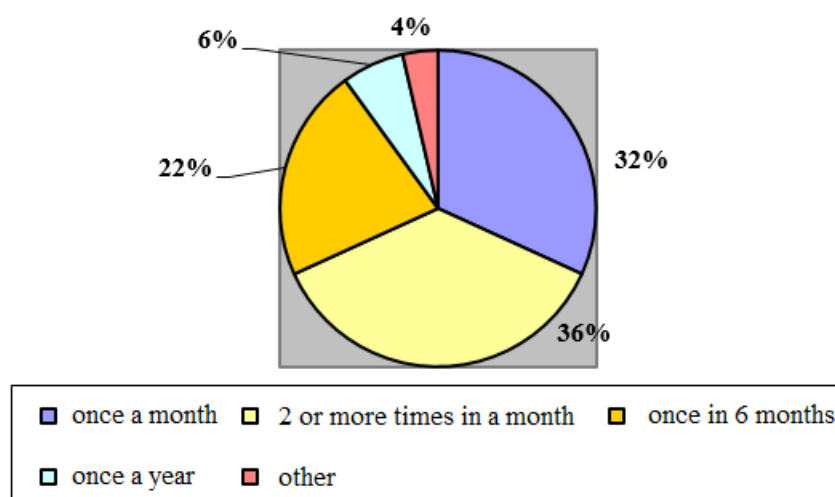


Figure 1 Online shopping frequency

Source: Own research

Research results (Figure 2) also showed that the respondents most often buy clothing (60%) and electronics (59.1%). Other groups of respondents with a higher percentage share buy household goods (41.8%) and books, games and music (32.7%).

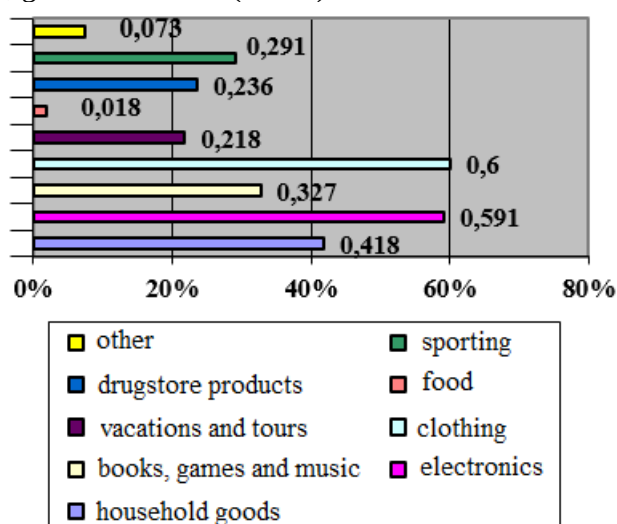


Figure 2 Most frequently purchased products via e-commerce

Source: Own research

Respondents order goods not only from domestic but also from foreign Internet shops. This group accounts for almost 62%. When choosing a specific e-commerce, there is no emphasis on whether it is located inside or outside the EU. Respondents who do not buy from foreign e-commerce (38.2%) have cited the main reason for mistrust against foreign retailers. Among other reasons, customers have been worried about complicated goods claim, support for the Slovak market, concerns about the language barrier, postage rates, the exchange rate and long delivery times.

Respondents are most interested in the price of the goods (89.1%). The second most important factor when shopping online is the review.

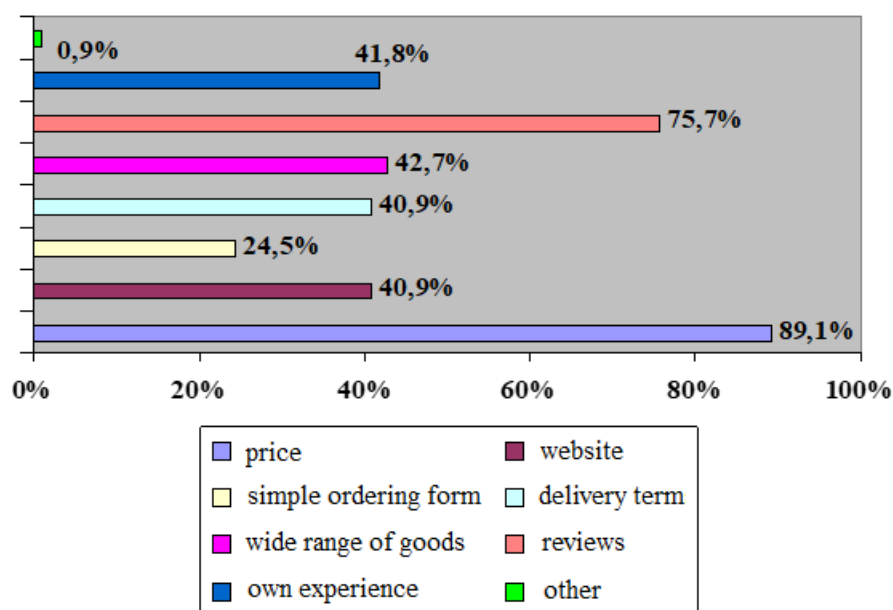


Figure 3 Factors affecting shopping via e-commerce

Source: Own research

The majority of buyers (90%) compare the prices of e-commerce goods with prices in the stone stores and up to 89.1% of respondents compare prices of goods among e-commerce.

Up to 94.5% of respondents read reviews before buying goods. Many times, it can influence the decision whether to buy the goods and, if so, in which online shop.

Most often, respondents order goods with cash on delivery payment method. (76.4%). This is partly due to concerns about the failure to deliver pre-paid goods and distrust of vendors.

The average amount that customers spend on one e-commerce purchase ranges from € 21 to € 40 (30% of respondents). From € 41 to € 60 – 28.2% of the respondents. The smallest group (3.6%) of respondents consists of buyers who spend an average of 101 € and more on one purchase.

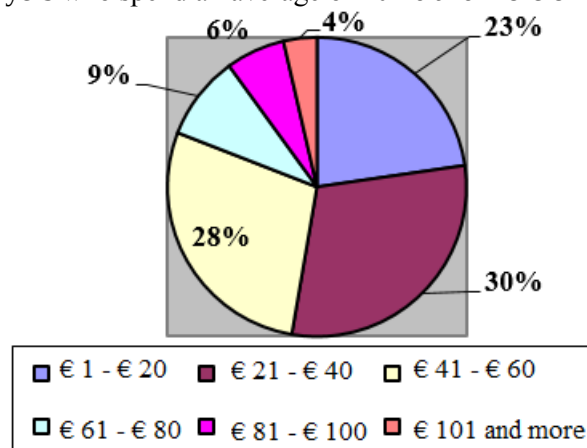


Figure 4 The average amount per one online purchase

Source: Own research

Average annual amount of the Internet orders range from € 1 to € 250 for 60.1% of respondents. The second largest group of respondents (23.6%) said their average annual spending was in the range of € 251 to € 500. The smallest percentage of the respondents (4.5%) spend an average of from € 751 to € 1000 or € 1001 and more.

4. CONCLUSION

Customers are becoming more and more demanding, and when choosing goods, they look not only at its functionality but focus on some other factors. This is the reason why the number of buyers

through the Internet is increasing, and shops that do not yet have e-commerce are no longer competitive. Potential customers, before purchasing the goods or services, compare each other according to several criteria, between e-commerce with stone stores or pure e-commerce. When choosing a store, customers look at a warranty and post-warranty service, company reputation, customer service, design, price and product quality.

The results of a questionnaire survey showed that most of the respondents are buying in online shops two or more times a month. Respondents mentioned that lower prices are the main reason for buying via e-commerce. Most of the respondents shop mostly for clothing. When choosing goods, respondents do not distinguish whether the goods are from the EU or outside the EU. Most buyers compare the prices of goods in e-commerce with prices in stone stores. Reviews are also very important. The average amount that buyers spend at online shops ranges from € 21 to € 40. Those respondents who do not buy via e-commerce do not like the fact that the goods can not be tested and seen before.

From the results of primary research, we found out that online buyers are interested mainly in reviews and the price of goods. Other important factors are respondent's own experience, website clarity, a wide range of goods, delivery and claim terms. This implies that e-commerce operators should focus on these factors and do everything to make the customer satisfied.

Acknowledgements

These research grants supported this paper:

- 2/KS/2017 Labour market and employment policy in Slovakia and the EU,
- VEGA 1/0725/17 Startup company lifecycle research as the basis of a business startup business model,
- VEGA 1/0515/15 Endogenous factors of the IPR intensive Industries in the regional enterprise environment in Slovak Republic.

References

- Brozyna, E., Michalski, G., Blendinger, G., Ahmidat, A. 2016. The Limitations of E-commerce Development in Full Operating Cycle Firms: V4 Countries Case, In *Proceedings of the 13th International Scientific Conference of the European Financial Systems*. Brno, Czech Republic, p. 57–64.
- Corejova, T., Holla Bachanova, P., Mockova, M. (2015). *Industry and Business Study of Architecture in Terms of the Zilina Region*. CERS 2014: 5th central European conference in regional science, international conference proceedings. Slovakia, p. 125-135.
- Dorcak, P., Markovic, P., Pollak, F. 2016. Selected view on the Slovak e-commerce entities in the light of reputation analysis, In *Proceedings of the 24th Interdisciplinary Information Management Talks*. Potebrady, Czech Republic, p. 295–302.
- Dudekova, A. 2014. The Concept of Electronic Shop Certification Model in Slovakia, In *Proceedings of the 5th International Scientific Conference on Trade, International Business and Tourism*. Mojmirovce, Slovakia, p. 78–87.
- Fedorko, R., Bacik, R., Kerulova, V. 2017. The analysis on the importance of the reputation management in relation to e-commerce subjects. *Polish Journal of Management Studies* 15(1): 48–56.
- Fichter, K. 2003. E-Commerce: Sorting Out the Environmental Consequences. *Forum* 6(2): 25–41.
- Gao, J. 2000. *Introduction to E-Commerce* [online]. Retrieved from <https://www.scribd.com/presentation/159092905/Intro-e-Commerce>
- Jankalova, M., Vartiak, L. 2016. Corporate social responsibility issues in the Slovak E-commerce companies. *Scientific Papers of the University of Pardubice, Series D: Faculty of Economics and Administration* 23(38): 43–55
- Ko, A., Feher, P., Varga, K. 2011. Facilitating Knowledge Sharing in Virtual Networks, In *Proceedings of the 12th Annual European Conference on Knowledge Management*. Passau, Germany, p. 524–534.
- Madlenak, R., Madlenakova, L. 2016. The global impact of e-marketing strategies on SME in the segment of touristic services, In *Proceedings of the 16th International Scientific Conference on Globalization and its Socio-Economic Consequences*. Rajecké Teplice, Slovakia, p. 1235-1243.
- Nanehkaran, Y. A. 2013. An Introduction To Electronic Commerce. *International Journal of Scientific & Technology Research* 2(4): 190–193.
- Nemec, J., Bušina, F., Grega, M., Orviska, M., Sumpikova, M. 2016. Transaction costs in Czech and Slovak public procurement, In *Proceedings of the 21st International Conference on Theoretical and Practical Aspects of Public Finance 2016*. Prague, Czech Republic, p. 282–286.

- OECD. 2001. *OECD science, technology, and industry scoreboard: Towards a knowledge-based economy*. Paris – OECD. pp. 212.
- Pollak, F. 2012. E-business and Its Application in Conditions of Slovak Market, In *Proceedings of the Conference on Management 2012*. Presov, Slovakia, p. 361–364.
- United Nations. 2015. *Information Economy Report 2015: Unlocking the Potential of E-commerce for Developing Countries*. United Nations – Geneva. pp. 120.
- Walker, J. H., Saffu, K., Mazurek, M. 2016. An Empirical Study of Factors Influencing E-Commerce Adoption/Non-Adoption in Slovakian SMEs. *Journal of Internet Commerce* 15(3): 189–213.
- Wirtz, B. W. 2001. *Electronic business*. 2nd edition. Wiesbaden – Gabler Verlag. pp. 693.

CLOUD TECHNOLOGIES IN EDUCATION

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ABSTRACT

The current globalized society is referred to as a learning (or knowledge) society. In the development of international cooperation in times of general globalization, one of the main conditions of inter-cooperative cooperation is mutual understanding. This is not only about the knowledge of the language, but also about the interconnection of the acquired knowledge and the possibilities of their application in the international business. To gain such universal knowledge, it is essential to bring together several universities not only within the EU but around the world. In order to create flexible study materials, procedures and assessments, it is appropriate to use modern digital systems and the cloud as an information tool for creating an international learning platform.

The use of cloud technologies increases the mobility of students who can get access to information and reference systems of the university from any modern communication devices..

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: cloud computing, virtual machines, higher education, educational process, open-source software, CMS.

1. INTRODUCTION

Currently, some of the main trends in the development of education include informatization and computerization implying the introduction of new information technologies into the educational process, equipping of educational institutions with electronic computing equipment, as well as anytime access to the Internet. Creation of a virtual educational space is a solution to one of the pedagogic tasks, namely, the task of developing effective forms of the educational process organization. The fundamentals of information systems that provide activities of the virtual space of educational institution are based on various approaches, methods and tools; however the most effective is the use of cloud technologies representing a promising area that provides enormous advantages in data management (Schmidt et al., 2012).

Cloud computing is a model for providing ubiquitous and convenient on-demand network access to a common pool of configured computing resources (for example, data transfer networks, servers, storage devices, applications and services – both jointly and separately) that can be promptly provided by and released with minimal operating costs and calls to the provider (Что такое облачные технологии - what is cloud technology, etc.).

Cloud technologies terms include several service models:

- Storage-as-a-Service;
- Database-as-a-Service;
- Information-as-a-Service;
- Application-as-a-Service;
- Security-as-a-Service;
- Platform-as-a-service;
- Infrastructure-as-a-Service.

The popularity of cloud computing may be explained by their advantages:

- "computational elasticity" is the ability to automatically scale its computing resources from a pool of available hardware;

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- “resource billing” is the ability to take into account the consumption of computing resources by users;
- “on-demand user self-service” is the ability to perform many routine tasks on deploying configurations in automatic mode upon user’s request.

As compared with traditional technologies, cloud computing has a number of significant advantages such as accessibility, mobility, flexibility, reliability, high manufacturability, leasing ability and profitability, thanks to which they are widely applied in many fields of science and engineering (Glazunov).

2. MATERIAL AND METODS

This section is aimed at analyzing the use of different technologies, especially in the field of education. Our goal was to analyze Cloud services and then use them to improve the quality of education.

2.1 The possibilities of using wide-spread models of providing cloud services while training

While considering the used classification of cloud computing applied in the educational process that can be viewed more correctly as a classification of cloud solutions or technologies without focusing on the aspect of properly distributed computations as the dominant one, three types (levels) can be distinguished. They include Infrastructure-as-a-Service, Platform-as-a-service and Application-as-a-Service types (Musaev et al., 2014).

Service-as-a-Service, Database-as-a-Service, Information-as-a-Service, and Application-as-a-Service models allow to use the software necessary to create educational materials or organize educational process on the basis of the cloud paradigm. Cloud services that support, for example, the Storage-as-a-Service model, are widely used in the educational process. They provide an opportunity to place educational and methodical materials, links to useful electronic resources, home or control tasks, attendance and progress logs, audio and video resources on the virtual disk, and open access to them for a certain group of users. Fig. 1 schematically shows the scopes of cloud technologies in education.

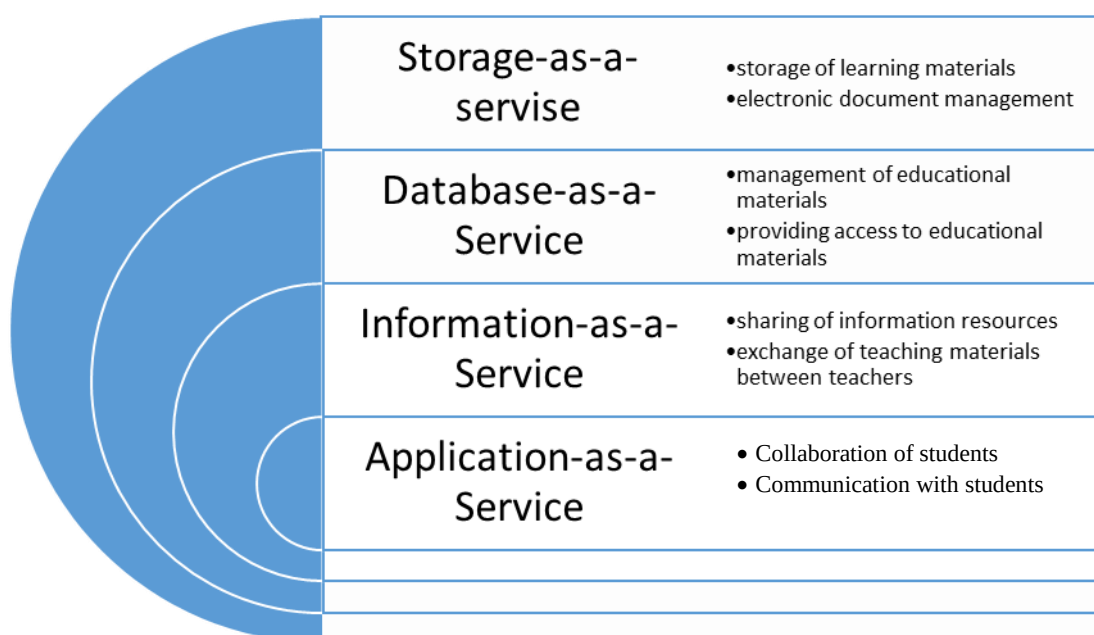


Figure 1 Schematically shows the scopes of cloud technologies in education

Online applications for creating presentations are widely distributed today providing users with software to create and format presentations, place in the server of system for their storage, as well as access to them at any time from any device if they have access to the Internet. Moreover, there is

also a possibility to publish own works, view and use presentations of other users which are in free access.

One of the examples of cloud services that offer software for creating study assignments is LearningApps.org. This application is designed to support learning and teaching processes using interactive modules. The service allows creating interactive learning tasks for independent work of students, and also has a functional for organizing work in a virtual classroom. LearningApps provides a variety of task patterns (puzzles, crossword puzzles, sequencing or matching between concepts, classification of concepts, tasks with audio and video content) and supports several languages.

In view of the above mentioned it becomes obvious that the use of cloud technologies in the field of education is actual and promising. The variety of cloud services presented on the modern market opens wide opportunities for teachers of educational institutions and allows to considerably reduce material, temporary, labor and organizational expenses for conducting the educational process. Chapter 3 contains examples of increasing the efficiency of educational process of organizations using virtual machines.

2.2 The use of virtual machines in the process of education

Today not only the traditional use of computerized classrooms where students work with software products installed locally on their computers, but also the use of these computers as terminals for connecting to virtual machines operating in the cloud becomes possible (Gazul et al., 2015; Schmidt, 2011). The use of computer as a terminal removes the limitations related to insufficient computer power, due to which it is impossible to install software locally on the computer that is required for implementation of training in accordance with the program of a particular academic discipline (Gazul et al., 2015). It is necessary to provide a stable access channel allowing to work smoothly with servers on which virtual machines used in the educational process are running. Since classroom computers are used as terminals it allows to flexibly change auditoriums where the classes are held, if necessary. As part of the traditional solution the software is installed on classroom computers, the installation process can take considerable time and be quite labor-intensive. It should be noted that in case of the traditional approach, not only the training groups are rigidly tied to training classes where the software necessary for the training is installed, but there may also be problems of compatibility of the software installed for different courses and different academic disciplines. The less applied software is installed on the computer, the fewer problems with compatibility of the software used simultaneously are. While working with the cloud it is possible and advisable in many cases, both in terms of technical capabilities and economics, to create an individual virtual machine for each student that is generated specifically for a specific assignment as part of a particular academic discipline (Serik et al., 2017).

The solution ensures unification of training places while excluding the situation when a student cannot work effectively on a par with everyone for the reason that some other student who worked on this computer earlier has reconfigured or erased something. Not only the possibility of mass generation of the same type of virtual machines based on images stored in libraries should be noted, but also it is necessary to take into account that the state of virtual machines can be preserved when the training session is over. This possibility is quite convenient for teachers, as laboratory and practical work can be planned without strict limitations associated with the use of software on a physical computer, when the program must be completed by the end of the training session. Not all software supports the ability to pause its work with data saving, but providing such support from application software is irrelevant if there is a possibility to save the state of virtual machine (the operating system together with the applications running in it).

2.3 Aspects of increasing mobility and accessibility in the process of education and discussion

The use of cloud technologies increases the mobility of students who can get access to information and reference systems of the university from any modern communication devices (stationary computers, laptops, netbooks, smartphones, tablet computers, cell phones with Internet access, etc.) both from local (including wireless Wi-Fi networks) networks of the university, and using channels of the global Internet network, which allows to connect virtually from any place. It should be

noted that students receive not only the opportunity to quickly get access to information resources (including electronic library of the university), but they can also connect to virtual machines on which software is installed necessary to perform laboratory and practical work, as well as other tasks provided for by the curriculum. The software used in educational process can be quite resource-intensive preventing some students from installing this software on their home computers – there are not enough computer resources, there is incompatibility with the installed operating system, conflicts with other software already installed, etc. Using remote access technologies (for example, connecting via RDP (port 3389) to the remote desktop of a virtual machine or physical remote server) gives a possibility to work with devices with very modest technical characteristics, the connection programs (clients) are built-in or can be downloaded to almost any communication device. It is necessary to emphasize such an important aspect for educational institution how to track the correct use of licensed software by students. If the software is hosted in the cloud, the mechanisms for controlling who of the students and how the software is used are significantly simplified in comparison with the option when students install the software locally on their home computers. The software placement in the cloud does not only facilitate control over the provision of licensing, but also solves the problems of a centralized software upgrade – for all students working with the cloud the transition to new software is carried out simultaneously as all students contact and work with the same software.

Educational institutions, individually or jointly in cooperation, can create their own private clouds allowing to control over the entire cloud infrastructure and eliminate the risks associated with posting information “on the side”. However, creation of own private cloud is a costly solution that requires the availability of modern hardware, software and, importantly, qualified personnel responsible for the deployment and maintenance of the cloud. Using public clouds significantly reduces costs, because only actually consumed resources are paid. For example, low-level IaaS-services of public cloud systems can be used by educational institutions with minimal economic costs for storing large amounts of data, including recorded video lectures, audio materials, etc. However, there remain risks associated with ensuring the availability and confidentiality of the information stored. The owner of public cloud can economically unreasonably increase the cost of storage services; access to information can be given by law enforcement officials in the country where the data centers that implement the cloud infrastructure are actually located; sanction risks associated with the current international situation are possible, etc. It is possible to implement a combined option when the educational institution deploys and uses a hybrid cloud consisting of a segment of the private cloud of the educational institution and cloud resources leased in a public cloud or clouds.

2.4 Ready solutions for Higher School

There are specialized cloud solutions designed specifically for educational institutions, among which there are two the most famous and demanded by higher education institutions – GoogleAppsforEducation and Live@Edu. GoogleAppsforEducation (GAfE) is a set of cloud-based applications provided free of charge by Google for educational institutions (registration page https://www.google.com/a/signup/?enterprise_product=GOOGLE.EDU). A similar service Live@Edu (MLE) is offered by Microsoft Corporation both in terms of composition and quality of the services proposed (<https://www.microsoft.com/eng/education/higher/ms-live.aspx>).

Students, staff and teachers of universities can use publicly available cloud data storage services, such as Dropbox (<https://www.dropbox.com>), YandexDisk (<https://disk.yandex.ru>) allowing to store and transfer files to any device connected to the Internet and other similar services. When choosing a public cloud service for storing files, it is necessary to take into account such important basic parameters as free storage space for files; support for the ability to automatically synchronize stored data between all user devices; the possibility of obtaining links that can be publically accessed. Using the link, anyone can download the file that the link points to. Special attention should be paid to the security of data storage, for example, whether the SSL or TLS crypto protocol is supported when the user-client refers to the cloud storage; whether the mode of transparent encryption of files uploaded to the storage is supported; whether the service offers means for checking the downloaded files for viruses, etc. There are a lot of aspects to consider, but generally speaking everything comes down to three key points: the protection of personal data, the protection of metadata in open files and the actual protection of access to private data. Metadata (EXIF data) are present in media files and

carry additional advanced information, such as the method of obtaining the file, authorship, GPS coordinates received from the GPS location, etc. Placement of such data in the public domain can be undesirable for a number of reasons; special software, for example MetaStripper (<http://www.photthumb.com/metastripper/>), can be used to delete metadata from files.

3. RESULTS OF ANALYZES OF THE USE OF CLOUD TECHNOLOGIES IN EU BRATISLAVA

This section shows the results of the Cloud services analysis and their use in teaching at the University of Economics in Bratislava. The first part is devoted to the analysis of program resources. The second part is the results of the use of the given technologies in teaching in the process of knowledge control of particular topics.

At present, distance learning is a very progressive method of teaching. Its benefits can be used in the training of external students in one country. An example of such a teaching method is teaching at the University of Economics in Bratislava. In this case, the teaching methodology was changed. The original 2-3-day sessions on Saturdays for 8 hours a day at the University's premises were replaced by multiple encounters at short intervals after 1-2 hours at home. This change may have been due to the use of several types of technology, from Caltech, ONwebinar or Blue stream (Figure 2, Figure 3).

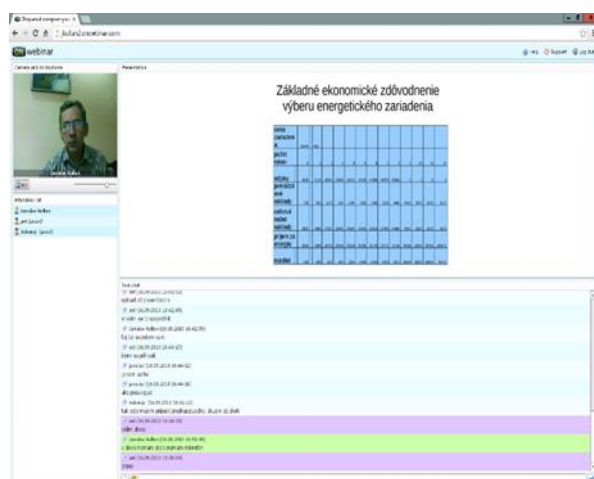


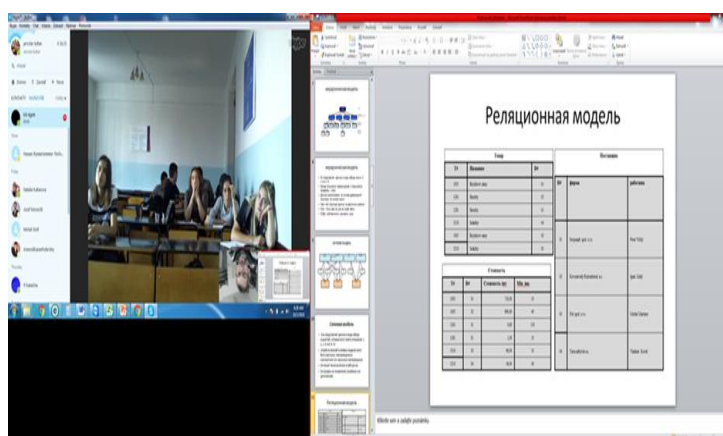
Figure 2 ONwebinar - AUOG Atyrau



Blue stream - EU in Bratislava



Figure 3 Caltech - DGUNH Makhachkala



Skype - DGUNH Makhachkala

These technologies have been replaced with Cloud Technologies - Skype for Business, acquired by our University with Office 365 (Figure 4). Using Cloud technologies, it was possible to

implement videoconferencing lessons with the common use of study materials placed on virtual disks. During the lecture the students were at home.

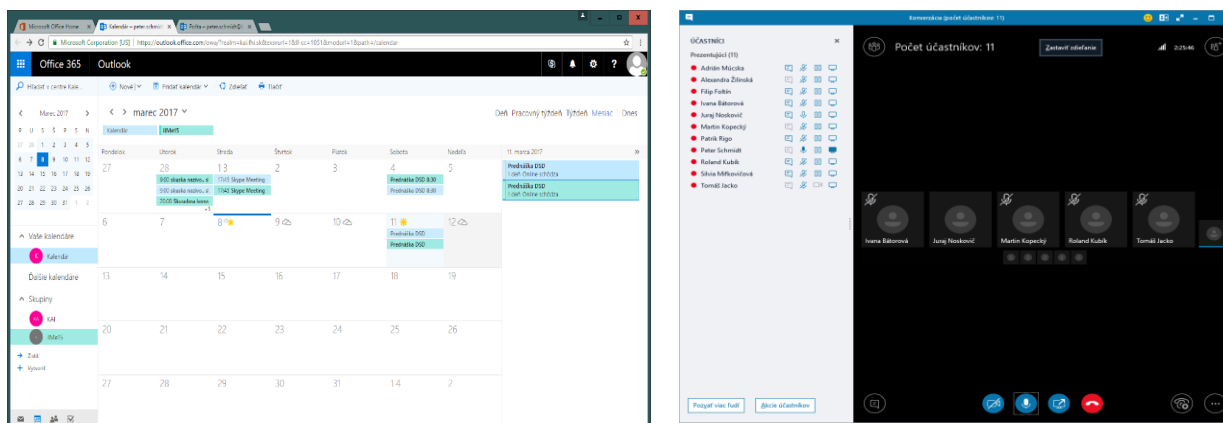


Figure 4 Skype for Business – EU in Bratislava

The second case of active use of cloud technologies was the teaching of students DGUNH Machačkal in RF, Atyrau UOG Kazakhstan, UIB Almaty (Figure 5) . All of these universities have used common materials and also a common DBS server. The use of these technologies has led to the development of international education.

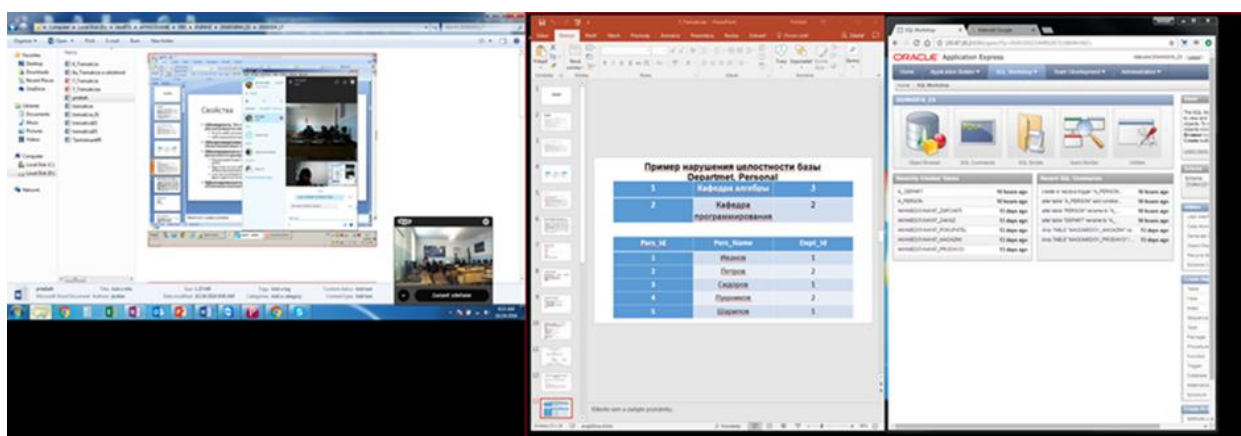


Figure 5 Database-as-a-Service – DGUNH Makhachkala

The figure (Figure 6) shows the success graph of the same tasks in the learning space. In solving these tasks, it is possible to compare the results of several universities.

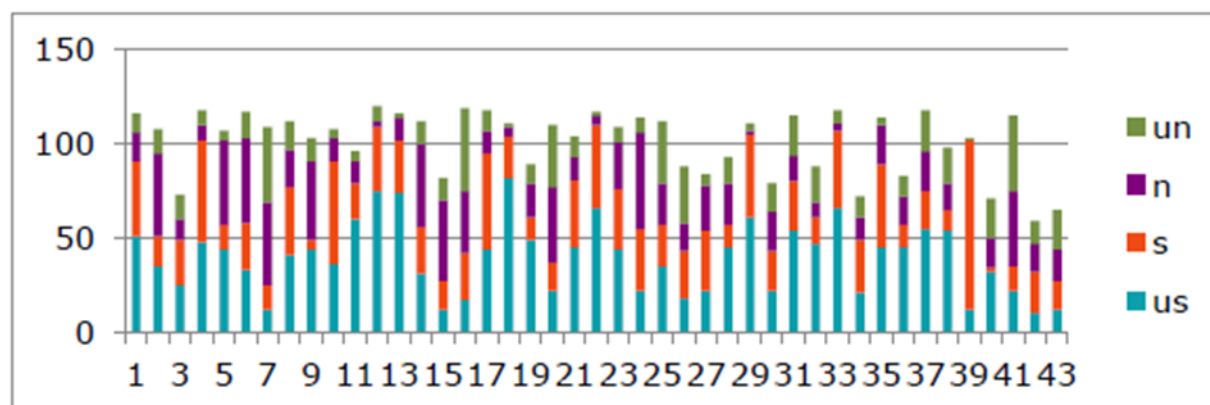


Figure 6 View results of using very fast feedback

On the basis of unified study materials, it was possible to compare the results of student teaching at several universities. The use of a common learning area is the basis of equal access to education as well as the same assessment of student results.

4. CONCLUSION

The use of cloud technologies (cloud computing) by higher educational institutions is a promising direction allowing to increase the educational process efficiency and reduce overhead costs for its implementation. The capital costs related to creation and maintenance of own data processing centers by educational institutions are significantly reduced, flexible scalability and high availability of services used in educational process are provided which ultimately raises the level of satisfaction of the end users' needs: students, teaching staff, auxiliary educational staff as more time is given to solve educational and research problems. Services provided by cloud computing open huge opportunities for both students and teachers, as well as for developers of resources and subsystems which are directly connected with education process or accompany the education process. Currently, an important problem is to achieve the maximum effect from the use of cloud technologies and increase the quality level of modern education without damaging existing effective methods and means of education.

As a result of the use of these technologies, it forms the basis for creating an international learning environment. Creating such an environment allows for the development of the education process, an increase in the quality of education. The main contribution is to combine the strengths of several universities with the creation of study materials and the development of international scientific cooperation.

References

- Schmidt P., Kultan J.: Cloud computing v miestnej samospráve. In Ekonomické aspekty v územnej samospráve II [elektronický zdroj] : recenzovaný zborník príspevkov z vedeckej korešpondenčnej konferencie, S. 159-167, Košiciach (2012). ISBN 978-80-7097-932-7.
- Chto takoe oblachnye tekhnologii. <http://hostdb.ru/articles/show/id/47>
- Glazunov S. Biznes v oblakah. <https://kontur.ru/articles/225>
- Musaev A.A., Gazul S.M., Anantchenko I.V.: The informationin frastructure design of an educational organization using virtualization technologies. Izvestiya Sankt-Peterburgskogo gosudarstvennogo tekhnologicheskogo instituta (tekhnicheskogo universiteta). № 27(53). pp. 71–76, (2014)
- Oblachnye vychisleniya, kratkij obzor, ili Stat'ya dlya nachal'nika. <http://habrahabr.ru/post/111274/>
- Oblachnye vychisleniya: opredeleniya i resheniya. <http://www.osp.ru/cio/2011/03/13007508/>
- Oblachnye tekhnologii dlya zemnyh pol'zovatelej. <http://sonikelf.ru/oblachnye-tekhnologii-dlya-zemnyx-polzovatelej/>
- Gazul' S.M., Ananchenko I.V., Kiyaev V.I.: Sovershenstvovanie obrazovatel'nogo processa v vuze: aktivnye metody obucheniya i gibridnye informacionnye sistemy na osnove virtualizacii. Sovremennye problemy nauki i obrazovaniya. №2, (2015), www.science-education.ru/122-20856
- Schmidt P.: Virtuálny veľtrh. In AIESA - budovanie spoločnosti založenej na vedomostiach. 14. medzinárodná vedecká konferencia, pp. 1-6, Bratislava, Vydavateľstvo EKONÓM (2011). - ISBN 978-80-225-3312-6.
- Gazul' S.M., Ananchenko I.V., Kiyaev V.I.: Proektirovanie prototipa klientskogo ustrojstva dlya gibridnoj informacionnoj sistemy podderzhki obrazovatel'nogo processa v vuze. Sovremennye problemy nauki i obrazovaniya, № 1, (2015). www.science-education.ru/125-20219
- Serik M., Sadvakassova A.K.: Virtualization technologies in educational process. Sciences of Europe (Praha, Czech Republic) VOL 3, No 12 (12), pp. 45-50, (2017). ISSN 3162-2364
- Kultan J., Serik, M., Alzhanov, A., Informacionnyje tekhnologii objekt sredstvo i instrument obučeniya. In Information technology applications = aplikácie informačných technológií. - Bratislava : Paneurópska vysoká škola : Občianske združenie VZDELÁVANIE - VEDA - VYSKUM, 2012. - ISSN 1338-6468. - Č. 1 (2012), s. 55-69
- GLATZ, M., MIŠOTA, B. 2016. Active education of the employees of the small and medium-sized enterprises. In Knowledge for Market Use 2016: Our Interconnected and Divided World, International Scientific Conference Proceedings (s. 104-114). Olomouc : Societas Scientiarum Olomucensis II, 2016. ISBN 978-80-87533-14-7
- Schmidt P., MOOC – budúcnosť vzdelávania alebo bublina /In Inovačný proces v e-learningu [elektronický zdroj] : recenzovaný zborník príspevkov. 9. medzinárodnej vedeckej konferencie : Bratislava 22. apríl 2015 / zostavili: Eva Rakovská, Miroslav Kršiak, Martin Blahušiak, Janette Brixová ; recenzenti: Igor Bandurič, Martin Blahušiak ... [et al.]. - Bratislava : Vydavateľstvo EKONÓM, 2015. - ISBN 978-80-225-4076-6. - [S. 1-7] CD-ROM.
- Rakhimzhanova M., Davletova A., Maykibayeva E., Kasymova A., Kusainov A., Didactic Potential of Multimedia-Technology in the Development of Students' Informational Culture, Indian Journal

of Science and Technology, Vol 9(12), DOI: 10.17485/ijst/2016/v9i12/89517, March 2016 (Scopus)

Галяев В.С. & Гасанова З.А. (2012). О некоторых дистанционных технологиях при обучении дисциплине "Информационная безопасность, In Medzinárodná vedecká internetová vidoekonferencia vedeckých pracovníkov a doktorandov. *Trendy a inovácie v internetovej podpore podnikania a vzdelávania : recenzovaný zborník [príspevkov] : II. medzinárodná vedecká internetová vidoekonferencia vedeckých pracovníkov a doktorandov : 7. november 2012, [virtuálne EU Bratislava]* [elektronický zdroj]. Vydavateľstvo EKONOM, 2012. CD-ROM [80 s.]. ISBN 978-80-225-3553-3.

CHANGES OF SELECTED ANTHROPOMETRIC DIMENSIONS OF THE ADULT SLOVAK POPULATION IN THE CONTEXT OF PRODUCTION MANAGEMENT

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ABSTRACT

In hygienic and ergonomic practice is necessary to know the basic anthropometric parameters of employees and users, which can be used by the designer when constructing machines, tools and devices. The aim of this paper is quantification of changes of selected anthropometric dimensions of the current adult population of Slovakia aged 18-25. On the basis of the previous research of the physical dimensions of the Slovak adult population we can state that there is a substantial growing in the adult population over the course of 40 years. This trend can have a major impact on designing of arrangement of optimal and safe working, residential and non-residential space. Increasing of dimensions of the adult population will have principal economic impact on the costs of consumer products and it will be needed to deal with cost-price calculation formula adjustments. With that comes a need of a multidisciplinary cooperation between experts of various areas of human life.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: anthropometry, prediction of anthropometric dimensions, adult population, ergonomics.

1. INTRODUCTION

A person is the focal point in the workspace with regard to the use of working tools or workpieces. Largely, products, as well as all the equipment are designed and constructed for man (Kováč, Szombathyová, 2010). Therefore, it is necessary to take into account the human figure, especially its dimensions and strength, in designing them, as well as in the manufacture of ergonomically correct working tools, machines and furniture. In designing and assessing spatial layout of workplaces, machines, notification and control elements, there is a basic limitation of man, especially his dimensions and strength (Konrád, 1989). Therefore, the optimal work design itself is always based on the measurement of the interest group of employees, which is compared with the data of the entire population of working age divided into males and females. This is especially important in the furniture industry, where it is mainly about setting suitable dimensions of cabinets, seats, beds, seating and table furniture, as well as other residential equipment. Another important area, taking advantage of different sizes of the population, is the driver's workplace, which affects his or her own health as well as the health and safety of passengers. This is similar in other occupational fields, where the right size of the job allows the employee to occupy a comfortable position and thus to perform his (her) work according to the qualitative and quantitative requirements of the employer.

One of the basic anthropometric methods suitable for solving these problems is somatometry, which is a system of measurement techniques and observations of man and parts of his body in the most accurate ways and methods for scientific purposes (Strelka, 1978). Somatometry systematizes and defines a set of relevant anthropometric features of the human body that significantly affect the performance and safety of employees.

Also, it provides a series of measuring tools and procedures that allow accurate determination of the values of the anthropometric traits. The set of the most used special anthropometric devices and tools include, for example, personal weight, antropometer (two-meter-long metal bar for height measurement), tarakometer (large sliding scale), pelvimeter and kefalometer, (touch compasses with tilting arms), measuring tape, caliper (the instrument for measuring the thickness of skin folds).

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However, it is possible to do anthropometric investigation even without special anthropometric tools. The assumption is to use the correct investigative method, for example to measure the body height, or even other height dimensions of the body, it is possible to use metal or paper tape meter with centimetre scale, which can be mounted on the wall. Then, we determine the height of the wooden rectangular triangle, which we attach with one shoulder to the scale on the wall and the other on the top of the head (vertex). Another possibility is the use of auxiliary technical instruments instead of special auxiliary instruments used in anthropometry, etc. In anthropometric practice, there is a basic methodological rule according to which the research method must be adequate to the research goal. From this point of view, the researcher has the option of choosing the method of research himself, deciding which dimensions and characters will investigate how to proceed and which devices to use, etc.

Population data is always detected on sample samples at some point in time. They can trendily change for various reasons over time (such as the way of nutrition of the population, lifestyle, etc.).

Therefore, it is necessary, especially after longer periods of time, to systematically check possible changes in position, variability and the shape of the distribution of values of interest anthropometric features of the population under study. Based on this requirement, there will be no comparison of specific anthropometric measurements with outdated data. The aim of this thesis is to define an increase in selected anthropometric measurements of the adult population (18-25 years) in the last 40 years in Slovakia.

2. MATERIAL AND METHODS

In anthropometric literature, there is a set of standardized dimensions and characters that can be accurately detected on the human body. Based on our experience and literature analysis, we present a selection of dimensions and features that can be used in hygienic and ergonomic practice, especially when designing the optimal spatial layout of the workplace and creating an optimal working environment.

The empirical measurements of the values of selected anthropometric features of the current population were made in the years 1992-2016 on a sample of 789 men and 975 women aged 18-25 years coming from all over Slovakia. The data were obtained and compared with data from the Czechoslovak "Spartakiada" (sport demonstration activities) from 1980 and 1985 (619 men, 650 women). Consequently, we have computed descriptive statistics for respondent groups, such as arithmetic averages, standard deviations, medians, variance coefficients, variance, minimum and maximum values, quantum boundaries, coefficients of curvature, and slope coefficients. In the calculations, we focused on two main indicators - body height and body weight. Based on these indicators, we analysed the secondary character of the resulting from them - BMI (body mass index - body mass index). We are able to consider this index (Equation 1) as an indicator of an individual's health if it is in its ideal and normal values ranging from 20.00 to 25.00.

$$BMI = \frac{m}{h^2} \quad (1)$$

where: m – is body weight in kilos,
 h^2 – is a square of height in meters.

We used the Student t - test and F - test the correlation of two variances to compare of the arithmetic averages of the values measured at different 2 periods. The two-choice test is based on zero hypotheses testing where we assume that two variables are equal to the second alternative where we assume the inequality of these variables.

$$H_0: \mu_1 = \mu_2 \text{ compared to alternative } H_1: \mu_1 \neq \mu_2 \quad (2)$$

The STATISTICA 12.0 software (Statsoft, Inc. 2012) was used for all calculations. The tests were done at the level of significance $\alpha = 5\%$.

3. RESULTS AND DISCUSSION

The results of the work are contained in Tables 1 and 2 and Charts 1 to 4. The weight (not the length character measured in kg) has a special position from the anthropometric data observed in both analysed male / female categories. We note that there was a change of 10.53% of the average weight in the male category and a weight increase of only 4.63% of the average weight in the female category. The height of men increased by 3.15% and for women by 1.76%. BMI increased by 3.82% in the male category, but the BMI did not change for women. Our research statistically demonstrates the existence of significant secular trends in the observed characteristics. The new generation of males, compared to older populations, is consistently characterized by better height growth combined with higher body weight and consequently higher BMI. In the female category, there is an increase in height and a corresponding increase in weight (but the BMI remains the same). The subsequent generation of men is higher and larger in size, and the generation of women is higher and slimmer. Based on linear regression equations, we can define the magnitude of secular changes for men in 1992-2016 (Table 1). The change of one year represents a 0.1545 cm (1.55 mm) body height increase and an increase in body weight of 0.3107 kg (310.7 g). The third regression equation for men shows the dependence between time and BMI index the body mass index BMI increases by 0.0547 per year.

Based on linear regression equations, we can define the results of secular changes in female category (Table 2). There is an increase in body height of 0.0463 cm (0.5 mm) per year. The third regression equation for women shows the dependence between the number of years and the BMI index. The body mass index BMI increases by 0.0013 per year.

Table 1 Descriptive male's statistics in 1980-1985 and 1993-2016

Men 18-25 years (1980-1985)					
	$\bar{x}$	K 5%	K 95%	s_x	T-test p-level
weight	71.57	57.46	85.67	8.60	0.00000
height	176.40	165.74	187.06	6.50	0.00000
BMI	22.99	19.30	26.69	2.26	0.00000
Men 18 - 25 years (1993-2016)					
	$\bar{x}$	K 5%	K 95%	s_x	T-test p-level
weight	79.11	61.00	100.00	12.26	0.00000
height	181.96	171.00	194.00	6.97	0.00000
BMI	23.87	18.92	29.60	3.24	0.00000

Source: own processing

Table 2 Descriptive women's statistics 1980-1985 and 1993-2016

Women 18 - 25 years (1980-1985)					
	$\bar{x}$	K 5%	K 95%	s_x	T-test p-level
weight	57.17	45.04	69.31	7.40	0.00000
height	164.71	155.04	174.39	5.90	0.00000
BMI	21.31	17.35	24.73	2.25	0.00000
Women 18 - 25 years (1993-2016)					
	$\bar{x}$	K 5%	K 95%	s_x	T-test p-level
weight	59.82	48.00	77.00	9.24	0.00000
height	167.61	158.00	178.00	6.02	0.00000
BMI	21.31	17.65	26.80	3.21	0.00000

Source: own processing

Knowledge of the basic anthropometric parameters of the employees is a necessary condition for the creation of the correct layout of the workplace in terms of both the optimal performance of the employees and the safety and hygiene of the work. The creation of an optimal workplace (or machine construction, a design of work equipment, etc.) is almost always based on the comparison of the

anthropometric data of individual employees with the general data of the population from which they come.

The results of researches conducted abroad confirm the existence of a secular trend as a global. The results of the anthropometric research in the area of the Czech Republic, which was published by Kovařík (2009), clearly show that there is a significant increase in body dimensions, especially body height and weight, in the Czech and Slovak population. It is interesting that the height and weight of the body do not increase in proportion, according to Kovařík (2009). The weight of the Czech population grows more pronounced than the height of the body, especially among men. However, there is a fundamental difference in the development of the body weight of the Czech and Slovak populations.

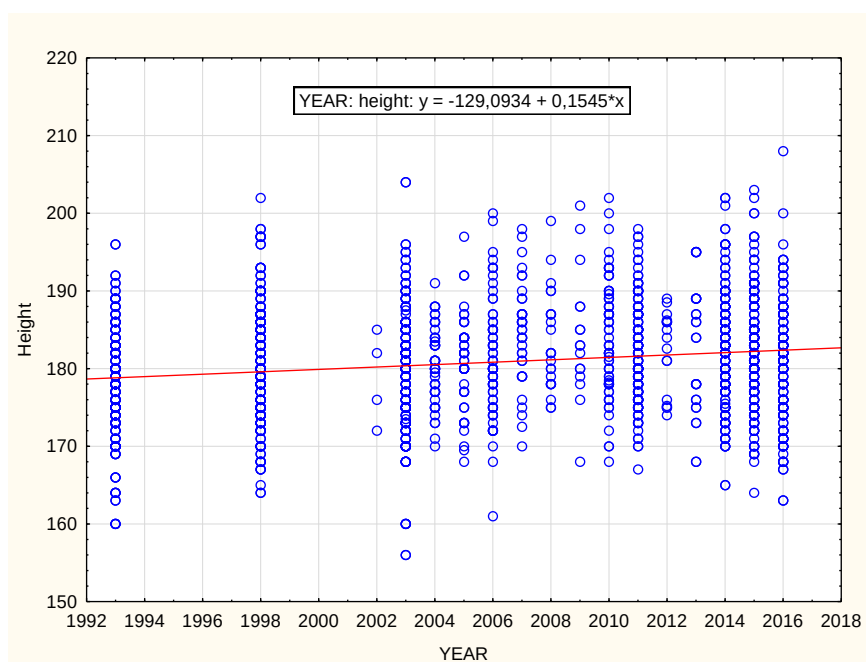


Figure 1 Estimated height increase model in male category

Source: own processing

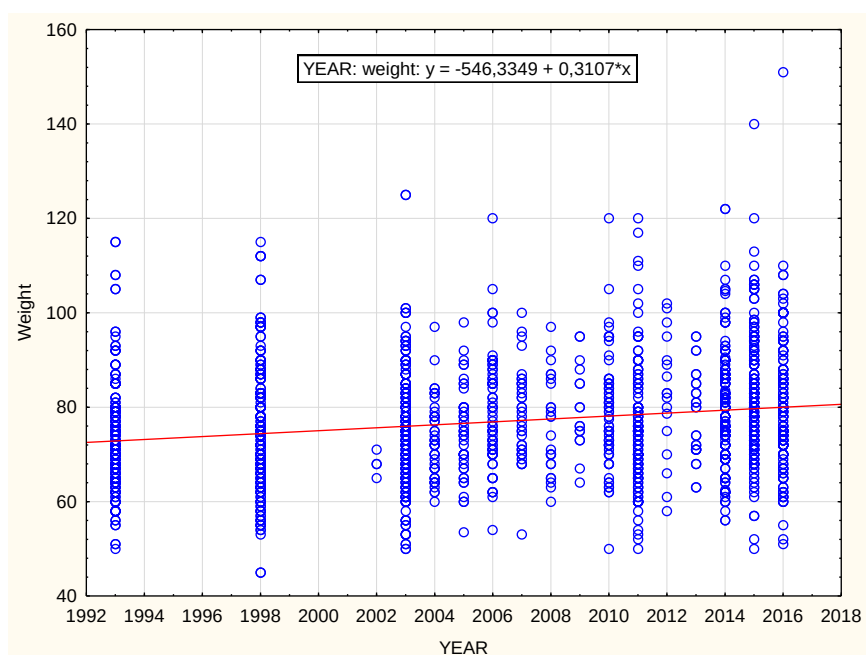


Figure 2 Estimated weight increase model in male category

Source: own processing

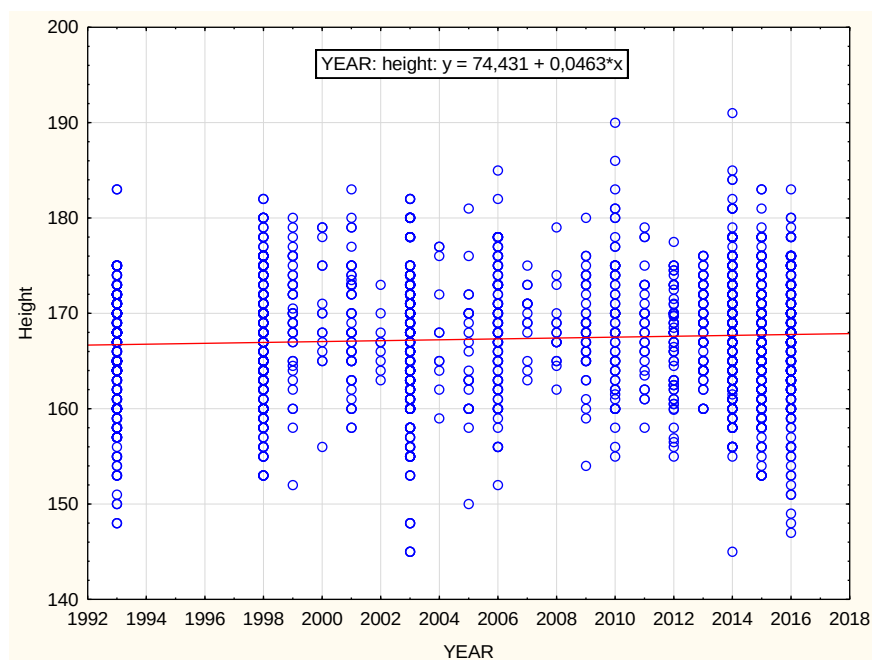


Figure 3 Estimated model of height increase for female category

Source: own processing

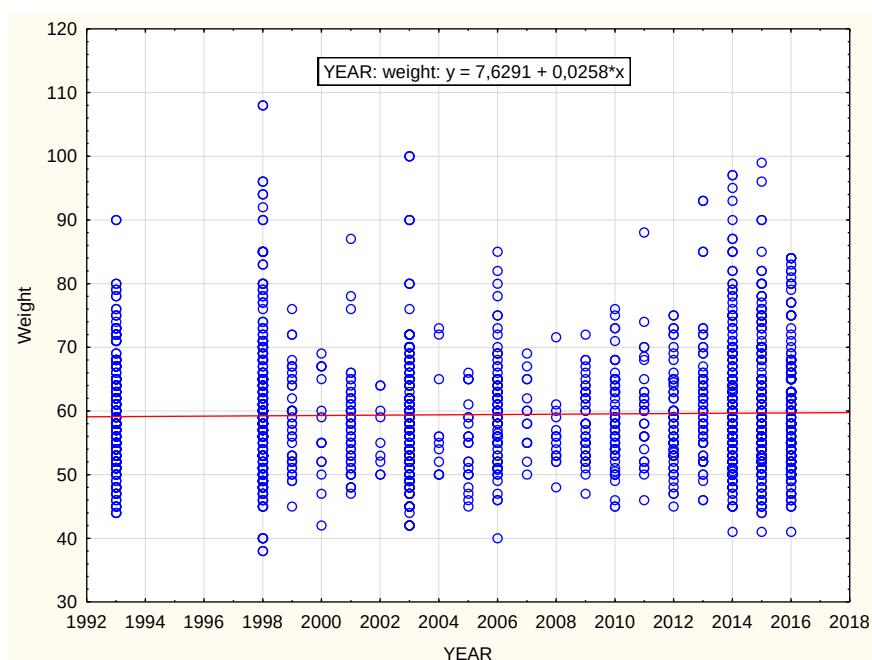


Figure 4 Estimated model of weight increase for female category

Source: own processing

According to the results of the Kovařík (2009) research, the Czech population is growing in weight. In contrast, according to the results of our work, as well as the results of the Kotradyová (2009) research project, there is a decrease in weight in the Slovak population. Both studies showed a significant decrease, especially in female body weight. We can state that the social status and the achieved education are one of the factors influencing the population growth. The reason is a more carefully chosen way of life - lifestyle, way and quality of eating, sports activities, etc. These facts can be caused by a variety of factors, the pressure fashion trends and increasing demands of the women's appearance are the probably the most important ones.

Our work adds to a number of other studies and works carried out in the past in different countries. It is difficult to compare the results of this work with the results of other works for various reasons like sample size, specific measurement conditions, demographic coverage, ethnic mix, the health status of participants, etc. However, despite the above, the results of our work are similar to the others research results in our country as well as abroad in the past (Sedmák, Hitka, 2004; Sedmák, Hitka, 2007; Kolena, Vondráková, 2013). Kotradyová (2009) also studied the basic anthropometric dimensions in the area of Slovakia. She surveyed selected anthropometric dimensions on a sample of 202 respondents in her research. The results of her project, as well as our results, confirmed the existence of a secular trend of the physical dimensions of the Slovak population. Our results, as well as other works, have shown the existence of a secular trend in Slovakia. We can see the existence of this trend as a global phenomenon. This is also confirmed by the results of various foreign works and research (Kavis, Özok, 1991; Cole, 2000; Loesch, et al., 2000; Bolstad et al. 2001; Jelačić et al. 2002; Mokdad, 2002; Baroso et al. 2005; Vígnerová et al. 2006; Chuan et al. 2010). We can see several explanations for increasing body dimensions. One of these explanations can be the overall lifestyle, today's way of life, quality, diversity, quantity and ways of eating, as well as health care, sports and other activities. However, other events of the last decade may be the cause of change. The political regime has changed; Slovakia has joined the European Union. In particular, these changes have led to a change in the habits of our population as well as in dining possibilities. The opening of the borders has resulted in a significant globalization of the nation, the population of Slovakia has begun to migrate and interfere with other nations. Based on the results, we have been able to determine the prognosis of these changes over the next 30 years using regression linear equations. We assume that in 2046 (30 years from the latest data in the sample), the average body height for men will be about 187.01 cm, their body weight will be about 89.36 kg in average, and as a result, BMI will rise to 25.74. For women over the next 30 years, there are some changes expected, but not as significant as for men of the same age category. In 2046, according to our prediction, the estimated average body height of women in this age category will be 169.16 cm, their average weight will be 60.42 kg and their BMI drops to 21.19. Over an extended period of time, the anthropometric characteristics of a particular population can be changing, particularly as a result of several factors such as changes in the standard of living and lifestyle of the population, changes in nutrition, genetic factors. Other factors affecting height growth include higher per-person earnings, the expansion of hygiene-friendly housing, improved health education and proper nutrition, better social services and health care. Therefore, it is necessary to update the population anthropometric characteristics periodically, especially after longer periods.

At present, we are talking about a generation likely to have signed the events that have taken place over the last three decades in Slovakia (change of political regime, accession of the Slovak Republic to the EU). The effects of these changes were reflected both in the diet of the population as well as in the globalization of the Slovak society. The opening of borders has resulted in a "crucial migration and mixing of" population, which may result in changes in body proportions of the current adult population of Slovakia. For these reasons, we recommend using up-to-date data presented in recent research to design optimal layouts and create optimal work environments (but also for all other potential applications). The updated data reflects the real situation and allows you to design the optimal layout of your workplace. This means that they allow the creation of the real optimal working environment necessary to achieve the maximum performance of employees in compliance with all principles of safety and hygiene of work.

4. CONCLUSION

Anthropological and ergonomic requirements are crucial in relation to the shape and dimensions of consumer products in many ways. From our previous studies of the dimensional characteristics of the present-day Slovak population, there is a positive secular trend in the last two decades. We assume that this situation was due to better nutrition, better psychosocial factors and socio - economic conditions in which today's population grew. The trend will continue to a lesser extent. The creation of ergonomic, hygiene and construction norms and standards for consumer products is based on the values of anthropometric characteristics quintile characters, so it is necessary to review the suitability of the current standard dimensions.

In this context, it is also necessary to update the calculation pricing formulas of individual products (Potkány, 2009). This will increase our production costs by about 10-15%, according to our calculations (Šatanová, Krajčírová, 2012; Chodasová, et al. 2015). So it is necessary to deal with incoming problems and conflict solutions and try to meet customers' requirements without additional costs (Kampf et al. 2017), because there will be a rise in the future. The secular trend is visible not only in our country but also in the world, it is necessary to review outdated standards globally. If economists do not address the issue in the future, it can lead to serious damage to the health of the population.

Knowing the basic anthropometric dimensions of employees is a prerequisite for creating a proper work-place layout. This condition is determined not only in terms of optimal performance of employees but also in terms of safety and hygiene of work. Creating optimal machine construction, a design of working tools and daily consumption items are based on a comparison of the anthropometric data of individual employees with the general data of the population. It is necessary to periodically update the population anthropometric characteristics after the expiry of longer periods, because the anthropometric characteristics of a particular population can vary substantially due to the effect of a number of factors, especially over longer periods of time. Modification of standard dimensions requires interdepartmental collaboration between designers, developers, anthropologists, ergonomists and health professionals. Only such a multidisciplinary approach can deliver results in the production of health-conscious consumer products.

Acknowledgements

This research was supported by APVV-16-0297 Updating of anthropometric database of Slovak population.

References

- Barroso, M. P., Arezes, P. M., Costa, L. G., Miguel, A. S., 2005. Anthropometric Study of Portuguese Workers. *International Journal of Industrial Ergonomics* 35(5): 401–410.
- Bolstad, G., Benum, B., Rokne, A., 2001. Anthropometry of Norwegian Light Industry and Office Workers. *Applied Ergonomics* 32(3): 239–246.
- Cole, T. J., 2000. Secular Trends in Growth. *Nutrition Society* 59(2): 317–324.
- Chodasová, Z., Kucharčíková, A., Tekulová, Z., 2015. Impact analysis of production factors on the productivity enterprise, In *Proceedings of the International scientific conference on Knowledge for Market Use*. Olomouc, Czech Republic.
- Chuan, T. K., Hartono, M., Kumar, N., 2010. Anthropometry of the Singaporean and Indonesian Populations. *International Journal of Industrial Ergonomics* 40(6): 757–766.
- Jelačić, D., Greger, K., Grladinović, T., 2002. Research on Anthropometric Characteristics of High School Students and Ergonomic Characteristics of High School Furniture. *Drvena Industrija* 53(2): 99–106.
- Kampf, R., Ližbetinová, L., Tislerová, K., 2017. Management of Customer Service in Terms of Logistics Information Systems. *Open Engineering* 7(1): 26–30.
- Kayis, B., Özok, A. F., 1991. The Anthropometry of Turkish Army Men. *Applied Ergonomics* 22(1): 49–54.
- Kolena, B., Vondráková, M., 2013. *Nitra–Dražovce. Osteologická Analýza Jedincov zo Stredovekého Pohrebiska z Okolia Kostola sv. Michala Archanjela v Nitre – Dražovciach*. Univerzita Konštantína Filozofa v Nitre – Nitra.
- Konrád, V., 1989. *Ergonómia a Bezpečnosť Práce*. Skriptum – Zvolen. pp. 77.
- Kotradyová, V., 2009. Prekonávanie stereotypov v interiérovej tvorbe, In *Interiér*. Bratislava, Slovakia, p. 14–21.
- Kováč, J., Szombathyová, E., 2010. *Ergonómia*. Technická univerzita v Košiciach – Košice. pp. 122.
- Kovařík, M., 2009. Nové aspekty v ergonomii interiéru, In *Interiér*. Bratislava, Slovakia, p. 36–40.
- Loesch, D. Z., Stokes, K., Huggins, P. M., 2000. Secular Trend in Height and Weight of Australian Children and Adolescents. *American Journal of Physical Anthropology* 111(4): 545–556.
- Mokdad, M., 2002. Anthropometric Study of Algerian Farmers. *International Journal of Industrial Ergonomics* 29(6): 331–341.
- Potkány, M., 2009. The Methodology of Creation of Basic Budgets Types in Commercial Enterprise at the Furniture Sales. *Acta Facultatis Xylogologiae* 51(2): 105–119.
- Sedmák, R., Hitka, M., 2004. Analýza zmien antropometrických údajov dospeléj populácie na území Slovenska, In *Manažment ľudského potenciálu v podniku*. Zvolen, Slovakia, p. 1–7.
- Sedmák, R., Hitka, M., 2007. Dynamika Zmien Vybraných Antropometrických Znakov Populácie Slovenska. *HRM&E* 3, 24–34.
- Statsoft Inc., 2012. *Electronic Statistics Textbook*. Tulsa, OK, USA. [online] URL: <http://www.statsoft.com/textbook/>.

- Strelka, F., 1978. Metodika Merania Základných Antropometrických Parametrov. Acta Hygienica, Epidemiologica et Microbiologica.
- Šatanová, A., Krajčírová, L., 2012. Application of Accounting and Reporting in a Cost-oriented Quality Management in Wood-processing Companies. Drvna Industrija 63(4): 283–289.
- Vignerová, J., Brabec, M., Bláha, P., 2006. Two Centuries of Growth Among Czech Children and Youth. Economics and Human Biology 4: 237–252.

APPLICATION OF MODERN QUALITY MANAGEMENT METHODS IN SELECTED COMPANIES IN SLOVAKIA

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ABSTRACT

The Kaizen method is not a commonly used management quality tool in Slovakia. Practical experience shows that with the exception of manufacturing international organizations operating in Slovakia and some national manufacturers, new trends, methods and information regarding quality management are rejected. Reasons for this rejection by managements of individual national organizations are the same: insufficient financial resources, not enough time to apply new methods, rejection by owners, doubts about advantages from the method and doubts about successful implementation of the method in practice. The paper focuses on the research of the application of modern quality management methods focusing on the Kaizen method. The research was carried out in three Slovak manufacturing companies. Appropriately chosen implementation of the Kaizen method into business processes make it possible to achieve a more flexible business and improve economic performance with optimal use of enterprise resources.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: KAIZEN, quality management methods, models, practical applications.

1. INTRODUCTION

We consider today's economy to be a phase during which using classic methods became the norm and often even inefficient. Each company on the market is facing environmental changes and competitive pressures. After the entry of Slovakia into the European Union, Slovak economy, in a short time span, went through a transformation, which also changed conditions for doing businesses. Therefore, it is necessary, that companies also adequately adjust their methods of management. According to *Hqbek, P., Wolniak, R. (2016)* a company that would like to keep their position on the market, or potentially improve it, needs to implement these modern methods. Market economy is based on two basic phenomena, which are supply and demand. The dependence of supply on demand is undeniable. Another important economic phenomenon is competition, which is the "moving force" of all parts of the market. As reported by *Sujová, E. and Čierna, H. (2013)* competition propels forward quality of products and services. There is, hopefully, no company that does not take it into consideration. However, the problem often arises when choosing appropriate methods, because not all companies fully realize that classic methods are in a highly competitive market a very weak tool for achieving the top spot on the "market value scale". The goal of this article is to, based on theoretical foundations, apply modern methods of management, specifically with the Kaizen method, in three selected companies operating in Slovakia and evaluate contributions.

The research is part of a solution of a project subsidised by the KEGA no. 011TU Z-4/2017 project „Integration of progressive information technologies and soft-skills in education programs focusing on management of production processes“. We assume that the application of modern quality management methods helps managers to consolidate their soft skills.

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2. MATERIAL AND METHODS

Nowadays, in organizations, mainly manufacturing companies, quality management is considered to be a required part of company's management. Quality management influences all processes within an organization or a company. Companies have gradually, also with influences from international partners, adopted implementation of quality systems and how to adhere to them. By implementing a quality system, companies have gained competitive advantage. With more accessible information about quality and experience, many organizations and companies realize that they are not satisfied with implemented quality systems. As a result, we noticed a move to a higher degree of quality management systems - Total Quality Management (TQM). Managers during their work make decisions, which are based on thorough analysis with the goal to improve quality. Therefore, methods and tools for correct analysis and plugging into quality management processes seep into manager's work *Industry world (2015)*. Globalization is also visible in company management and how organizations look for savings; lower costs, flexibility and in their approach how they aim to improve their competitive advantage. According to *Bauer (2012)* organizations often confront their competitors and study them. Successful companies are role models for others. It is common, that organizations compare themselves with market leaders with the highest growth, profits, and brand. This way they try to achieve better results by using similar resources and try to be a step ahead of competition. For organizations to survive, the current market, number of good competitors, price increases of inputs and other aspects, they are forced to apply modern quality management systems. As reported by *KAIZEN Institute (2015)* Japanese companies from manufacturing are leaders and achieve high productivity and quality. These currently specialize in flexible production technology. European organizations are slowly implementing systems of Japanese manufacturing companies. Slovak companies are also following this trend. A progressing Japanese system of quality management in companies is the Kaizen strategy.

We can define the Kaizen strategy based on terms developed by various authors. *Massaki (2005)* founder of the strategy, however, has the most appropriate definition of the strategy. The root of the term is simple and clear: Kaizen means to improve and perfect (*Massaki 2007*). Lecturers at the *Kaizen Institute (2015)* in Slovak and Czech Republics view the Kaizen strategy as a process of change. In this article, we will also approach the Kaizen strategy as a process of change. The Kaizen strategy encompasses other techniques and tools that are necessary for successful application of the strategy in organizations.

By combining all techniques and tools, we create a complete system - Kaizen Management System – KMS. It is a system that promotes organization's long-term profit and growth. It has four basic pillars: TFM – Total Flow Management, TPM – Total Productive Maintenance, TQM – Total Quality Management, TSM – Total Service Management, tied to the TCM – Total Change Management methodology. The goal of KSM is continuous improvement from suppliers of materials and subcontractors to fulfilling customers' wishes and expectations. The main tools are: including all employees and utilizing their creativity, set up of all processes, zero tolerance for mistakes and errors, effective use of equipment and technology, use of lean production systems and QCD – Quality, Cost, Delivery. The foundation for creating a total system is creating awareness about waste (MUDA) and basic tools - Kaizen Foundations. It is foremost the 5S method, standardization, Problem Solving Story and use of visual management. According to the Kaizen principle, process optimization is realized in small steps. As part of this method, improvements are initiated by employees, not management. According to *Nölke (2004)* Process of improvement is voluntary and continuous and improvement is understood as a never-ending process. Kaizen (in Japanese - improvement) is a Japanese philosophy focusing on lasting improvement in all parts. When applied in work, Kaizen permanently improves all aspects of running of a business, from production to management and from top management to employees at the assembly line. By using the Kaizen method, organizations can eliminate waste. Employees at all levels, from the managing partner to external employees, can participate in the Kaizen process. It can be put in place by an individual, a small or large group (*Nölke, 2004*)

3. RESULTS AND DISCUSSION

The aim of this part of the article is to formulate an analysis, evaluation and implementation of processes with application of the Kaizen method in manufacturing companies operating in Slovakia, which apply the Kaizen method in comparison with manufacturing companies that do not use this method in their processes. We will focus on specific steps, tools and methods of how the Kaizen method is applied in the companies. A secondary goal will be to highlight advantages of application of the Kaizen method in production and management processes of the companies. For this purpose, we have selected manufacturing companies that operate in the Zvolen and Žiar nad Hronom regions that apply the Kaizen method. The third manufacturing company is a leading paper and pulp manufacturer from central Slovakia, which does not use the Kaizen method of process management and quality improvement.

3.1 Introduction of ŽOS Zvolen, Inc.

ŽOS Zvolen, Inc. is a modern organization operating in Slovakia specializing in repair of train locomotives. As reported by *Internal company documents ŽOS (2014)* the company classifies their production program within repair of train rail vehicles, which includes a large number of motorized locomotives, train cars and based on customer's demands and train undercarriages. The company strives to be a leading organization in central Europe in repair and modernization of ŽKV, manufacturing of engines and manufacture of other machine manufacturing.

3.1.1 Analysis of critical processes of an organization

After observation of the manufacturing company and analysis of their processes, we determined critical processes at ŽOS Zvolen, Inc. The company does not separately evaluate expenses for quality. They analysed and evaluate only expenses for not-quality. The goal for application of the Kaizen method in the company was to determine critical factors of costs for quality. Each division has a separate quality department.

3.1.2 Cost of not-quality

Expenses for not-quality as well as individual business entities (LOKO and SV) are analyzed by the institute of Management Systems. Expenses for not-quality are divided into:

- Expenses for internal mistakes,
- Expenses for suppliers' mistakes (other's mistakes),
- Returns (external mistakes).

The analysis shows the fact that defects are aligned with low quality of work and they represent losses in production and affect business results negatively. The company though the institute of Management systems performs regular, monthly, analysis of expenses for not-quality. The analysis consists of description of mistakes that result in returns, as well as statics of reasons for mistakes by work shifts.

According to *Internal company documents ŽOS (2014)* ŽOS Zvolen, Inc. divides mistakes in the following manner:

1. Based on where it originated
 - a. Internal – discovered directly in the company
 - b. External – discovered outside of the company's premises, by suppliers
2. Based on why it occurred
 - a. Their own – mistakes caused by employees and company's departments and supplier mistakes, which cannot be returned
3. Others – mistakes caused by suppliers, which can be returned
4. Based on ability to be repaired
 - a. Repairable – these are expenses for mistakes that can be calculated only after the repair, which was not expected by the original technological process, if the repair is technically possible and cost effective. The company considers a repair to be cost effective when the cost of the repair does not exceed the cost of production of a new unit.

- b. Not repairable – products that cannot be used for their intended use and repair is technically impossible and not cost effective.

3.1.3 Cost for quality

The controlling department of the company manages all expenses related to quality, specifically on analysis spreadsheets in accounting class 5 – Expenses. ŽOS Zvolen, Inc. Divides expenses for quality into two groups: expenses for prevention and expenses for evaluation. The total cost of expenses for quality is currently quite high. According to available sources, these expenses, in 2014, represented 30% of company's total expenses (*Internal company documents ŽOS, 2014*).

3.1.4 Using the KAIZEN method in an organization

The company implemented the Kaizen method with the help of the Kaizen team tool. ŽOS Zvolen followed the following steps during creation of the Kaizen team:

1. Select a problem or process that would benefit from improvement or should be eliminated
2. Define demands of members of the Kaizen team
3. Create the Kaizen team
4. Train the Kaizen team
5. The Kaizen team completes its work.

Members of the ŽOS Zvolen, Inc. Kaizen team strive to achieve permanent improvement while using all tools (methodical processes, techniques, standards, statistical data, etc.) to solve given problems in departments that take on responsibility. Members of the Kaizen team implement permanent improvement with the help of the PDCA cycle. Results of their work are provided to company's management, which in turn suggests measures and processes. Following this process, the Kaizen team will implement a new standard or process to decrease overall expenses, if suggested measures will be followed in all departments of the organization.

3.1.5 Results and advantages of application of the KAIZEN method in an organization

After successful application of the Kaizen method with the help of the Kaizen team, members of the team provided management measures and processes that will decrease the risk of incorrect estimates and analysis of total expenses for quality and not-quality. The result is implementation of unified oversight of expenses by utilizing management information systems. The Kaizen team also discovered a problem of insufficient oversight over expenses related to environmental protection. Until recently, this was only monitored in terms of total expenses. They could not distinguish what part of the expenses represents expenses for waste management, monitoring of the environment, etc. The team suggested a system, which was accepted, to include these expenses in individual categories. In a span of a year, they discovered numerous mistakes, which were returned immediately to the supplier. The result was a 12% decrease in expenses for external mistakes.

3.2. Introduction of Nemak Slovakia, L.t.d., Ladomerská Vieska

A manufacturing company, Nemak Slovakia, is a division of a global corporation Nemak with headquarters in Mexico, established in 1979 in Monterrey. As reported by *Internal company documents Nemak (2015)* as the main producer of high tech aluminum components, it specializes in production of cylinder heads, engine blocks or parts of transmissions for the automotive industry. The company's clients are car manufacturers. The biggest client is Kia Motors Slovakia, followed by the Volkswagen Group. Nemak Slovakia uses the Lean Management philosophy. The Lean philosophy is based on the Just in Time system. To achieve this philosophy, they use several tools and methods of quality management such as: Benchmarking, the 5S method, Visual Management, Cellular Manufacturing, FMEAS, Total Productive Maintenance, Kaizen, Kanban, PokaYoke system and others.

3.2.1 Using the KAIZEN method in an organization

Nemak Slovakia has been using the Kaizen method since 2009. The method is used in many parts of the company. Most often it is used in: quality, productivity, OHS and expenses.

The company implemented measures, to which they need to adhere in various situations:

- Inform about application to the Kaizen method to solve an existing problem in advance, information to be included, the Kaizen team needs to be received it at least a week in advance to be able to fully understand the topic,
- Make sure that a member of the Kaizen team is only working on work that will result in application of the Kaizen method,
- Select members for the Kaizen team from employees who are affected by the problem,
- Allow in the process to apply the Kaizen method to turn off equipment or to clearly define a time frame required for short repairs,
- Quick and effective move of materials required for application of changes, which are the goal of the Kaizen team,
- Goals and tasks part of the solution are fully executed,
- After application of the Kaizen method, changes, new processes and advantages will be explained to the other employees (*Internal company documents Nemak, 2015*).

3.2.2 Application of the KAIZEN method to solve a specific problem

Application of the Kaizen method is usually used in companies when critical situations arise in production processes. It is mainly elimination of defects and products that do not meet customer's requirements. Nemak Slovakia used the Kaizen method to improve and implement a system for installation of cooling production equipment. The goal was to better meet customer's demands dictated by project documents, so that the company is able to manufacture the required number of pieces without potential technical errors on production equipment. Production employees suggested a specific and appropriate process. The reasoning behind improvement was the fact that some products did not meet customer's requirements and project documentation. This caused the company not only financial losses, but also meant that the products will not be delivered to the client on time and they will not meet quality. As a result, management decided to solve the problem, which could potentially cost them their reputation. For better preparation they used a flow chart. The aim is to define a process of preparation. It determines the sequence of individual processes. It portrays a model of preparation from its conception until the end.

Specific application of the method can be summarize into several steps:

1. Define members of the Kaizen team – the team usually has 5-7 members.
2. A mediator is appointed, who is responsible for the Kaizen process, for definition of goals and for accomplishing tasks and presentation of results.
3. Time frame of Kaizen – determine a time frame of Kaizen, e.g. 4 days (Figure 1).

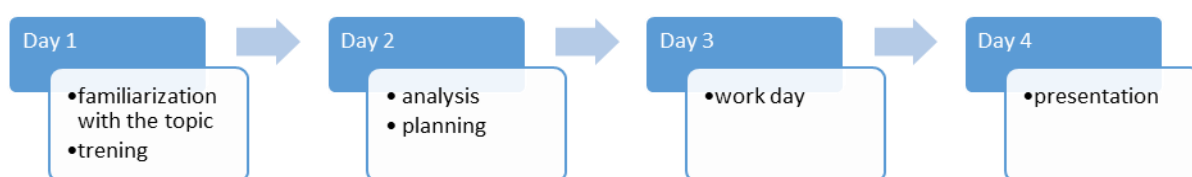


Figure 1 Process of Application of the Kaizen method

Source: Internal company documents Nemak (2015)

In terms of analysis, various techniques can be used, such as brainstorming, diagrams of causes and consequences (see Figure 2), improvements are defined and a pilot project is launched.

The pilot project defines the necessary material. Team members implement the changes, which they have outlined in their goals. The last step of the Kaizen process is presentation of achieved goals and explanation of changes to other employees

4. Performance of open tasks – after several days, members of management of affected departments meet with the moderator. The goal of such meetings is preparation for execution of open tasks and determining deadlines for completion.
5. Checking completion of tasks – each task assigned to the Kaizen team is discussed with management and responsible employees who will execute the task. Task execution is regularly

checked during short meetings where statuses of individual tasks are presented and their contribution is evaluated.

6. Evaluation and application of the Kaizen method – approximately three months after completion of the work performed by the Kaizen team, the moderator calls a meeting with the person who brought the problem forward and manager of the affected department. They evaluate the status of open tasks. After execution of all short term and long term open tasks, another meeting is called within 3 months where all tasks are evaluated. Fulfilled goal are noted in the process for resolution of tasks by applying the Kaizen method.

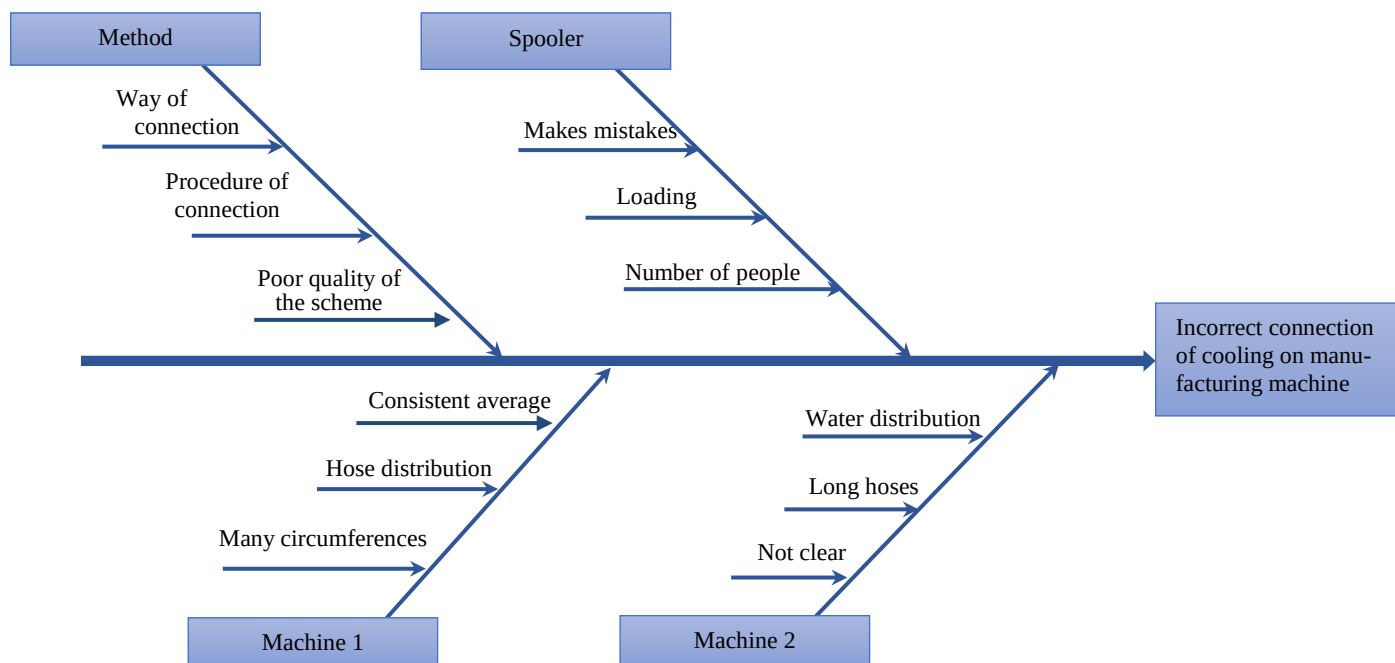


Figure 2 Ishikaw Diagram

Source: Internal company documents Nemak (2015)

3.2.3 Results and advantages of application of the KAIZEN method in a company

Application of the Kaizen method in Nemak Slovakia brought results that resolved a long lasting problem relating to incorrect marking and connection of cooling into production equipment. The Kaizen team suggested improvement in terms of new systems of connecting cooling production equipment. The Kaizen team, supported by the company's management, implemented a new color marking system of cooling hoses and pipes leading from individual production equipment. They identified people responsible for marking the feeding hoses and pipes. The new system also established a standard for such processes. The standard, among other things, also includes consolidation and clarification of technical and connecting material for affected production equipment. It is consolidation of flows, of connecting materials, hoses and pipes. This will during unexpected breakdowns limit losses and waiting time caused by different parameters of technical and connecting material.

3.3 Introduction of the pulp and paper producer

A manufacturing company with headquarters in central Slovakia considered to be a leader in the pulp and paper business in central and Eastern Europe. It is a multinational company that brings together manufacturing and business departments in numerous countries. A more than a one hundred year old history of the company suggests that the company has vast experience in production of pulp and paper (Research institute, 2014).

3.3.1 Determining specific problems and approaches to solutions in a company

We have selected the structured conversation method for our research to determine problems in a company. The structured conversations showed, among others, that a problem is warehousing of inventory – input into the production process. We realized that supply and planning of production are two separate centres, which causes unnecessary inventory of inputs. The structured conversation also revealed another problem, which is over production of completed products. From analysis of internal resources, we realized that cost for storing of inventory input consist of:

- costs for warehousing facilities (utilities, cleaning, snow removal, security),
- maintenance costs (repairs and renovation of warehousing facilities),
- cost of technology (heating and cooling, dehumidifiers, water, gas),
- cost of internal transportation (crane, transportation vehicles including repairs and maintenance),
- cost of fire safety (electric fire extinguishers, fire fighters),
- cost for environmental protection (regular checks of building equipment that there is no leaking, repairs of insulation to prevent leakage of chemicals),
- cost of employees (salaries and benefits, OHS, personal protective equipment PPE).

According to *Internal pulu and paper company's documents* (2014) the warehousing facilities are between 135 and 270 m². The company currently utilizes 6 warehouses, which are for storage of inventory inputs for production. For the purpose of storing inventory inputs, in 2011 the company built 2 warehouses. These were renovated older production buildings. We found out that at that time, this was a temporary solution to a problem, which has not yet been resolved. Average time of storage in the warehouse (from arrival until delivery to production) is on average long and is between 1 to 3 months.

3.3.2 Application of the KAIZEN method in the company

With the help of the method, tools and processes, we suggest elimination of the problem of high cost of storage of inventory of inputs. We decided to resolve the problem in the company by creating an effective Kaizen team. The team's creation is a response to unsynchronized ordering, and a supply and production planning system.

For effective creation of a Kaizen team, we have set up the following sequence of steps:

1. Select appropriate processes or problems that need improvement
2. Define expertise requirements for members of the Kaizen team
3. Determine and create a Kaizen team
4. Train the Kaizen team
5. Work of the Kaizen team
6. Completion of work of the Kaizen team

3.3.3 Results and advantages of application of the KAIZEN method in an organization

With the help of the Kaizen team, we solved a problem with high cost of storage of inventory of inputs for production. By decreasing cost for storage of excess inputs, we are optimizing all processes that are tied to it. Thanks to the efficient work of the team, we discovered MUDA – incorrect process of an organization, which negatively affect creation of the described problem. From the analysis, we can define some basic kinds of MUDA, which need to be addressed: inventory, transport, overproduction and unnecessary moves.

From results of analysis, we can define three main reasons for increase in cost of storage of inventory of inputs:

1. Economic – suppliers motivate a company to purchase higher volume of material by offering bulk discounts. The company also receives additional discounts for payment before delivery or upon delivery. This way the company is tying up financial resources into inventory, which will be stored long term.
2. Reasons stems from ordering and production planning processes– we do not think that the process of ordering inputs in the organization is effective. It is data that contains important amounts of materials for a specific order whose delivery sometimes takes up to 6 months. Following this, the

ordering department out of fear of running out of inputs in their internal warehouse, preventively orders inputs in the required amount.

3. Reasons result from internal logistics—amount of inventory in the warehouse is tied to internal transport, which is the largest portion of costs for storage of inputs. We discovered that warehouses filled to capacity, make manipulation more difficult and lengthy. It is often necessary to move some parts around. Warehouses therefore need to be equipped with special equipment, such a rail cranes, forklifts, moving platforms, etc. Transportation equipment also requires regular maintenance and service. Results of the Kaizen team's work indicate that department of internal logistics is the most overloaded department in the production process. As an optimal tool to eliminate the problem, we suggest implementing the Just In Time system in the company. With help of this system, the company can eliminate the main causes of the problem.

3.4 Discussion

Decision to implement Kaizen has to come from a need to optimize processes in an organization, eliminate problems, effective production, decrease in costs, and achieve better competitive advantage and position on the market.

Application of the Kaizen method in an organization can only be successful if the organization's management and employees are open to change. Unsuccessful implementation is a result of fear of change, fear of risk and fear of results.

3.4.1 Recommendations for implementation of the KAIZEN method in v ŽOS Zvolen, Inc.

ŽOS Zvolen, Inc. implemented the Kaizen method by using Kaizen teams. Results of work of the Kaizen team became processes and measures to decrease risk of improper estimation and analysis of all costs for quality and not-quality. The company implemented a system for monitoring costs by using management information systems. It improved estimates and provided better analysis of total costs for quality and not-quality, in the form of detailed classification of costs for all of company's departments. The Kaizen team also discovered a problem with monitoring of costs for environmental protection. The suggested and approved system recommended including such costs in individual categories. They also suggested a process for improvement for evaluating quality of inputs from external suppliers. These defected products represented the largest portion of costs for not-quality. For ŽOS Zvolen, Inc., we suggest focusing on the Kaizen concept, specifically targeting groups. We recommend that the company appoint one person in the organization who will belong to the quality department and the person will focus on groups – workshops for quality control. This employee will attend a specialized seminar for quality control. The person would act as an instructor for quality control workshops in the organization. We recommend for ŽOS Zvolen, Inc. that workshops take place during work hours. If necessary, they can also take place as part of overtime. We presume that our suggestions and measures will bring the company improvements in terms of higher quality of supplied materials, quality of processes, increase in quality of employees and their relationships, product quality and satisfied customers.

3.4.2 Recommendations for implementation of the KAIZEN in Nemak Slovakia, L.t.d.

Nemak Slovakia, L.t.d. has many years of experience in using the Kaizen concept in their company. Also in this case, the company used a Kaizen team to more effectively resolve a problem. Results from the team's work were implemented into production processes. The problem in this company was absence of a system for connecting cooling production equipment. Some products did not meet customer's requirements and project documentation. During the process, the company experienced financial loss, but also risked that supply of products will not be delivered on time and will not meet the required quality. To solve this problem, the company also created a Kaizen team. The team suggested an improvement in terms of a new system for connecting cooling production equipment. The Kaizen team and company's management agreed to implement a new color marking system of cooling hoses and pipes leading to individual production equipment. The team and management appointed people who will be responsible for marking the feeding hoses and pipes. The new system of connection set a unified standard for such processes. This way during an unexpected

breakdown, it will limit loss and waiting caused by different parameters of the technical and connecting material. We suggest to employees in the quality department that they implement into their activities Total Productive Maintenance as the next effective tool from the Kaizen concept. The reason for application of this tool from the Kaizen concept, is the fact that Nemak Slovakia, L.t.d. is a manufacturing company, while analysis of the company revealed problems tied to technology and equipment.

3.4.3 Recommendations for implementation of the KAIZEN in the pulp and paper producing company

With the help of the Kaizen team, we have solved a problem of high cost for storage of inventory of inputs for production. Thanks to the effective process work of the team, we discovered some MUDA–incorrect processes in the company, which negatively influenced development of the described problem. From the analysis, we can define some basic kinds of MUDA, which need to be addressed: inventory, transport, over production and unnecessary moves. Based on the results of the analysis, we can define three main reasons for increase of cost of storage of inputs:

1. Economic – suppliers motive a company to purchase higher volume of material by offering bulk discounts.
2. Reasons stem from ordering and production planning processes – as we described in the previous parts, we do not consider the ordering process of inputs in the company to be effective..
3. Reasons result from internal logistics – amount of inventory in the warehouse is tied to internal transport, which is the largest portion of costs for storage of inputs. Results of the Kaizen team's work indicate that department of internal logistics is the most overloaded department in the production process.

As an optimal solution to eliminate the problem, we suggest that the company implement the Just in Time system. By using this system, we can eliminate the main reasons for the problem.

The system is based on the principle that individual levels of production receive a precise number of required units at the required time. Based on received and analysed data during the work of the Kaizen team, we suggest focusing on eliminating above mentioned reasons for costs:

- Eliminate economic reasons – we recommend letting suppliers know about company's requirements as outlined by the Just In Time system;
- Suppliers should visit the production and warehousing facilities of the company.
- Implement a system of internal orders from the department of production planning to the inventory department.

Saved financial resources from internal logistics can be used for innovation within the company. Finally, we suggest that the company standardize achieved results with an appropriately selected form, for example by publishing internal guidelines with new processes.

4. CONCLUSION

In conclusion, we would like to recommend that companies pay attention to problems. They need to view problems as “an opportunity for improvement”. Where there is no problem, there is no “opportunity for improvement”. A problem within an organization can be anything that causes problems to individual employees, to processes or to customers. Experience has shown that the person who is creating the problem is not directly affected by that problem. We suggest that individuals do not move a problem into another process. The worst that an employee can do, is to ignore, hide or cover up a problem. On the other hand, if management supports Kaizen and motivates employees to improve, employees are ready and able to identify and solve problems. We suggest using every “opportunity to improve” and apply the Kaizen method because at the start of each Kaizen is always a problem.

Acknowledgements

The authors would like to thank Agency KEGA for their support of the KEGA 011TU Z-4/2017 project „Integration of progressive information technologies and soft-skills in education

programs focusing on management of production processes“. This article was created as part of the project.

References

- Hábek, P., Wolniak, R., 2016. Relationship between Management Practices and Quality of CSR Reports. In. *Procedia - Social and Behavioral Sciences*, 2016. [online]. [15-06-2017]. Available from: <http://doi.org/10.1016/j.sbspro.2016.05.475>. pp. 115–123.
- Sujová, E., Čierna, H. 2013. Corporate culture as a tool to improve safety culture. In *Management Systems in Production Engineering*. ISSN 2299-0461. Vol. 11, no. 3 (2013), pp. 49-52.
- Industry World. 2015. Professional internet portal (in Slovak). [online]. [9-1-2015]. Available from: <http://www.svetpriemyslu.sk/profil/nemak-slovakia-podporuje-vo-vyrobe-inovativne-riesenia.html>.
- Bauer, M. et al. 2012. *Kaizen, the way to the lean and flexible company*. Brno: BizBooks. 2012. ISBN 978-80-265-0029-2. 192 p.
- Kaizen Institute. [online] [09-08-2017]. Available from: www.cz.kaizen.com/poradenstvi/kaizen-management-system.html.
- Masaaki, I. 2005. *Gemba Kaizen, Management and quality improvement at workplace*. Brno: Computer Press. 2005. ISBN 80-251-0850-3. 324 p.
- Masaaki, I. 2007. *Kaizen*. Brno: Computer Press. 2007. ISBN 978-80-251-1621-0. 272 p.
- Nölke, M. 2004. *Practical management. How to successfully lead and manage yourself, other people, businesses, and other organizations*. Praha: Grada Publishing, 2004.. ISBN 80-247-0912-0. 112 p.
- ZOS Zvolen, Inc. Internal company documents (in Slovak). 2014. [online]. [13-12-2014]. Available from: www.zoszv.sk/
- Internal company documents (in Slovak). Nemak Slovakia. [online]. [25-08-2017]. Available from: www.nemak.com/index.html.
- Research Institute of Pulp and Paper (in Slovak). 2014. [online]. [11-12-2014]. Available from: <http://www.vupc.sk/sk>
- Internal pulp and paper company documents.

THE CHANGE MANAGEMENT OF THE MANUFACTURING PROCESSES IN THE WOODWORKING COMPANY

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ABSTRACT

The article deals with the management of changes in production processes in the woodworking company. The aim of the paper is to illustrate the management of changes in the production processes in a particular process of wood production. Process management methods such as process maps, efficiency analyses, and degree of the utilization of production capacities, method 5S, Kaizen, FIFO, TMP have been utilized to optimize bottlenecks in production processes and in change management of production processes to improve their performance and effectiveness, and reduced costs.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: Production process; process management; process management methods; change management; performance.

1. INTRODUCTION

In today's turbulent changing environment it is important for the company effective response to changes brought about by the market. The ability to maintain the market, resist competition, reporting profits and ensure a good name in the competitive environment, are among the key factors in driving a successful business. These factors are largely driven by enterprises with a sophisticated internal philosophy based on each article of the process. Most company in Slovakia are engaged in manufacturing activities, and the production process itself consists of a large number of complicated operations. In production processes and in their harmonization, bottlenecks are often created to the increase of costs. Recognizing the bottlenecks of production processes, optimization and process improvement are an important starting point for change management. The main aim of this article is to illustrate the change management of production processes by means of selected methods of process management with proposals for their optimization. Businesses that emphasize the correct selection methods and their implementation in the management of changes in processes for the purpose of improving and optimizing gain competitive advantage and improve the performance of their processes.

2. MATERIAL AND METHODS

In order to change management, optimization and improvement of production processes, increasing organizational performance, achieve high productivity and efficiency in terms of process management is important in the selection of appropriate methods, tools and techniques.

The process can be characterized as an organized group of interrelated activities or sub processes that pass through one or more organizational units or one (business process) or multiple cooperative organizations (intercompany process) that consume material, human, financial and information inputs, and their output is the product (Šmida, 2007).

A similar opinion was expressed by Řepa, who claims that the business process is a sum of activities transforming inputs into a sum of outputs (goods or services) for other people (Řepa, 2007).

According to Lee and Dale (1998), the process is a sequence of defined activities performed on the basis of specified output requirements.

According to Krajčiová (2014), the production processes create the main added value for the customer, so it is natural that the attention of managers and employees is concentrated in the production organization to manage production processes whose main goal is to achieve high efficiency, productivity and efficiency, to the maximum satisfaction of the customer.

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Of these theoretical results it shows that the authors have a similar idea on that basis we will not further distinguish these concepts, as in the professional community are understood identically and without significant differences.

Business Process Management - BPM by Cienciala (2011) can be defined as a strategic approach to business management, in which using appropriate methods, techniques and tools of management processes for the purpose of achieving maximum business performance.

Řepa (2012) argues that process management means managing an enterprise in such a way that business processes play a key role.

The process map serves as a key factor in the process analysis, the processes are clear and their analysis is faster. The practical use of the process map is applied in the areas of process management, namely process analysis, process reengineering, process redesign, process optimization, process management, and process audit. The second area of process map utilization is in managing company performance, focusing on identifying key performance indicators (Řepa, 2007).

As reported by Fiala a Ministr (2003) process map shows the input-output relations processes, activities and departments themselves. Using the sequence of process steps, the documented activities are required to transform inputs to outputs.

According to Kollár (2013), using the process map, the enterprise describes its processes in the hierarchy - management, main and auxiliary processes.

According to Teplická and Alexandrová (2009), the efficiency of production processes can be calculated according to the coefficient of the process, which is an indicator of measuring the efficiency of processes:

$$K = \text{fact} / \text{plan} \quad (1)$$

According to the resulting coefficient value, the process can be evaluated as follows:

- Effective process - the value of the coefficient is $K \geq 0,85$
- A predominantly efficient process - the value of the coefficient is $0,85 > K \geq 0,70$
- Inefficient process - the value of the coefficient is $K < 0,70$.

We consider the change as a surprise, a novelty, it is a step into the unknown. It is associated with risk, unwillingness that leads to resistance.

Changes that may occur in the enterprise in technology, in consumer preferences, markets, organizational structure, business environment, procedures, and practices, in individuals where employees need to change their habits, attitudes, skills, and capabilities, depending on the rapidly changing environment (Drucker, 1992).

Change management in the enterprise by Majtán (2002) can be seen as a project for which it is necessary to observe the following steps: defining targets and milestones, identify the person, their roles and responsibilities, determine the form and extent of communication, establishing a timetable.

Successful change requires adaptation of methods, techniques, strategies and implementation tactics to specific history, culture, and people in the organization. The change process is very complex, but there are models to make the change (Rosenau, 2000).

The Donnelly model of change is based on the principle of sorting and evaluating information that expresses the severity of the forces of the factors that require change. It is not important whether these forces stem from internal or external sources (Majtán, 2002).

Methods of optimization, redesign and process reengineering are aimed at improving processes in an organization. Basically, they are divided into reengineering, business process reengineering (BPR), improvement, redesign, and continuous improvement methods based on quality management. Currently, the following improvement methods are used:

- Process Reengineering (Reengineering)
- PPP (Participatory Process Prototyping)
- Generally, it can be used to continuously improve the quality management methodology processes such as TQM (Total Quality Management), Deming PDCA, DMAIC, Six Sigma.

Approaches to improving processes that deal with the structure and functioning of the processes in the company by Svozilová (2011) can be divided:

- Business Process Improvement (BPI) - process improvement
- Business Process Reengineering (BPR) - a radical change in business processes

The goal of the logistic support of the production process by Dupal' and Brezina (2006) is to ensure its functional integrity. Just newer logistics concepts enable us to achieve a higher functional and qualitative level of manufactured products, shorten the continuous production times, increase

productivity, and effectively solve the logistics chain. They also optimally align and synchronize individual transport, warehousing, production or assembly processes throughout the logistics chain, improving the production system.

The most common method of production and management concepts are by authors Rašner and Rajnoha (2006), Kavan (2002), Vytlačil (1997), Gregor et al. (2000), Dupal' and Brezina (2006): JUST IN TIME, CANBAN, OPT, KAIZEN.

3. RESULTS AND DISCUSSION

3.1 Analysis of the process of production of three-layer latte deburring boards through a process map

For the analysis of the production of three-layer latte deburring boards, a process map as a process control tool was used to identify key processes and the relationships between them. This tool is often applied also in the production processes of the wood-processing industry. The demonstration of the interconnection and succession of the individual processes for the production of latte deburring boards is illustrated in Figure 1.

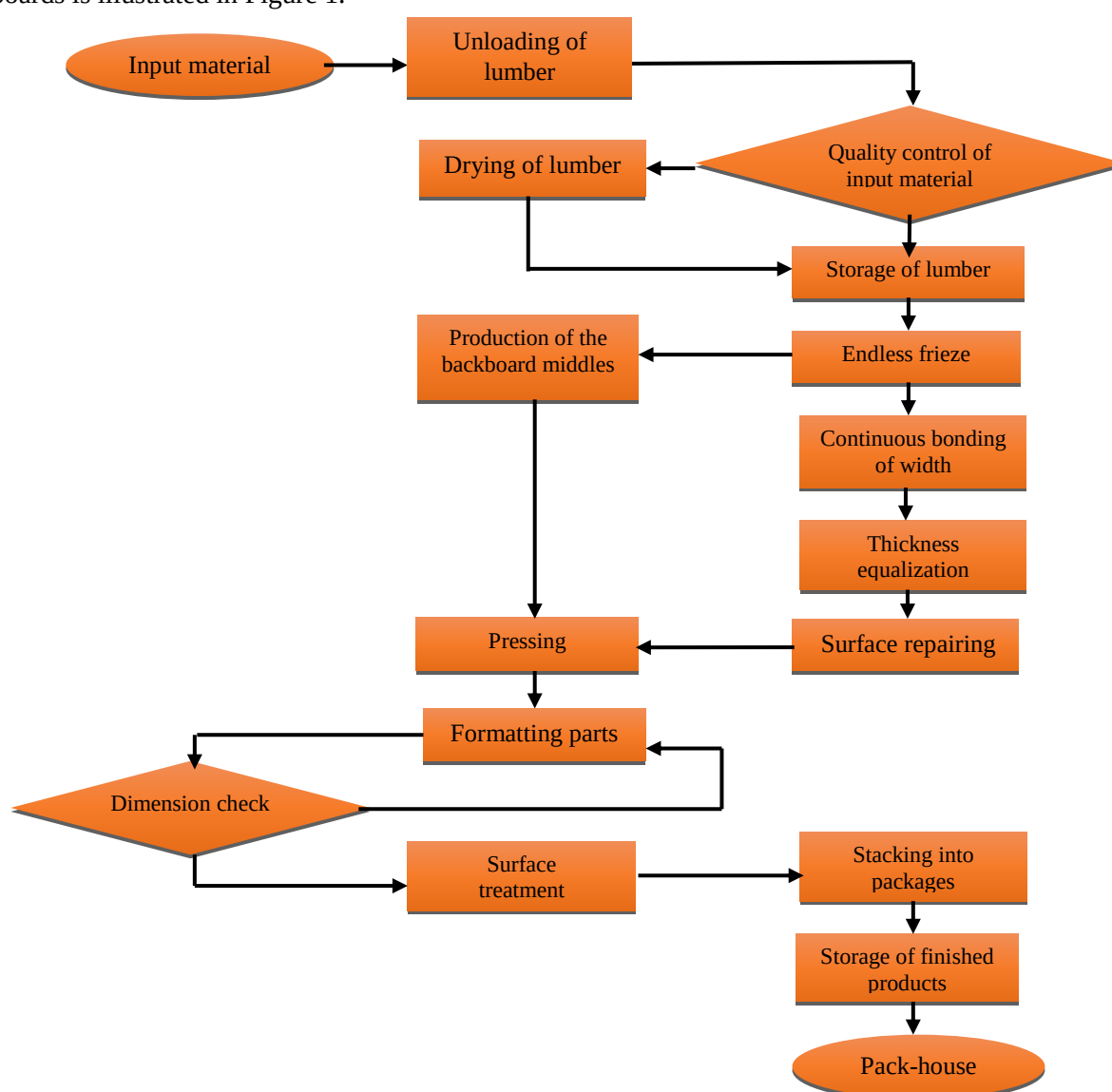


Figure 1 The process map of the production of deburring boards

Source: personal processing

3.2 Analysis of efficiency and degree of utilization of machine capacities in the production of three-layer latte deburring boards.

The analysis of effectiveness and the degree of utilization of machine capacities was carried out for two operations - production of casings and assembling of block boards for a period of 6 months.

By analysing production processes and performances of work shift, on the basis of the average daily values of theoretical, effective and current capacities, the efficiency and capacity utilization rates for the following workplaces for the production of casings were calculated:

- A - The process of continuous filament production,
- B - The process of width loading of the timber,
- C - The process of planning, cutting of and grinding,
- D - The process of dressing up the casings.

The resulting efficiency values were calculated based on the formula (1) and are given in%.

Table 1 The current effectiveness and the degree of utilization of the capacity of machine for the production of casings

Workplace	Average performances of workplaces per work shift m ²			
	A	B	C	D
The theoretical capacity	14 255,00	1 300,00	5 321,00	1 600,00
The effective capacity	13 721,00	1 110,00	4 645,00	1 425,00
The current capacity	12 852,00	946,00	4 501,00	1 102,00
Effectiveness %	94,26	86,17	96,41	77,25
Degree of utilization %	90,12	73,03	84,32	68,29

Source: internal company documents and personal processing

Table 1 we can see that they currently achieve efficiency values of almost 100% at workplaces A and C. Workplace D, where the repair process of casings is performed, reaches the lowest value of 77.25%.

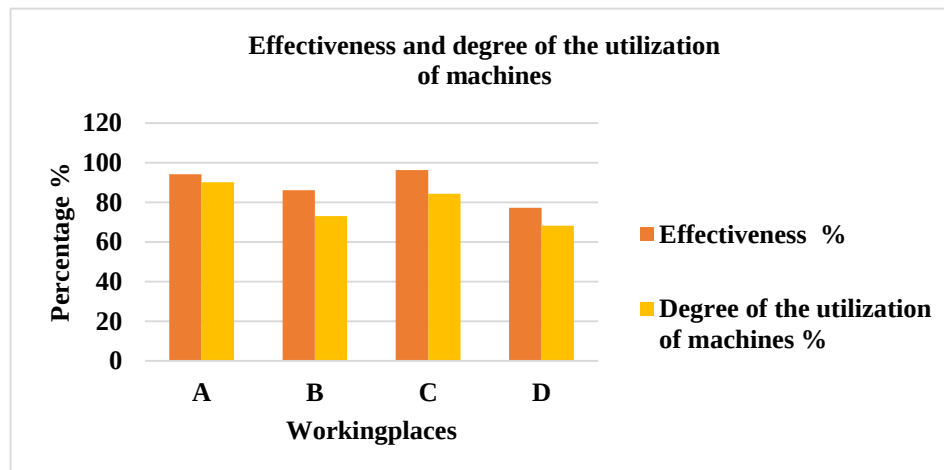


Figure 2 Effectiveness and degree of the utilization of machines in production of casings

Source: internal company documents and personal processing

As shown in Figure 1, the highest efficiency is the C workplace 96.41% process of planning, cutting and grinding. Subsequently, the workplace A is 94.26%, where the process of continuous filament production and workplace B having an 86.17% efficiency value. These processes can be evaluated as efficient processes because their value is more than 85%. The D workplaces with process of dressing up the casings with an efficiency of 77.25% is included in a group of predominantly efficient processes. Workplaces C, A and B are fully automated, delivering high performance and high productivity.

The lowest efficiency of production capacities was recorded at Workplace D and was due to insufficient equipment by automated machinery. At the same time, reduced productivity of work performance was due to the poor quality of the input material and to the amount of timber mistakes,

such as forged bumps, holes, smoulders, porous damage, dark colouring that needed to be repaired. Efficiency copies the levels of utilization of machine capacities in individual workplaces.

Analysis of efficiency and degree of utilization of machine capacities was carried out at workplaces of assembling of block boards. Daily performance workplaces were surveyed for a period of 6 kneading and calculations were performed on average values.

By analysing production processes and performances of work shift, on the basis of the average values of theoretical, effective and current capacities, the efficiency and capacity utilization rates for the following workplaces for the completing of block boards were calculated:

E - The process of production of bracelets

F – The process of pressing

G - The process of formatting

The resulting efficiency values were calculated based on formula (1) and are given in%.

Table 2 The current effectiveness and the degree of utilization of the capacity of machine in completing of block boards

Workplace	Average performances of workplaces per work shift m ²		
	E	F	G
The theoretical capacity	40,00	2 160,00	2 050,00
The effective capacity	35,00	1 985,00	2 005,00
The current capacity	27,00	1 841,00	1 920,00
Effectiveness %	77,23	92,11	96,48
Degree of utilization %	67,01	85,36	94,21

Source: internal company documents and personal processing

The lowest production efficiency of 77.23% was reported by the workplace E, where the lathe centring process was carried out. In this workplace there is no automation of production facilities, which was the main reason for low efficiency. The highest efficiency of 96.48% had a working G, where was the process of formatting. This workplace was fully automated, which proved to be the highest values of effectiveness found, and the processes at this workplace can be considered as effective. Workplace F, based on the resulting results of efficiency and the degree of utilization of the machinery, could be included in efficient processes.

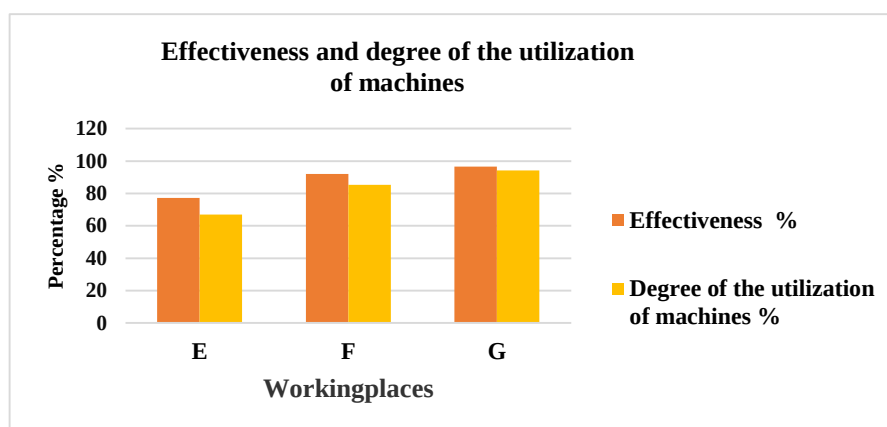


Figure 3 Effectiveness and degree of the utilization of machines in completing of block boards

Source: internal company documents and personal processing

3.3 The procedure of application and implementation methods to change the process of producing of block boards

To increase the efficiency of processes and the degree of utilization of machine capacity the company were recommended and subsequently implemented by these selected methods:

- Method 5 S - It is recommended to implement it throughout the enterprise, including manufacturing staff who, after thorough training, will be able to eliminate unnecessary activities from processes, to prioritize and to observe them, to save work equipment before the end of each shift to the designated place to avoid losses due to non-optimized deposit in the workplace. Within the working hour's schedule, 20 minutes of workplace maintenance (cleaning) and control are recommended for each shift. Leaders at each workplace and for each production process will develop standards that employees will be required to adhere to, such as standards for cleaning machinery. For individual jobs is precisely defined schedule of working hours of each shift and the individual actions to be taken during the shift in the workplace. On the basis of shift working time it is increased motivation among employees and creates in them habits to maintain a certain system.
- Method Keizen - will be introduced at all levels of government and in all production and non-production processes of the company. In process improvement should be involved every single employee of the company. Through improvement proposals of employees is expected to increase process performance. Every employee has the opportunity to present its proposal for improvements to be assessed and then after evaluating the benefits financially assessed.
- FIFO - the method has been recommended for use mainly in the field of logistics for the storage of timber, semi-finished products, finished products where the material is degraded, the storage costs are increased and the material handling losses are increased.
- TPM (Total Productive Maintenance) - were recommended the introduction mainly in manufacturing processes, where for each production facility on a particular workplace will be defined timescale for daily, weekly, monthly, semi-annual and annual maintenance. Applying this method, employees should be able to respond operationally to the disruptions that have occurred and the downtime should be eliminated.

4. CONCLUSION

Comparing, re-evaluating, applying and implementing the theoretical aspects of process management, using methods and methodologies for process optimization by authors Teplická and Alexandrová (2009), Ciencala (2011), Fiala and Ministr (2003), Rataj (2013), Šebej (2003), Řepa (2012), Čierna a Sujová (2016), Gregor (2005), Sujová and Marcinek (2015), Majtán (2002), Rosenau (2000), Dupal' and Brezina (2006) were analysed of planned and actual process performance were carried out, a map of processes, analysis of efficiency and degree of utilization of machinery, as well as application and implementation of recommended methods for improvement of efficiency and optimization of processes.

Analyses of production processes revealed, based on the low efficiency of two workplaces, particularly in the production of semi-fabricated block boards and in the repairing of casings, a space for change which, through the use of selected methods and tools, brought positive results in increasing the efficiency of workplaces.

The results of the optimization of the production processes were most pronounced at the workplace of repairing of casings, after the implementation of the modernization of the production facilities and the introduction of the recommended methods, the overall efficiency of the production facility increased by 14% and the workplace of the assembly of block boards the by 12%.

Businesses that are process-driven significantly increase their efficiency and improve their performance. Through a thorough knowledge of individual manufacturing processes, they can flexibly respond to stimuli in a complex and changing business environment.

Modern production management tools provide enterprise flexibility to respond flexibly to change, achieve improvements in managing process changes, look for the basics of production optimization, and early detection of deficiencies to ensure enterprise development.

The main objective of the article was to analyze production processes, streamline processes and optimize them in a woodworking company for the production of blockboard deburring boards.

Acknowledgements

This article has been supported by funds of the projects No. 1/0286/16 and No. 1/0537/16 under VEGA agency, Slovakia for covering the publishing costs.

References

- CIENCIALA, J. et al. 2011. *Procesně řízená organizace, tvorba, rozvoj a měřitelnost procesů*. Professional Publishing. ISBN 978- 80-743-1044-7.
- ČIERNA, H.; SUJOVÁ, E., 2016. Application of modern QMS - KAIZEN management system. In MM science journal. - ISSN 1803-1269. - No. November (2016), p. 1456-1464.
- DRUCKER, P.F.: *Management.Budoucnost začíná dnes*. Praha : Management Press, 1992.
- DUPAL, A., BREZINA, I. 2006. Logistika v manažmente podniku. Bratislava: SPRINT, 2006. 326 s. ISBN 80-89085-38-5.
- FIALA, J., MINISTR, J. 2003. *Průvodce analýzou a modelováním procesů*. VŠB - Technická univerzita, 2003. ISBN 802-48-0500-6.
- GEJDOS, P. Metóda Six Sigma – flexibilný systém zdokonaľovania podnikovej výkonnosti. In: Acta facultatis xylologiae XLVIII 2/2006. Zvolen: TU Zvolen 2006, p.103-111, ISSN 1336-3824.
- GREGOR, M. et al. 2000. Dynamické plánovanie a riadenie výroby. Žilina: Žilinská univerzita v Žiline, 2000. ISBN 80-7100-607-6.
- KAVAN, M. Výrobní a provozní management. 1.vyd. Praha: Grada Publishing, 2002, 424 s. ISBN 80-247-0199-5.
- KOLLAŘ, V. 2013. Manažment kvality 1. vyd. Trenčín. 2013. 210 s. ISBN 978-80-89600-11-3.
- KRAJCIOVA, M. 2014. *Procesné riadenia: 8 zásad SMK*. [online]. [cit. 2014-10-26].
- LEE, G.R - DALE, G.B. 1998. Business process management: a review and evaluation. In: Business Process Management Journal, roč. 4, 1998, č. 3, s. 214-225.
- MAJTAN, M: *Projektový manažment. Nové trendy v manažmente*. Bratislava: Ekonóm, 2002, ISBN 80-225-1553-1.
- MARCINEKOVÁ, K., SUJOVÁ, A. (2015). The influence of the process control level on the enterprises' roe. Conference: 9th International Scientific Conference on Business Economics and Management (BEM), Book Series: Procedia Economics and Finance. Číslo: 34. 290-295.
- RASNER, J., RAJNOHA, R. 2006. Nástroje riadenia efektívnosti podnikových procesov. Zvolen: Technická univerzita vo Zvolene, 2006. 286s. ISBN 978-80-228-1748-6.
- ROSENAU, M. D.: Řízení projektů. Praha : Computer Press, 2000, ISBN 80-7226-218-1.
- ŘEPA, V. 2007. *Podnikové procesy: procesní řízení a modelování*. 2., aktualiz. a rozš. vyd. Praha : Grada, 2007. 281 s. ISBN 9788024722528.
- ŘEPA, V.. *Procesně řízená organizace*. Praha: Grada:2012. 301s. ISBN 978-80-247-4128-4.
- SVOZILOVÁ, A. 2011. Zlepšování podnikových procesu Praha: Grada, 2011. 232 s. ISBN 9788024716794.
- ŠEBEJ, P. 2003. *Optimalizácia topológie výrobných liniek a organizácia tokov vo výrobevyužitím matematických prostriedkov*. In: Nové trendy v prevádzke výkonnej techniky. Prešov: TŮ-FVT, ISBN 8080-730-598.
- ŠMIDA, F. 2007. *Zavádění a rozvoj procesního řízení ve firmě* Praha: Grada, 2007. 293 s. ISBN 9788024739380.
- TEPLICKÁ, K., ALEXANDROVÁ, G, 2016.: Hodnotenie efektívnosti a funkčnosti procesov v systéme manažérstva kvality. In: Q-magazín : internetový časopis o jakosti [online]. [cit. 2009-07-09]. Dostupné na internete: <http://fmml10.vsb.cz/639/magazin.htm>. ISSN 1213-0451.

APPLYING THE SIX SIGMA METHOD TO IMPROVE THE QUALITY OF PRODUCTION

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ABSTRACT

Six Sigma methodology and methods used in the different stages of the DMAIC improvement model are excellent tools for reducing undesirable variability in business processes that result in disagreement, rise of unproductive costs, losses and customer dissatisfaction. The aim of the article is to point out the possibilities of quality improvement using DMAIC methodology and its various methods such as COPQ, Ishikawa diagram, SPC, capability index, Pareto chart, histogram, DPMO and other.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: Quality, process, quality improvement, disagreement, Six Sigma.

1. INTRODUCTION

The adoption of a quality management system is a strategic decision for an organization that can help to improve its overall performance and provide a sound basic for sustainable development initiatives. The reason for the resulting changes in the quality and quality management is the overall development of the economic and political situation in developed countries. This trend is particularly marked change in producers' market to market buyers, quality assurance for the entire lifecycle of the product and the utilization factor of time to influence the market. At present, the companies aim to be able to enforce the domestic and foreign markets, while in the past focused primarily on increasing production volume and cost reduction. The success of any organization in the market depends on the quality of its manufactured products and services that are compared to the competition as well as the performance of the processes that take place within companies. An integral part of quality management in companies, not excluding furniture production are the using of modern techniques for securing and improving quality within process management, change management and performance improvement. The potential benefits to an organization of implementing a quality management system are:

- the ability to consistently provide products and services that meet customer and applicable statutory and regulatory requirements,
- facilitating opportunities to enhance customer satisfaction,
- addressing risks and opportunities associated with its context objectives,
- the ability to demonstrate conformity to specified quality management system requirements.

2. MATERIAL AND METHODS

In accordance with the recommendation of the authors Mateides et al. (2006), Töpfer (2008), Schroeder, 2006, Grasseová et al. (2008), Marcinekova – Sujová (2015), (Pande et al., 2002), Čierna – Sujová (2016) and others amongst the most well-known and used methods and tools that are used in the process approach are Plan-Do-Check-Act (PDCA – Deming cycle), DMAIC, , Balance Scorecard, models EFQM (European Foundation for Quality Management), Systems of quality control, CAF (Common Assessment Framework), SIX SIGMA, norms ISO order 9000 and others.

Six Sigma has been applied not only in the industrial enterprises but also in the area of the services, health, and public administration, both in the private and public field, where there is a strong orientation on the customer, quality, time, and performance (Schroeder, 2006)

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According to Töpfer et al. (2008), Six Sigma has two dimensions which are:

Six Sigma, as project management, with sound statistical foundations and effective quality management tools, which contain: systematic methodology DMAIC (Define-Measure-Analyze-Improve-Control) and DMADV (Define-Measure-Analyze-Design-Verify), project and process management, and a set of tools process analysis for resolving problems, statistics, philosophy and quality culture at a zero defect level.

Pande et al., 2002 Six Sigma, as a statistical concept for measurement, is based on the principle that there are no more than 3.4 errors in the process per million chances, whilst taking into account the complexity of products and processes.

The highly useful role of Six Sigma for small and medium enterprises was justified by Kaushik et al. (2012).

The term “Six Sigma” refers to the ability of highly-capable processes to produce output within specification. In particular, processes that operate with six sigma quality produce at defect levels below 3.4 defects per (one) million opportunities. According to Ev – Scaria (2010), Al – Agha et al., (2015), Kaushik et al. (2012) a Six Sigma is a statistical measure of process capability, which is equivalent to 99, 99966 % of good parts.

The **DMAIC** procedure will be describe in this section according to Pande et al., (2002), Mateides et al. (2006), Töpfer (2008) and amongst. This procedure for the implementation of improvement projects that requires management commitment and team work also involves the use of statistical methods, quality improvement techniques and the scientific method.

In the **Define** step, a team defines the problem objectives and goals, identifies the customers of the process and customers’ requirements. In this step, the most used methods as a project charter, work plan, a measurement of the customer requirements and process map documentation.

In the **Measure** step includes the process performance measure selection, measurement system evaluation and analysis and determination of the process performance level and capability. In this step what to measure must be decided by the team.

The step of **Analysis** includes the analysis and determination of potential root causes of variation through the use of statistical tools and the basic quality tools such as Pareto charts, Ishikawa Diagrams, etc. The important input of this step is data generated by the measuring the important variables.

The goal of the **Improve** step is to find and implement solutions that will eliminate the causes of problems, reduce variation in a process or prevent a problem from recurring. The identification of potential solutions is often generated by brainstorming.

The **Control** step has the objective to continue measuring the performance of the process periodically and keeping it under control. The process management control and action plans are made by implementing control charts, control plans and mistake-proof devices. The first three steps are observational studies, that is, there is not intervention in the process. While in the last two steps are designed experiments.

Comparing the main ideas of the authors Pande et al., (2002), Töpfer et al. (2008), Sujová – Marcinekóvá(2015), Simanová (2015), Čierna - Sujová, (2016), Závadský, (2006), the classification and structure of methods, tools and techniques for managing and changing processes can be diverse. A classic breakdown of these methods used to ensure quality in all phases of the production cycle is the breakdown of methods into seven traditional and seven new tools of the quality management.

Values of output variables that are the result of transformation of input quantities in production and technological processes characterize the state of the process and can be described by Hrubec et al. (2009) as quality requirements (dimension, roughness, strength, the proportion of non-conformity of the portion, the diameter of the opening for the joint, etc.) or technological parameters (pressure in the compression of the veneer, the temperature of the adhesive, adhesive coating, and the like). The ideal condition would occur if the output values still had the same values.

The introduction of statistical methods into processes is one of the requirements for obtaining a certificate of quality management system according to STN EN ISO 9001: 2015. The application and implementation of selected statistical methods through Six Sigma methodology into processes decisively affects to the improving quality of produced products and services (Terek - Hrnčiarová, 2004).

The histogram is a bar chart used to express scattering. To construct is required to be obtained output variables. The values of the examined variable representing the individual classes are applied to the x axis. The corresponding absolute or relative abilities are applied to the y axis. The random variable changes its value by acting accidentally. To create a histogram need to create a set of statistics (a set of statistical units). The histogram should be applied especially in the studies of process capability, in the continuous control of production processes (Palan, 2002).

Control charts of measurement are effective tools that can be used, if available data obtained from the measurement process. The aim of the control diagrams is to get the process under statistical control. The process under statistical control is a process in which the only cause of scattering random causes. While the process is under a statistical check, it is possible to judge to what extent the customer's requirements will be met.

In principle, all control diagrams have the following objectives:

- determine whether the process is under statistical control,
- keep the process under statistical control,
- demonstrate measures to improve process capability (Hrubec et al., 2009).

Six Sigma, as project management, with sound statistical foundations and effective quality management tools, which contain: systematic methodology DMAIC (Define-Measure-Analyse-Improve-Control) and DMADV (Define-Measure-Analyse-Design-Verify), project and process management, and a set of tools process analysis for resolving problems, statistics, philosophy and quality culture at a zero defect level.

Pande et al., 2002 Six Sigma, as a statistical concept for measurement, is based on the principle that there are no more than 3.4 errors in the process per million chances, whilst taking into account the complexity of products and processes. According to Gejdoš (2006), the improvement of processes is amongst the basic attributes of the Six Sigma method. The aim of the process improvement is the performance at the level 6σ . It is an enabled process, in which out of the million opportunities for a mistake, i.e. not fulfilling the customer's specification, it happens only 3.4 times. Process capability - the sigma level is an indicator of the quality of the process, therefore the likelihood of errors in the process. The higher the sigma, the lower the probability that the process will produce an error. Based on the study of opinions of various authors on Six Sigma methodology, we can see a consensus that the methodology Six Sigma is an approach or system that, combining the use of statistical methods, understanding customer requirements and reducing process variability, is moving towards improving the processes and increasing their level of perfection, expressed by a maximum number of errors per million opportunities and this value should be around 3.4 errors. (Simanová, 2015)

3. RESULTS AND DISCUSSION

For the improvement project was selected the product based on the highest costs of poor quality as illustrated in Figure 1. Phase Define was completed by Six Sigma application project charter defining work positions, responsibilities, tasks, time tables of individual phases and economic evaluation.

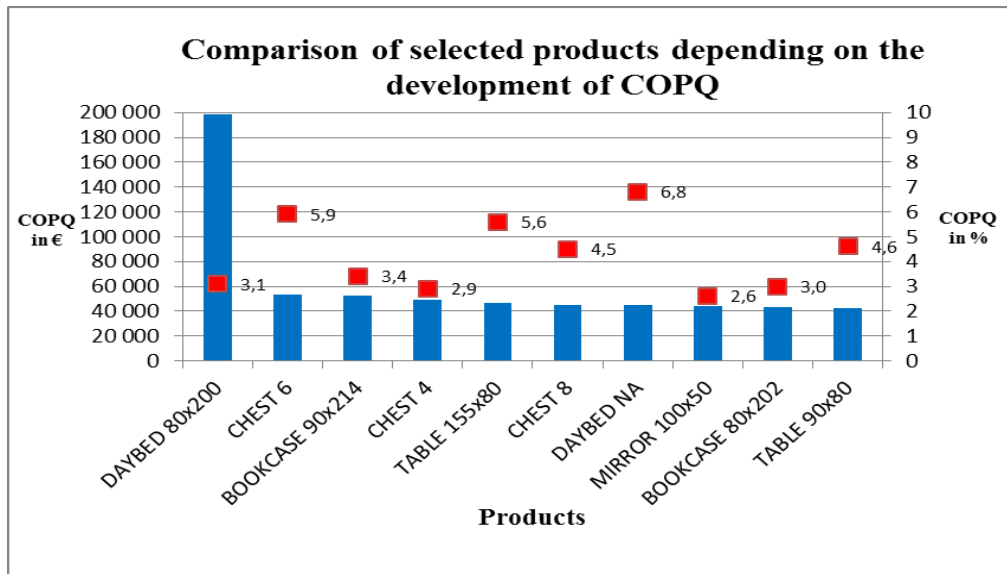


Figure 1 Comparison of selected products depending on the development of COPQ

Source: internal company documents and personal processing

For measurement as the second step of the DMAIC model, the Ishikawa Diagram was constructed by brainstorming and teamwork. This diagram, known by its shape on the fish bone, was chosen to identify and detect possible causes that could have occurred during the manufacturing process as a result of which the product was identified as being unadulterated (Fig.2).

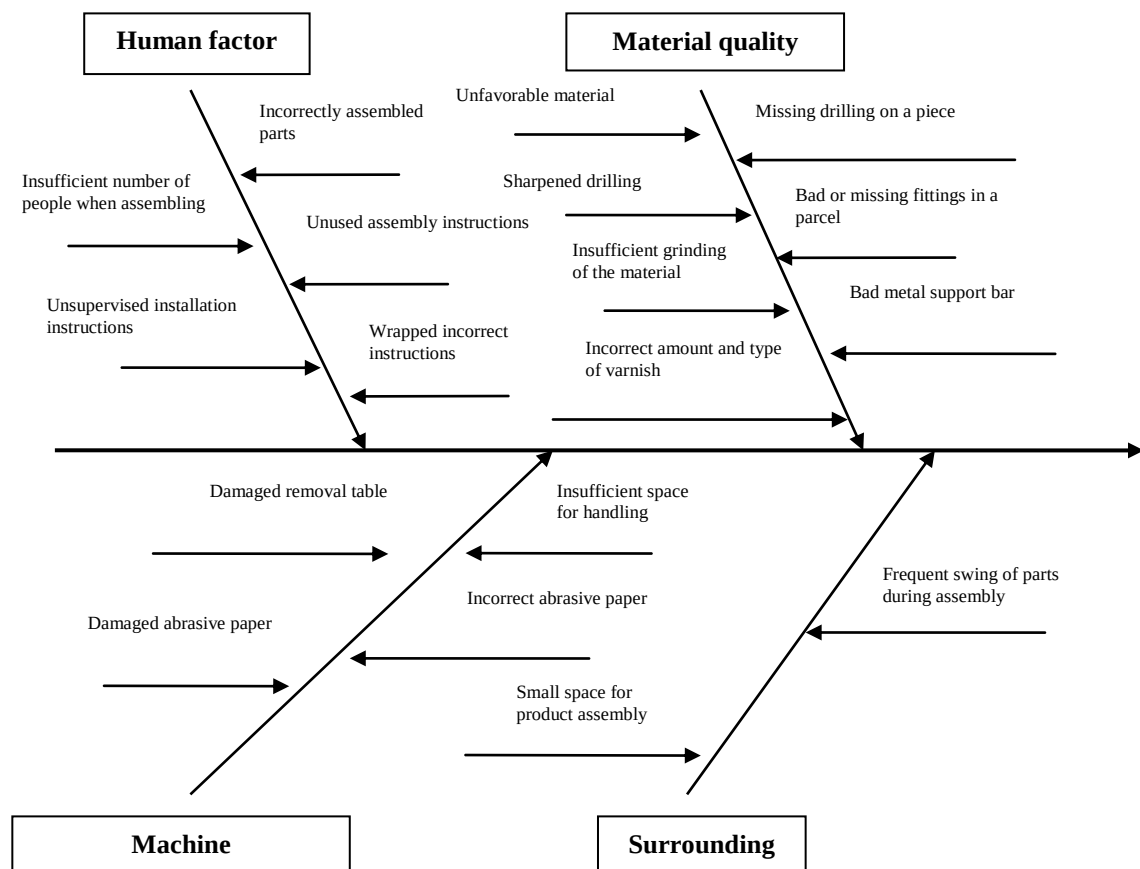


Figure 2 Ishikawa diagram for determining the causes of the problem

Source: internal company documents and personal processing

The analysis showed that the main reason for ensuring the functional product is the incorrect diameter of the holes for the fittings, therefore we made a measurement, the results of which are shown in the Fig 3. The x axis shows the number of measurements and the value of the monitored quality mark on the y axis.

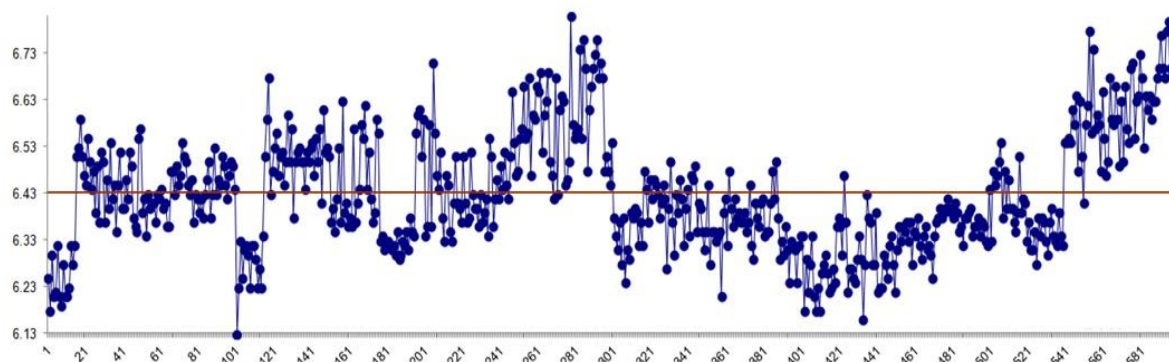


Figure 3 Measure the diameter of the holes for fitting

Source: internal company documents and personal processing

The next step in monitoring the quality of the process and the Six Sigma concept is the phase of analyzing the results obtained from the previous solution. At this stage, we will set the actual quality of the process by calculating the capability index **Ppk**.

$$Ppk = \frac{\min[(USL - \bar{X}); (\bar{X} - LSL)]}{3 \times s}$$

USL (LSL) - upper (lower) tolerance limit

X - arithmetic mean

S - Selective standard deviation

Tab. 1 shows the results of each measurement. As we can see in Table 1, the parameter analyzed is below 1.67, meaning that the process is inappropriate. Because we have determined by the Ppk calculation the ineligibility of the process, we decided to analyze the impacts that could have caused this ineligibility. To view measurement data, we used one of the basic tools of quality management - a histogram (Fig.4) that displays the distribution of the measured values of the monitored quantity at appropriate intervals around the mean value.

Table 1 The results of each measurement

sample range	600
standard deviation s	0,1257
arithmetic mean X	6,43
upper tolerance limit USL	6,6
lower tolerance limit LSL	6,3
index Ppk	0,35

Source: internal company documents and personal processing

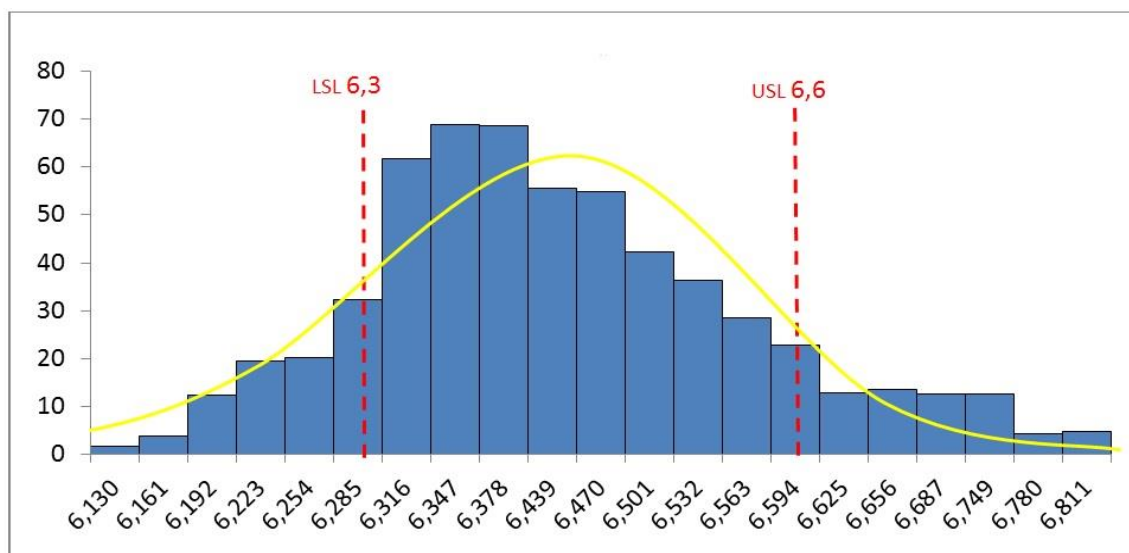


Figure 4 Histogram - hole diameter

Source: internal company documents and personal processing

In view of the established facts about the process capability in a company, consideration should be given to creating and implementing corrective actions that can improve the capability of the manufacturing process. By improving the process and thus also the quality of the products, the costs associated with poor production and non-production are also eliminated. In cooperation with the company, we have put together several of the above-mentioned corrective measures to ensure the improvement of the process and the elimination of costs of poor production. Some of the proposed and implemented measures were:

- changing the fitting and its placement,
- changing installation steps in assembly instructions,
- retraining of the operator,
- new suction filters installed and their regular maintenance and others.

The final step that closes the DMAIC modeling methodology is the check that needs to be done to conclude and see if the implementation of the measures to improve the process has been successful. Because the company is currently tracking its quality mainly with the COPQ value, we evaluate the results before and after the corrective actions that have been implemented after this analysis (Fig.5).

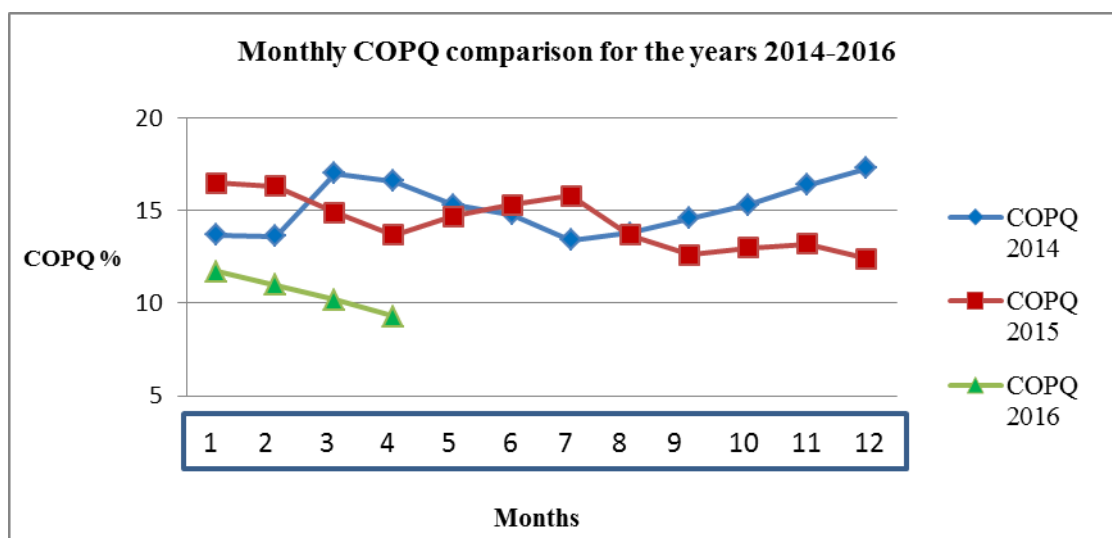


Figure 5 Monthly COPQ comparison for the years 2014-2016

Source: internal company documents and personal processing

4. CONCLUSION

Today's highly competitive market environment increases the enormous demands on the products and services provided and anyone who wants to apply to the market must adapt to these rules. Today, the customer does not accept a poor product, so it is up to manufacturers to improve the quality of their products, accept customer requirements, and minimize the production of poor quality products, as there is no other way to succeed.

The last decades have been the process of automating processes and activities in all areas of life. The competition pressure to improve the quality of production has led businesses to start looking for ways to increase the efficiency and performance of their businesses. In their activities, companies began to focus on the customer and meet their growing demands and began to look for ways to address these issues because the company's business performance improvement strategy means profitability for the enterprise, increased competitiveness, market position and the resulting economic benefits of the business can be calculated by each manager.

Acknowledgements

This article has been supported by funds of the projects No. 1/0286/16 and No. 1/0537/16 under VEGA agency, Slovakia for covering the publishing costs.

References

- Coulson-T.C., 1994. Business Process reengineering: Myth and Reality, London, U.K.Kogan Page Limited.
- Čierna, H.; Sujová, E., 2016. Application of modern QMS - KAIZEN management system. In MM science journal. - ISSN 1803-1269. - No. November (2016), p. 1456-1464.
- Drábek, J., Merková, M., 2010. Efektívnosť priamych zahraničných investícií v odvetví spracovania dreva. Vydavateľstvo TU Zvolen. 2010. 103 s. ISBN 978-80-228-2196-4.
- Gejdoš, P. 2006. Metóda Six Sigma – flexibilný systém zdokonalovania podnikovej výkonnosti. In Acta facultatis xylologiae XLVIII 2/2006, TU Žvolen 2006, 103-111s, ISSN 1336-3824
- Grasseová, M., Dubec, R., Horák, R., 2008. Procesní řízení ve veřejném sektoru. 1. publ. Brno: Computer Press, 2008. 266 s. ISBN 978-80-251-1987-7.
- Hammer, M., Champy, J., 2000. Reengineering - radikální proměna firmy: Manifest revoluce v podnikání 3.vyd. Praha Management Press. ISBN 80-7261- 028-7.
- Hrubec, J., a kol. 2009. Integrovaný manažerský systém. Nitra: Slovenska poľnohospodarska univerzita, 2009. 544 s. ISBN 978-80-552-0231-0.
- Kassay, Š., 2013. Riadenie organizačnej štruktúry, štvrtá časť, Veda, Vydavateľstvo SAV, Bratislava, 2013. ISBN 978-80-224-1323-7.
- Luděk, K., 2005. Ekonomika procesně řízených organizací. 1. vyd. Praha : Oeconomica, 2005. 54 s. ISBN 80-245-0965-2.
- Marcinek, K., Sujová, A. (2015). The influence of the process control level on the enterprises' roe. Conference: 9th International Scientific Conference on Business Economics and Management (BEM), Book Series: Procedia Economics and Finance Číslo: 34. 290-295.
- Mateides, A. et al. : Manažérstvo kvality. História, koncepty, metódy, EPOS Martin 2006, ISBN 80-805-7656-4.
- Nenadál, J., Plura, J., 2008. Moderní management jakosti, management press, 2008, ISBN 978-80-7261-186-7, s.348-354.
- Owen F., Maidment, D., 1996. Quality Assurance. Institution of Chemical Engineers, , Rugby, ISBN 0- 85295-372-0.
- Palán, J. et al., 2002. Řízení změn.1. vyd. Praha: Credit, 2002. 256 s. ISBN 80-213-0893-1.
- Pandě, P.S., Cavanagh, R.R., Neuman, R.P., 2002. Zavádíme Metodu Six Sigma: aneb jakým způsobem dosahují renomované světové společnosti špičkové výkonnosti. 1. vyd. Brno: TwinsCom, 2002. ISBN 80-238-9289-4.
- Pyzdek, T., Keller, P., 2010. The six sigma handbook. New York: McGraw-Hill, 2010. ISBN 978-0-07-162337-7.
- Rastogi, M. Production and operation management, Bangalore: University science press, c2010, v, 168 s. ISBN 978-93-80386-81-2.
- Simanova, L., 2015. Specific proposal of the application and implementation Six Sigma in selected processes of the furniture. In Procedia - economics and finance [elektronický zdroj]. International scientific conference: Business economics and management (BEM2015). - ISSN 2212-5671. - Vol. 34 (2015), p. 268-275 [online].
- Stamatis, D. H., 2004. Six Sigma Fundamentals: A Complete Guide to the System, Methods and Tools. 1st ed. New York: Productivity Press, 2004. ISBN 156327292X.

- Šmída, F., 2007. Zavádění a rozvoj procesního řízení ve firmě. 1. vyd. Praha: Grada Publishing, 293 s. ISBN 978-80-247-1679-4.
- Terek, M. - Hrnčiarova, L.: Štatistické riadenie kvality. Bratislava: IURA EDITION s.r.o. Bratislava 2004, 234s, ISBN 80-89047-97-1.
- Töpfer, A. 2008. Six Sigma. Koncepce a příklady pro řízení bez chyb. Praha: Computer Press, 2008. ISBN 978-80-251-1766-8.
- Veber, J. et al., 2006. Management kvality, prostředí a bezpečnosti práce: Legislativa, metody, systémy, praxe. Praha: Management Press, 2006. 358 s. ISBN 80-7261-146-1.
- Vodáček, L., Vodáčková, O., 2001. Management – Teorie a praxe v informační společnosti. Praha: Management Press, 2001. 314 s. ISBN 80-7261-041-4.
- Závadský, J., Koval'ová, M., 2011. Operatívna a strategická výkonnosť podnikových procesov. Bratislava: Slovenský komitét pre vedecké riadenie ZSVTS, 2011. 84 s. 84 s.

STRATEGIC CONCEPT FOR SELECTED TRANSPORT COMPANY BASED ON FORECASTING PERFORMED BY MOVING AVERAGES MODELS

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ABSTRACT

In this paper authors suggest a strategy for selected Slovak transport companies into the future. At first, theoretical aspects of supply chain in automobile industry are discussed. Authors then analyse the current as well as past situation on the market using content analysis, they study different factors which have influence on this situation. Using real historical data, they create quantitative models of exponential smoothing to forecast the future state on this market, the best model is selected on base of MAPE error. Finally, authors synthesize their analyses and predictions to create recommendations and suggest the optimal strategy for these companies.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: public transport, vehicles, prognosis.

1. INTRODUCTION

In Slovakia, transport can be characterized by two interesting facts. At first, there is an exponential growth of transport vehicles (Fig. 1) which causes conditions of road infrastructure are getting worse and worse as the road infrastructure in Slovakia has already achieved its limits. On the other hand, the number of people transferred by one vehicle is constantly decreasing. In other words, the transport of materials is increasing (logistics) as well as the individual transport (Dubovec & Makyšová, 2016). Neither the saturation of road infrastructure does not cause that people start use the public transport more. Therefore, this type of transport has been decreasing in Slovakia for quite a couple of years. There is a big difference between transport and ecology; in ecology people are aware of negative impacts of their behavior, try to be responsible and separate the waste they have produced. Unfortunately, the analogic behavior is not present in the transport area, i.e. using the means of public transport (one vehicle and many passengers), which, among others, also causes the savings in the family budget.

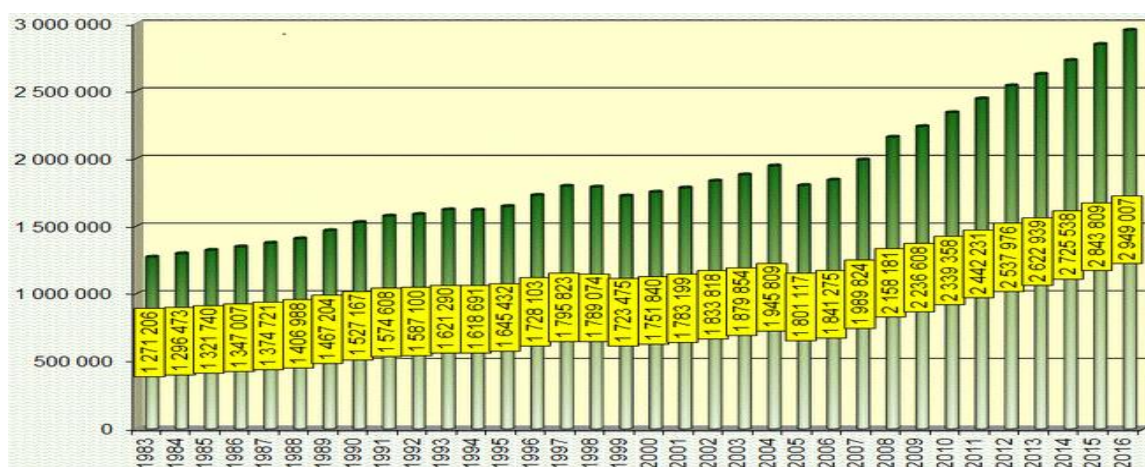


Figure 1. The total number of motor vehicles registered in Slovakia in the years 1983 - 2016

Source: <https://www.minv.sk/?celkovy-pocet-evidovanych-vozidiel-v-sr>

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The number of motor vehicles is increasing every year; in 2015 2,8 million vehicles were registered in Slovakia; it is 16,4 % more than in 2010. Motor vehicles were the highest portion from that number (71,5 %). The highest number of vehicles were registered in Bratislava region (17,7 %) followed by Nitra region (13,3 %), on the other hand, in 2015 the smallest number of vehicles were registered in Trenčín region (10,7 %). Table 1 states the overview of road transport in Slovakia

Table 1 Number of registered motor vehicles in Slovakia, vehicles-accidents 2010 – 2015

Year		2010	2011	2012	2013	2014	2015
Passenger cars	pcs	1 669 065	1 749 271	1 824 190	1 879 759	1 949 055	2 034 574
Trucks	pcs	252 866	256 869	259 839	261 840	265 424	272 955
Special	pcs	20 462	21 953	24 170	26 596	27 694	29 500
Trailers	pcs	23 183	24 942	26 139	27 561	28 429	29 928
Buses	pcs	9 350	9 074	8 957	8 821	8 876	8 939
Tractors	pcs	46 092	46 846	47 645	54 690	63 125	65 917
motorcycles (without small ones)	pcs	59 563	63 859	68 063	74 101	80 791	88 652
Caravans and semitrailers (incl. bus)	pcs	226 333	234 502	241 823	251 217	262 781	272 892
other	pcs	32 444	34 915	37 150	38 354	39 363	40 452

Source: ŠÚ SR, Odvetvové štatistiky, Doprava

Moreover, the public transport records decline in its use. In last five years, the number of passengers travelling by the public transport have decreased by 17,3 %, to 247,7 million of passengers.

Table 2 Public transport 2010-2015

Indicator			2010	2011	2012	2013	2014	2015
	sum	Thousands of passengers	312 717	299 579	289 228	270 123	262 262	252 175
Transport of people	national	Thousands of passengers	310 403	297 482	286 983	268 340	.	.
	international	Thousands of passengers	2 314	2 097	2 245	1 783	.	.

Source: ŠÚ SR, Odvetvové štatistiky, Doprava)

Following from the tables stated above, there is a clear trend for Slovakia – the smaller using of public transport and the more and more using of passenger transport with own vehicle. However, this phenomenon seems to be a big a problem for Slovakia. The question is, how the particular public transport company should react to this situation.

To create the big picture about the company's situation and how to proceed in the future, we performed qualitative and quantitative analysis.

2. ANALYSIS

2.1 Qualitative research

The transport company of city of Žilina (DPMŽ) has provided its services to passenger since the May, 1st, 1949. As time went on, the portfolio of services has been extended, today, DPMŽ offers also car service as well as other subsidiary services. However, the main subject of this analysis are public transport services even though it is not always possible to exclude other services (see for example Table 2, planned costs and revenues).

DPMŽ was the first public city transport company who implemented the information system consisted of on-board computer, electronic ticket markers, electronic routing tables and acoustic notifiers for notifying stops inside the vehicle as well as out to the exterior due to unseeing persons.

DPMŽ is constantly working so that more and more people would be motivated to change cars for mass public transport. For example, in 2015, the company, together with city of Žilina, made a

competition “Change to public transport and win”. The core of this competition was to speak to new passengers, mainly drivers. In October 2016, the free-of-charge public transport was implemented, this free-of-charge transport was available to a person who accompanies at least one child younger than 4 years old. Moreover, DPMŽ is constantly updating graphic timetables, adds or changes the public transport lines so that passengers would be more satisfied. These changes are often initiated by passengers themselves (Dubovec & Majer, 2016). Some of passengers demands include shorter waiting times between crossing multiple lines, ensuring the transfer from the night shift and to morning shift, connection to trains, public transport availability of new locations, more comfort in public transport vehicles, etc.

DPMŽ defines partial strategic goals for its development (DPMZ, 2017). These goals come out from demand of passengers as well as from trends in transport and financial situation. Some of the goals include:

- Obtention of financial sources from EU funds
- Economic and financial stability
- Fulfillment of defined financial plan and its evaluation
- Controlling and optimization of operational costs
- Satisfaction of public transport passengers
- Quality of provided transport services
- Feedback from passengers
- Efficient transport management

In order to make these goals, DPMŽ spends a lot of costs. However, it also expects the return of their investments. In Table 2 planned revenues and costs in particular years are displayed, these numbers are then compared to real data. We want to make an emphasis on the fact that these numbers are from all areas of business activities, not only from public transport itself.

Table 2 Costs and revenues of DPMŽ in 2009 – 2016

Year	Costs in €			Revenues in €		
	Planned	Real	Difference	Planned	Real	Difference
2009	10 593 546	9 432 414	89,04%	9 799 692	8 705 066	88,83%
2010	9 785 334	9 562 354	97,72%	9 102 744	8 864 392	97,38%
2011	10 256 670	9 830 343	95,84%	9 358 800	9 159 613	97,87%
2012	10 094 603	9 564 624	94,75%	9 678 117	9 413 188	97,26%
2013	9 782 968	9 624 571	98,38%	9 178 860	9 262 103	100,91%
2014	9 734 039	9 564 045	98,25%	9 272 674	9 320 865	100,52%
2015	9 838 313	9 490 957	96,47%	9 362 516	9 391 955	100,31%
2016	9 909 960	9 420 359	95,06%	10 206 731	9 202 101	90,07%

Source: www.DPMZ.sk

Several facts could be implied from the table stated above:

1. Making comparison between 2016 and 2015 the decrease of revenues was noticed. That means that revenues from public transport decreased by 7,11%. The sale of single-use tickets in the same time decreased by 6,58%. Also the times in mentioned time noticed the decrease by 6,49%
2. Estimation or planning of costs in DPMŽ has a quite good quality since 2010 when prognosis became better by approximately 10% compared to previous period. From the costs point of view. DPMZ always plans higher charges than it really spend in the year. There is not the same rule and stability for revenues. Estimations were first higher, later lower. Without significant deviation.
3. Estimation of revenues in the last evaluated period (in the year 2016) the plan was very inaccurate against DPMŽ. That means that higher revenues were expected than they really were. The deviation was 10%.

2.2 Data

We performed our analysis from data found at the official website of DPMZ company as well as data found at Statistical Office of the Slovak Republic. Table 3 summarized basic statistics of DPMZ.

Table 3 Selected data for analysis and modelling

Year	Number of kilometres	Number of transferred passengers	Vehicles	Accidents	Number of employees	Revenues (EUR)	Revenue (only public ticket transport)
2006	3602000	14666257			335	3 642 634	3 538 472
2007	3472000	14348825	96		301	3 494 158	3 375 158
2008	3697509	13504576	93		273	3 682 699	3 575 284
2009	3488330	11838671	90		272	3 511 399	3 422 346
2010	3509935	11312297	88	113	272	3 392 700	3 306 299
2011	3536607	11120339	84	74	269	3 444 292	3 373 573
2012	3525397	10890000	84	76	255	3 760 105	3 646 634
2013	3527062	10630000	84	79	257	3 688 984	3 566 684
2014	3517583	10809000	86	68	260	3 572 961	3 462 763
2015	3540956	11015000	83	81	258	3 580 390	3 486 491
2016	3570366	11411000	81	65	252	3 325 839	3 238 037

Source: www.DPMZ.sk

As the number of performed kilometers as well as number of transferred persons have a significant impact on total revenues of the company, they were also processed graphically (Figure 2).

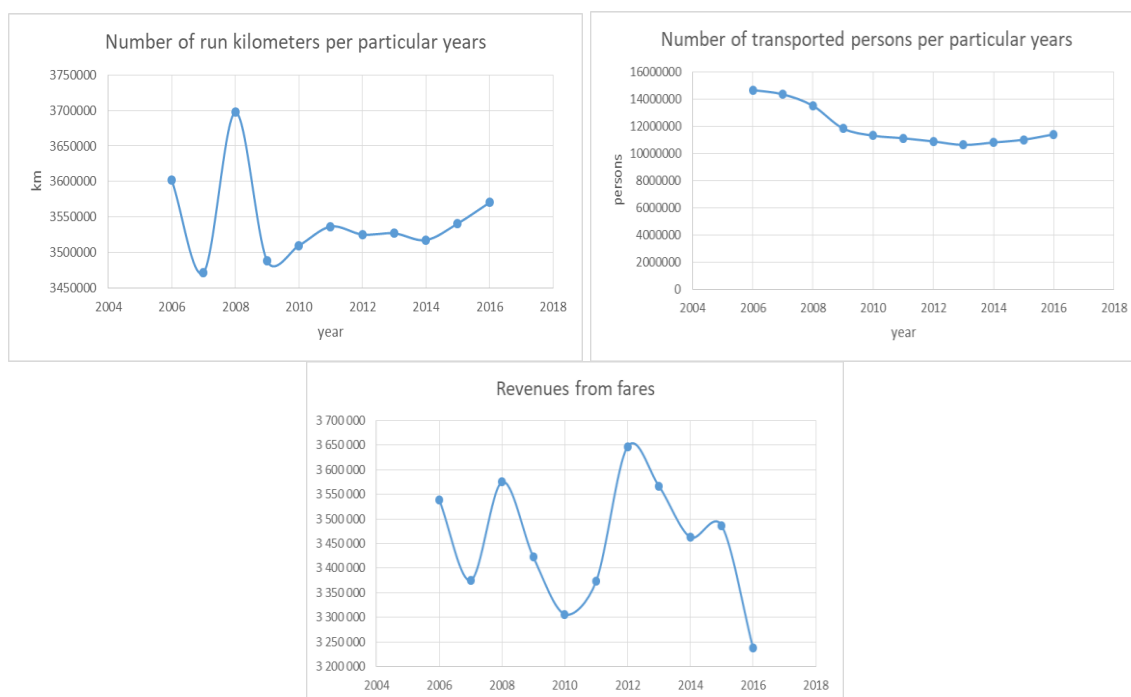


Figure 2 The development of the number of kilometers, number of transferred passengers and revenues in last 10 years

Source: own processing according to data at www.DPMZ.sk

We can see that in spite of run kilometers and transported passengers the DPMZ experienced decrease of revenues from tickets sale. Seeking reasons from DPMZ and from scientific specialists for

public transport detected quite large problem. DPMŽ is forced by higher resort to (1) offer reductions from ticket price to particular groups of passengers whether it means to travel gratis or require reduced price for a ticket and at the same time (2) the DPMŽ has to count all passengers even those who travel gratis and this fact increase the costs on evidence of all passengers. The result is that there are more passengers but who pay less per ticket. Also there are more passengers who can travel gratis. As it was mentioned above, DPMŽ participate to activities or creates its own activities to increase the number of passengers. This is a significant fact which influenced total revenues in DPMŽ in 2016. But there is still in question if the method used by DPMŽ to calculate planed revenues (or costs) is correct or not.

As next we prepare the revenue prognosis for the year 2017.

2.3 Quantitative modelling

We performed the quantitative modelling on time series of revenues. We used several models of time series, we used moving averages models, naïve model as well as so-called cumulative model where the forecast is made as the average of all previous years (Brown, 1956), (Holt, 1957). As for moving averages models, we used different parameters of moving, starting from value 2 to value 10. We use MAPE characteristics for measuring the accuracy of the models. The MAPE metrics is formally defined as

$$MAPE = \frac{\sum_{t=1}^N \frac{|y_t - e_t|}{y_t}}{N} * 100 \quad (1)$$

Table 4 The MAPE error of tested models based on 2006 – 2016 data

Model	MAPE (in %)
MA(2)	3,69157027
MA(3)	3,99156018
MA(4)	3,83029732
MA(5)	3,36094327
MA(6)	3,53319954
MA(7)	2,57369974
MA(8)	2,80910872
MA(9)	3,73371007
MA(10)	7,32954327
cummulative	3,44371413
naive	4,14932814

As stated in Table 4, the MA(7) performed the best, i. e. it has the lowest MAPE error. Therefore we decided to use this model as the base model. We also performed the forecast for 2017 with this MA(7) model.

Table 5 Predicted revenues by MA(7) model

	Tržby (len lístky)	$y^{\wedge}(t,t+1)$	$ e_t $	$ e_t / y_t$
2009	3 422 346	-	-	-
2010	3 306 299	-	-	-
2011	3 373 573	-	-	-
2012	3 646 634	3 462 537,89	104 146,1098	0,0291997
2013	3 566 684	3 466 568,211	3 805,211303	0,00109889
2014	3 462 763	3 479 083,258	7 407,741713	0,0021247
2015	3 486 491	3 466 398,571	228 361,5714	0,07052469
2016	3 238 037	3 440 068,714		

Following from the Table 5, the forecast for revenues in 2017 is 3 440 068.714 EUR, what is to be an increment by circa 6.24 per cent compared to previous year. It is important to note that we forecasted predictions of only public tickets sold. Also, it is obvious the model is not 100 per cent correct, however we believe that the error (2.5 per cent) is very good and acceptable in practice.

3. RESULTS AND DISCUSSION

The selected model MA(7) is able to model future revenues based on last 7 years data as it is counted as the arithmetic averages of last 7 years revenues. Even though it is not possible to say to 100 per cent why the value of 7 is the best choice for this data, it can be caused by following hypotheses:

- In the structure of the company there is 7-year persistence from the middle history. Therefore, the model of MA(7) can guarantee the information from the middle come into this model as inputs.
- On base of data, the model MA(7) can best smooth the series, i. e. this model contains in itself such a pattern which is able to mirror the character of this data.

One of advantages of this model is the fact that the company does not need to know exact reasons, i. e. what causes the increase or decrease of revenues. The moving average model MA(7) contains a pattern by which it is possible to realize predictions without knowing exact factors influencing the value of revenues in the future (the case of regression models). Besides this, interpretability, simplicity are other advantages of it. Also, flexibility of this moving average model is very good.

Due to these reasons we suggest to use and implement this model MA(7) as part of optimal strategy of the company, i. e. to use this model as a default model for forecasting the revenues of the company. The assumption of using this model is that there will not be any huge variation (e.g. due to external factors) – in that case, this model would provide probably insufficient results as it averages the revenues based on last seven years.

If the company decided to implement this model, there are various options how to make this model even more accurate and better:

- It is possible to implemented weighted moving averages where particular observations (years) would be weighted either by importance or by time (older observations would have less weight than the new ones).
- The moving average could be also weighted exponentially – in that case that would be an exponential weighted moving average, i. e. model of exponential smoothing. (Brown, 1956, Holt, 1957).
- Also, the accuracy of the model can be measured asymmetrically, i. e. the error from the close history would be more significant than the error from the far history.

4. CONCLUSION

Entrepreneurship in public transport is complicated because it is influenced by many different sometimes opposite factors. Management of public transport company has to innovate its bus fleet. It represents a long-time investment into capacity but which it paradoxically is not able to influence in its use (Dubovec & Majer, 2016). Accessibility of bus stops, localization of employers and changes of lifestyle lead to accentuated strengthening of individual motoring in the city area. That has direct impact on revenues of transport company.

The model which we have created and the following simulation illustrates the impact of global trends on local conditions and permits a more realistic estimation of these consequences to future revenues and the management could so use these data as a decision support.

Acknowledgements

This paper was published with the support of faculty scientific grant attributed by Faculty of management science and informatics.

References

- Brown, Robert G. (1956). *Exponential Smoothing for Predicting Demand*. Cambridge, Massachusetts: Arthur D. Little Inc. p. 15.
- DPMŽ - Dopravný podnik mesta Žilina (2017). Dostupné na: www.dpmz.sk
- Dubovec, Juraj & Majer, Tomáš (2016). Mobilita pracovného trhu na Slovensku. In: Mezinárodní vědecká konference "Trendy v podnikání 2016"
- Dubovec J., Makyšová J., Kubina M. (2016) Influence of Traffic Congestions on Safety Stock in Company. In: Leon-Garcia A. et al. (eds) *Smart City 360°*. SmartCity 360 2016, SmartCity 360 2015. Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering, vol 166. Springer, Cham
- Holt, Charles C. (1957). "Forecasting Trends and Seasonal by Exponentially Weighted Averages". Office of Naval Research Memorandum. 52. reprinted in Holt, Charles C. (January–March 2004). "Forecasting Trends and Seasonal by Exponentially Weighted Averages". *International Journal of Forecasting*. 20 (1): 5–10. doi:10.1016/j.ijforecast.2003.09.015.
- Ministretvo vnútra Slovenskej Republiky (2017). Celkový počet evidovaných vozidiel v SR. Dostupné na: <https://www.minv.sk/?celkovy-pocet-evidovanych-vozidiel-v-sr>
- ŠÚ SR – Štatistický úrad Slovenskej republiky, Odvetvové štatistiky, Doprava (2017). Dostupné na: <https://slovak.statistics.sk/>

SOCIALLY RESPONSIBLE BEHAVIOR OF THE CONSUMER FOR ACHIEVEMENT OF THE GOALS OF SUSTAINABLE DEVELOPMENT

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ABSTRACT

The article defines the role of socially responsible consumer behavior in co-evolution as an important element of realizing the principles of corporate social responsibility. The authors attempted to determine the role of consumer behavior based on the results of the sociological research in order to achieve the goals of Sustainable Development. Practical population willingness for socially responsible behavior was revealed based on the study of public opinion. The article was prepared as part of the implementation of the Agreement between the Ministry of Education and Science of the Russian Federation and the Ministry of Education of the Slovak Republic from November 7, 2006².

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: globalization, sustainable development (SD), corporate social responsibility (CSR), sustainable consumption, sustainable marketing.

1. INTRODUCTION

The abundance of goods, their deep differentiation create conditions when not only do price factors and quality affect the consumer choice of a particular product or brand but also many other factors. It is not enough for a modern consumer to be simply satisfied with the goods themselves. To make a decision of buying particular product the consumer is increasingly guided by the reputation of the company and the values it declares. It is possible to say that the social responsibility of business becomes an important consumer demand, a modern reference point to reach high competitive position on the market.

In the world's scientific publications corporate social responsibility (CSR) is increasingly becoming the subject of research. The analysis of Russian and foreign works (A. Mei-Pochtler, S. Turkin, J. Calloway, etc.) shows that today the consumer gives preference to socially responsible companies when choosing a product (Deaton, 2015). Moreover, many studies have identified a positive relationship between consumer preferences and the perception of the enterprise ethics (Kotler et al. 2009). For example, the MORI research center published the results of consumer survey on this issue: 28% of respondents boycotted the purchase of enterprises' products that do not comply with CSR principles; a significant proportion of customers are ready to change the trademark to the one that has a stronger association with good deeds. For example, the proportion of such consumers in Great Britain is about 86%, in Italy - 75%, in Australia - 73%, and in Belgium - 65% (Sakal et al. 2007).

A research conducted in 2001 by Environics International CSR Monitor made it possible to identify and rank factors that have a greater impact on public opinion on the enterprise: corporate social responsibility (49%), quality and brand reputation (40%), business performance of the company (32%). As the research shows, corporate social responsibility came to the forefront as a factor that forms the opinion and choice of the consumer.

In the second decade of the 21st century, the call for socially responsible consumer behavior in order to achieve sustainable development and corporate social responsibility has a particular urgency caused by aggravation of social problems and environment pollution and it becomes mandatory in the context of the evolution of the whole society.

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² Scientific and research training of Tokareva G.F. and Shalina O.I. under the guidance of prof. Peter Sakala at the Faculty of Materials Science and Technology of the Slovak Technical University in Trnava (September 15, 2015 - October 15, 2015)

2. MATERIAL AND METHODS

A sociological survey for studying public opinion of residents of the Volga Federal District of the Russian Federation (hereinafter, VFD) was conducted on the basis of the Institute of Economics and Management of the Ufa State Aviation Technical University on September and October, 2016. The current situation and the local population position regarding socially responsible consumer behavior were defined and characterized with the help of the questionnaire "Sustainable socially responsible consumer behavior". The main objective of the study was to determine the dependence of consumer behavior and consumer loyalty on the quality of enterprises implementing CSR principles. The opinion of the population as consumers regarding the implementation of CSR principles by enterprises was important for us in order to achieve the goals of Sustainable development, as well as the willingness of the population to conduct themselves (the act of buying a particular product) to encourage the enterprise to implement the concept of social responsibility.

2.1 Sociological survey of public opinion of residents of the Volga Federal District of the Russian Federation

The questionnaire was compiled by the team of the Department of Economic Theory (Professor Degtjareva I.V., assistant professor Tokareva G.F. and assistant professor Shalina O.I.)³, actively engaged in the study of the European experience of socially responsible investment. During the preparation of the questions we were guided by requirements that were tested in practice and that increased the validity and reliability of the questionnaire. The questionnaire used closed questions, which are preferable for us for identifying facts and opinions and which suggest a certain list of possible answers. The questionnaire also contained control questions to determine the reliability of the previously received response. Respondents answered 10 questions about how often they implement socially responsible behavior. The answer has 2 categories: "yes" and "no" and the corresponding assignment of points: "yes" - 1 point, "no" - 0 points. A high total score indicates a higher level of socially responsible consumer behavior. Respondents also answered questions related to their age and gender. The survey results may be considered as representative because of the coverage of a wide and random cluster. The survey was conducted in live communication mode (interview) in the cities of Ufa, Neftekamsk, Kazan, Izhevsk, Nizhny Novgorod, Perm, Orenburg and other major cities of the VFD from September 16, 2016 to October 13, 2016. In total, 257 respondents were interviewed. The age and sex composition of the respondents is shown in Figure 1.

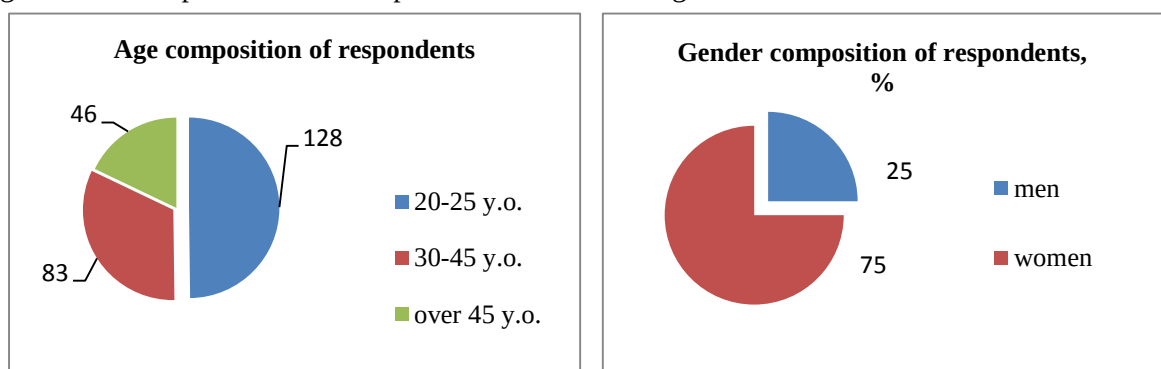


Figure 1 Title

Source: compiled by the authors

This is the results of processing the main answers:

1. Are you familiar with the concepts of Sustainable development and CSR:
 - yes – (89%);
 - no – (11%).
2. Is it necessary for an ordinary citizen to know about CSR issue:

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- yes – (71%);
- no – (29%).
- 3. Do you want to purchase the goods of those companies that you associate with the "good deed":
 - yes – (86%);
 - no – (14%).
- 4. Are you willing to pay for the goods more if you are sure that the manufacturer fulfills the CSR principles:
 - yes – (12%);
 - no – (88%).
- 5. The CSR principles should be determined by:
 - the government (at least at the level of basic principles and requirements) (93%);
 - company's internal documents (7%).
- 6. Is it possible to classify the enterprises you are familiar with as "socially responsible":
 - yes – (23 %);
 - no – (77%).
- 7. Company's implementation of CSR principles should be voluntary:
 - yes – (12 %);
 - no – (82%).
- 8. Should the state monitor enterprises implementing CSR principles, then compile a rating and bring this information through the media to the public:
 - yes – (91 %);
 - no – (9%).
- 9. Can the behavior of the population encourage enterprises to implement CSR principles:
 - yes – (56 %);
 - no – (44%).
- 10. Do you agree to increase the tax burden on enterprises/the population so that the state implemented social responsibility principles itself:
 - yes – (8%);
 - no – (92%).
- 11. Placement of CSR significant information should be through:
 - mass media (television, radio, magazines, newspapers) (45%);
 - periodicals and competent state institutions websites (38%);
 - enterprise websites (6%);
 - web page of the European Union (11%).

3. RESULTS AND DISCUSSION

Based on the document of the European Social and Economic Committee in the corporate social responsibility field from January 2013 « Report on corporate social responsibility: responsibility and transparent corporate behavior and sustainable growth » (Bagautdinova et al. 2015.) we can proceed from the importance and urgency of socially responsible consumer behavior. The majority of respondents noted that they are familiar with the concepts of SD and CSR. However, according to the results of the survey, we state that the bulk of respondents are least guided by the concepts of SD and CSR when choosing products in real life, while, paradoxically, they note that the consumer behavior has a real influence on the enterprise in CSR matters. It should be noted that respondents confidently state that most of the enterprises they know do not adhere to the CSR principles. This circumstance is explained by the fact that there are many small enterprises in Russia but they have small amounts of profit and their contribution to the total volume of goods produced is insignificant (especially after the crisis of 2008). And well-known transnational companies only declare CSR but this is not always true in reality. In view of this, Russian citizens are unanimous that the government (93%) should determine the CSR principles and the state should monitor enterprises implementing CSR principles, then compile a rating and bring this information through the media to the public (91%). Respondents also indicated that CSR significant information should be placed in the media (television, radio) - 45% and

in periodicals and competent state institutions websites (38%), because they completely trust the media in delivering general information about CSR implementation.

It should be emphasized that the survey participants do not support the idea of increasing the tax burden on enterprises. Initially, the authors put forward a proposal to transfer the function of implementing socially responsible behavior from enterprises to the state by increasing tax deductions to the local budget. However, 92% of respondents did not support this idea. This opinion of the respondents can be explained by the following: currently, the implementation of CSR principles by enterprises is voluntary therefore there is no control over the implementation of CSR principles in order to achieve the goals of sustainable development. Consequently, the state needs to think how to perform the monitoring functions to implement CSR principles through various organizations and institutions.

It is necessary to develop a set of guidelines and reporting standards for enterprises that will serve as the basic principles of social audit (internal and external audit). Such experience is known in world practice. For example, the standard of social reporting Account Ability (Institute of Social and Ethical Accountability) AA1000, based on the triple-bottom reporting principle (3 BL) of John Elkington (Degtjareva, 2010). The Financial Times in conjunction with the London Stock Exchange publishes the FTSE4 Good index that provides an assessment of company's effectiveness in the field of CSR (Korotkova, 2014; Trunin et al. 2009.). There are legislative requirements for social accounting, auditing and reporting in some countries (for example, Bilan Social in France), but it must be understood that it is difficult to measure social effectiveness clearly. Many companies prepare annual reports audited by external auditors that cover issues of sustainable development and CSR ("Triple-Tier Reporting") at present and these reports differ in the format, style and methodology of evaluation significantly, even in one industry. However, do not forget that such reports can be empty words (for example, social reports of tobacco corporations).

So can we call socially responsible consumer behavior a reality?

To answer this question we suggest two main approaches to understanding consumer loyalty, which currently dominate the scientific literature: behavioral and socio-psychological.

The behavioral approach representatives (for example, J.-J. Lamben, J. Bloomer and others) understand loyalty as a type of consumer behavior that is expressed in the long-term interaction with the enterprise (for example, making repeated purchases) (Sakal et al. 2007).

Socio-psychological approach representatives (J. Hofmeier, B. Rae, etc.) define loyalty in the aspect of the consumer attitude to the product or service as a preference that is formed as a result of generalization of feelings, emotions, opinions about the product or manufacturer (Kulinchenko, 2006; Stiglitz et al. 2010). The opinion on the priority of customer satisfaction as the basis for choosing when making a purchase is common in these approaches. Satisfaction here must be considered as the degree of conformity of goods to consumer preferences. Satisfaction of consumers can be conditioned both by concrete purchase and the relation to the enterprise that, in turn, depends on the interaction experience, the level of trust, company reputation as well as its social responsibility.

Another factor that influences the socially responsible consumer behavior is his involvement. Consumer involvement is the level of his interest in the brand (enterprise) and the amount of information processing that occurs because of the reaction to the marketing stimulus (Deaton, 2015). For example, the behavior model with high customer involvement is characterized by extensive processing of information, a conscious search for this information, a close relationship of the product with the consumer lifestyle. In the case of low involvement, the consumer perceives information accidentally and the purchases are not significant in terms of his reference group's norms and values. In view of this, the company's social responsibility will be of great importance to consumers with a high degree of involvement and will generate socially responsible consumer behavior (socially responsible consumer behavior can be expressed, for example, in the consumption of those products that are safe for the environment or willingness to pay more for such goods).

The degree of consumers' involvement may vary depending on perceived social responsibility. Our study showed that 86% of respondents express an intention to purchase goods of enterprises whose product they associate with the "good deed". However, only 12% of buyers are ready to overpay for this.

The consumer prolongs this association to himself. Survey respondents noted that as consumers of a socially responsible enterprise they identify themselves with "good deeds" they do,

which increases their involvement in the process of forming their socially responsible image. Thus, a socially responsible company receives a competitive advantage that can be expressed in an additional degree of customer involvement compared to a company that is not such.

Also the survey results' analysis showed the importance of the trust aspect in the process of interaction between the consumer and the enterprise. It should be noted that consumer confidence is one of the most significant factors in building long-term relationships with customers and achieving consumer loyalty.

Philosopher and ethic J. McMurtie leads the thesis that every purchase decision contains a moral choice in the book "The Global Market as an Ethical System" (Degtjareva, 2010). The consumer's moral preferences launch the principle of "ruble voting" in the choice of goods, during which the money spent on the goods is a kind of "voice" in favor of the product and its manufacturer.

We need to abandon the consideration of money as a means of purchasing goods. Money should be a means of voting, which we use every time we go shopping. Making purchases of cheap clothes made at the "sweatshop», we vote for the exploitation of workers. Acquiring a gluttonous 4x4-gasoline car for use in urban conditions, the buyer votes for climate change. Making even the smallest, daily purchases (bread, tea, coffee), we vote for something.

In addition, consumer boycotts are one of the ways to manifest socially responsible consumer behavior towards enterprises' negative business practices. The journal Ethical Consumer notes that products positioned as ethical cannot always be produced by enterprises that implement CSR principles (Sakal et al. 2013). Today businesses often use socially responsible consumer behavior to attract this segment of the consumer by offering an "ethical" product on the market. However, the rest of the enterprise may not meet the CSR criteria.

4. CONCLUSION

The relevance of the subject of socially responsible consumer behavior is undoubtedly associated with the increased importance of CSR over the past decade. As the world population grows, so does the pressure on the limited natural resources that are needed to meet growing consumer demand. As a result of globalization processes, the technology development, the promotion of SD principles consumers are more aware of the environmental and social component of their everyday consumer decisions and have the ability to make purchase decisions related to their environmental and ethical preferences. A survey of residents of the Volga Federal District, conducted on the basis of the Institute of Economics and Management of the Ufa State Aviation Technical University, showed that the consumer's behavioral features are far from consistent and not universal.

On the one hand, consumers are aware of the importance and necessity of following the social responsibility principles. On the other hand, consumer behavior is not always socially responsible for a number of reasons.

We are unanimous in the opinion that the product price is still the most important criterion of purchase for the consumer.

Another reason is the lack of information. The current trend of transferring goods production to the "third world" countries does not allow consumers to assess the degree of environmental purity and manufacturer's social responsibility. For example, buying a bouquet of flowers in Europe the consumer does not think that butterflies have not been flying on flower plantations in Kenya for a long time and the fish has died out in the lake, all as a result of the colossal use of pesticides. It is the payment for "beauty".

It is necessary to identify factors that will distinguish those enterprises that simply express concern about the state of the environment and society and those that are really taking steps in this direction in the consumer market.

The state has formed the concept of social responsibility and its basic postulates and self-destructed. There is no system for monitoring the implementation of declared CSR principles by enterprises.

Now enterprises instead of spending part of their profits on social projects carry out massive attacks of social advertising on the consumers' consciousness, thereby implementing preventive measures to create socially responsible behavior for this consumer. This is the so-called Sustainable marketing. Sustainable marketing today looks like this: "Our coffee is more expensive but ... one

percent is given to African children." Advertising aimed at socially responsible consumer behavior allows us not only to forget about the nature destruction and exploitation of the "third world" countries for the price of just one cup of coffee, but also to feel better as if we are doing something good. It seems to us, this is a clever ideological conspiracy ... This is a sophisticated way of manipulating the socially responsible consumer behavior.

Thus, it is real to achieve the goals of sustainable development with the socially responsible behavior of the consumer. The consumer can vote for a particular enterprise, which, in his opinion, adheres to the CSR principles by purchasing (or not) goods.

Socially responsible consumer behavior is not a myth. We must understand with full responsibility that right now an entire army of marketers is working to create new ways of manipulating our consumer behavior.

In this situation every consumer who chooses a particular product every day must appeal only with his own inner moral law and conscience.

References

- Bagautdinova, I., Tokareva, G., Shalina, O. 2015. On the issue of social justice, a progressive scale of taxation and institutional "traps". Moscow, p. 134-144.
- Degtyareva, I. 2010. Social responsibility of business: theory, models, public participation. Moscow, n. 10-16.
- Deaton. A. 2015. The Great Escape: Health, Wealth, and the Origins of Inequality. Journal of Economic Literature 53(1). p. 102-114.
- Korotkova, E. 2014. Use of social standards to manage corporate social responsibility. Ekonomika. Innovatsii. Upravleniye kachestvom. 4 (9). n. 133-134.
- Kotler, F., Armstrong, G. 2009. Fundamentals of Marketing. - 12th Edition. Williams. 1072 pages.
- Kulinchenko, V. 2006. Social responsibility of business as a condition for the effectiveness of social partnership. Moscow, p. 63-67.
- Stiglitz, J., Sen, A., Fitoussi, J.P. 2010. Report of the Commission on Measuring Economic and Social Progress. Paris. [Electronic resource]. Access: http://www.insee.fr/fr/publications-et-services/default.asp?page=dossiers_web/stiglitz/documents-commission.htm (date of the application October 2, 2016)
- Sakal, P. et al. 2007. Strategic management in practice manager. Issue 1 [Text] Trnava: SP Synergy, 703 pages.
- Sakal, P. et al. 2013. Sustainable corporate social responsibility [Text]: hand / Sakal P. et al. Trnava: MTF STU, 233 pages.
- Trunin, S., Muratova, A. 2009. Social responsibility as a basis for a developed market economy. Rossiyskoye predprinimatel'stvo. 12-1. p. 18-24.

THE IMPACT OF AIRLINE AUXILLIARY SERVICES ON THEIR REVENUE MANAGEMENT AND ECONOMIC RESULTS

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ABSTRACT

The article deal with analyze of auxiliary services market and to estimate of the new trends and prognoses of their necessity future development in competitiveness environment. Article summarizes the most offers ancillary services on the air transport market and include also economic analysis pointing on the revenue management. Article is focused on estimates of future development of selected services and their influence on economic results. The current market is characterized by high number of very comparable airlines services. Another importance can be clearly seen in additional generation of revenue and therefore in even better cash flow, that enables the airlines to sustain in highly competitive environment.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: airline auxiliary services, revenue management, economic indicators.

1. INTRODUCTION

Ancillary revenue is generated by activities and services that yield revenue for airlines beyond the simple transportation of customers from A to B. This wide range of activities includes: commissions gained from hotel bookings, the sale of frequent flyer miles to partners, and the provision of a la carte services – providing more options for consumers and more profit for airlines. “Successful ancillary revenue generation is dependent on offering customers the right product at the right time, often before they have even asked for it. Amazon has proven to great effect the positive impact that data science has on its business, with an estimated one third of total sales now coming via their recommendation algorithm. As with Amazon, the unlocking of data-driven insights is enabling airlines to propose ancillary products and services to their customers in an increasingly sophisticated way. This application of data is fueling the continued growth of the sector while at the same time unearthing further potential for building loyalty by identifying when, how, where and what to offer customers when they visit your website or app”, said O’Mahony(2015), Chief Commercial Officer at CarTrawler. By Bozogáň (2017) as the profitability of the airline companies is a challenge in the past decades, every airline is trying to find a business model which would increase the income of the airline. With the liberalized market of the airline, the competition on the market is very strong and there is a trend of approximation of the product of different airline types (LLC and FSC), many airlines face the difficulties to reach breakeven level of the income. In general, there are two ways how to increase the revenue and lower the loss. The first one is to come with breakthrough product which would differentiate the airline from the others and customers would choose this product over the others. However, this ways on the actual market is very difficult as the technological level of the important airlines is very similar and it is very difficult to find anything so different and attractive, to affect the customers the way, they would decide for the product of this airline. The second way how to reach the breakeven point is to customize own actual product the way to maximize the revenue, without the heavy impact on the customers. In the recent years, this is done by the offering additional services. The aim of this paper is to consider the reasons and trends in offering ancillary services by the airline on both low-cost and full-service market. The current era, where ancillary services are generating as important part of the revenue, is a result of several factors. According O’Connell and Warnock- Smith (2013) the main reasons for this change are global economic recession, together with

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revenues fell by 15 percent, liberalization of air services, very high level of competition, raising fuel bill and very volatile operating environment. To highlight complicated situation on the market we can compare the loss of the airlines between 2000 – 2009, which resulted to \$49.1 billion, comparing to \$10.0 billion in 2009 solely. This situation forced airlines worldwide to find alternatives ways how to generate the revenue. Due to very high competition and similarity of the core product and services in the air transport, airlines were forced to come up with new innovative products or to adapt the existing product the way it would be generating revenue. As coming with new product that would affect the customer to pay more for the fare is very limited, airlines decided to generate more revenue from so-called ancillary services. IdeaWorks defines ancillary revenue as “revenue beyond the sale of the tickets that is generated by direct sales to passengers, or indirectly as a part of the travel experience”.

2. MATERIAL AND METHODS

Ancillary revenue according O’Connell and Warnock- Smith (2013) can be generated in three diverse ways: A-la-carte product, commission based sales and Frequent flyer program activities. A-la-carte product is a package which is divided into separate parts and customer can create product that is necessary and suitable for him at the time of booking. This way airlines can offer personalized fares whose prices should normally be reflecting the level of services, and therefore to attract larger group of customers. However, this situation is very delicate for customers who usually travelled with the full-service carrier, who was previously offering all-inclusive fares, where everything was included in the fare. These customers often feel let down and lied to as they feel that the airline is charging them for something that was previously free. With very dynamic fare policies of the airlines it can happen that customer is forced pay more for the core product with one ancillary service than he was previously for full package with other services included. This is mostly due to different conditions at the time of booking, and therefore different available core product regarding fare flexibility, cancellation policies etc. The most common example of a-la-carte product is a bag fee, where airlines decided to charge for additional checked baggage or even for first checked baggage. Other examples are advanced seat reservation, extra legroom, on-board wireless connection or special meal, etc. Bag fees are very clever way for the airline not only to generate direct revenue directly, but also thanks to change of the behavior of the airline. The research by Tuzovic, Simson, Kuprewieser and Finsterwalder (2014) shows that as soon as the airline started to charge first and second bag fees, number of checked bags declined to 40 percent. This enabled the airline to lower the cost for the check-in staff, lower the cost of the fuel as less weight was transported, and even to generate more revenue from the cargo transport as more space in the compartments remained available for cargo transport. To show the importance of bag fee as additional income is easily shown on the example, which started to charge bag fees in 2008. By Odegard and Wilson (2016) revenue from ancillary services such as baggage fee is of growing importance to the airline industry. For example, the total baggage fee revenues for US airlines has over the past six years grown to a multibillion dollar industry; \$464M(2007), \$1,149M(2008), \$2,729M(2009), \$3,395M(2010), \$3,361M(2011), \$3,487M(2012), \$3,350M (2013), \$3,529M(2014). The second way how to generate ancillary revenue is be so called commission based trade. Commission based trade in the aviation can be find in selling of travel insurance, hotel bookings, car hire or duty free sales. Several airlines decided that higher focus on commission based sales will have lesser impact then offering alacarte product.

Based on the survey by customers of LCC or FSC are not very keen to buy such a service from the airline, but rather directly from the service provider. On the other hand, we can see some example where commission trade is working on very high level. Such an example could be Ryanair whose commission trade is one of the highest in the industry. This is enabled by very proactive employees with direct contact to the customers, who are highly motivated by incentives from the sales.

Third example of generating of ancillary revenue is through the Frequent Flyer Program activities, such as FFP Miles, or by offering the worldwide shop with possibility to pay by generated miles, where customer can decide what percentage he wants to pay with miles and how much with actual money. These three sources of ancillary revenue according Car Trawler estimates resulted in \$67.4 billion in 2016. IdeaWorksCompany researched financial filings made by 130 airlines all over the world, 63 of which disclosed qualifying revenue activity, to reveal that ancillary revenue reported by these airlines increased \$6.6 billion for 2014. IdeaWorksCompany used a number of resources,

such as airline stock indexes, to identify these publicly-held airlines. Statistically significant changes occurred in 2014 when the liberalization of the aviation environment in the EU region was also legislatively completed.

Table 1 Ancillary revenue reported by the chosen top 10 airlines

Annual Results – 2014		Ancillary Source	Annual Results – 2013	
\$5,861,000,000	United	Various	\$5,703,000,000	United
\$4,651,000,000	American/US Airways	Various	\$2,528,183,000	Delta
\$3,212,909,000	Delta	Various	\$2,079,000,000	American
\$2,046,292,309	Air France/KLM	Various	\$1,714,598,496	Air France/KLM
\$1,906,616,921	Ryanair	Various	\$1,689,457,120	Ryanair
\$1,885,000,000	Southwest	Various	\$1,623,500,000	Southwest
\$1,632,765,608	Lufthansa Group	Various	\$1,385,021,933	easyJet
\$1,457,215,349	easyJet	Various	\$1,282,738,470	Lufthansa Group
\$1,387,084,868	Qantas Airways	Mostly FFP	\$1,273,430,400	Qantas Airways
\$921,000,000	Alaska Air Group	Various	\$1,102,700,000	US Airways
\$24,960,884,055			\$20,381,631,432	

Another very good statistics done by IdeaWorksCompany shows us importance of auxiliary services in form of percentage of total revenue earned by auxiliary services.

Table 2 importance of auxiliary services in form of percentage

Annual Results –2014		AncillarySource	Annual Results –2013	
38.7%	Spirit	Various	38.4%	Spirit
33.7%	Wizz Air	Various	34.9%	Wizz Air
32.4%	Allegiant	Various	32.6%	Allegiant
28.5%	Jet2.com	Various	27.7%	Jet2.com
24.6%	Ryanair	Various	24.8%	Ryanair
21.8%	Tigerair	Various	23.6%	Tigerair
20.8%	Jetstar	Various	20.6%	Jetstar
20.7%	Flybe	Various	19.6%	AirAsia X
20.0%	AirAsia X	Various	19.2%*	easyJet
19.5%	Volaris	Various	17.6%	AirAsia Group

Table 3 Earning of ancillary revenue per passenger

Annual Results –2014		Ancillary Source	Annual Results –2013	
\$56.28	Jet2.com	Various	\$55.61	Jet2.com
\$52.35	Spirit	Various	\$51.22	Spirit
\$50.16	Qantas Airways	Mostly FFP	\$45.67	Qantas Airways
\$45.16	Allegiant	Various	\$44.87	Allegiant
\$43.22	AirAsia X	Various	\$44.43	AirAsia X
\$42.46	United	Various	\$40.97	United
\$39.60	Virgin Atlantic	Mostly FFP	\$38.93	Korean Air
\$39.28	Korean Air	Various	\$34.41	Wizz Air
\$34.87	Wizz Air	Various	\$33.92	Virgin Atlantic
\$31.46	Alaska Air Group	Various	\$32.61	Alaska Air Group

3. RESULTS AND DISCUSSION

These top 10 carriers (see table 1) showed an increase of nearly \$4.6 billion in a single year, which represents revenue growth in excess of 22.5%. Revenues and passenger traffic for these

airlines increased due to improving economics and these are leading factors for annual ancillary revenue gains. The big ancillary revenue numbers posted by carriers such as AirFrance/KLM, American, and United, include a mixture of a la carte activity from fees charged for baggage and extra leg room seating. But as shown above, and with a particular emphasis on Qantas, a big portion of the ancillary revenue total is generated by the sale of miles or points to banks that issue co-branded credit cards. If we compare Table 1 with Table 2, we can clearly see the importance of ancillary revenue by the low cost carriers. Even if network carriers earn more of ancillary revenue in total, it still performs only in small number of total revenue. However, in the TOP 10 table in percentage almost exclusively only LCC take part. This also explains the aggressive advertisements and policies done by LCC in order to perform in sustainable way. In two tables (2 and 3) about we can see statistical numbers, but the most important statistics to show us performance of all airlines researched by the company IdeaWorks is the table with earning of ancillary revenue per passenger. Even when importance for the carriers on both LC and FS market is considerable there is still one difficulty to overcome – actual customers. Since the beginning of the air transport, the development of services was different than in other industries. In other industries, customer is accustomed to pay for additional services, however in the aviation, customer are used over the time to get almost all inclusive service without additional payment. Therefore, way of generating ancillary services is very difficult for the airlines, as customer feels angry and let down when they need to pay for anything extra, but for the airline this step is almost inevitable. As LCC customers were also before used to pay optional fees, change to a-la-carte products did not affected views of their customers. However, FSC are still facing the problems with negative impact on the brand. According Cranfield report from 2011 FSC should only charge for new or additional services, however, Bejar's report from 2009 is advising that the FSC should work on changing customer expectations. These are two views how to approach new ancillary revenues. According L.E.K consulting report from 2007, which is with slight decrease applicable to the recent time, customer feels that all services on board should always be free. Looking back to research done by O'Connell and Smith (2014), there are three ways how to affect customer position on the airline and have them generate ancillary revenue. The first one is to understand the importance of touch points in the sales. According SAS the touchpoints could generate ancillary revenue, as customer often do last minute decision of buying services (car hire, last minute hotel), and with more touchpoint therefore there is a bigger possibility of sale. This can be done by using all possibilities in technology, such as mobile devices which are now more than common way of communication of airline customers. Another important use of mobile technology is to enhance the customer experience. As a new trend big number of major airlines offer their full application on different mobile platforms, where customer can not only check information about the flights, but also to purchase different services, which generates revenue. Another way how to affect customer's behavior and have them purchase something extra is to come with innovative product. Very good example was Air Baltic who come with bicycle rental. Another example was onboard flower delivery, which enabled romantic passengers to deliver flowers to specific seat. Next level of innovative product was to enable customers to bet on delay of the airline. This not only generated revenue in funny way for the passengers, but also shown airlines motivation to be on time to not to lose any money on the bet. The last example we will mention was to generate commission based trade in an innovative way, by selling the airline branded bag together with suitcase company. This suitcase had and advantage of free travel on board of the airline for one year. During this year customer came through period when he became accustomed to new bag fees implemented by the airline.

4. CONCLUSION

If we consider results of this new product structure, we can see that aviation market is in big development, and airline are trying to fight the economic recession by generating ancillary revenue. Considering the results published by Sorensen(2015) in CarTrawler Yearbook we can say that ancillary revenue is becoming even more important part of the air transport industry with positive forecast. Thus, as a result the recommendation for the future is for the airline to work on campaign for its customer to understand and accept the a-la-carte structure in a way that it will not be taken as a letdown anymore. Other important part is to try to implement commission based trade into touchpoints within the airline the way it would be attractive and trustworthy for the customers. As also providers

of GDS systems realized the development on the market, they are now offering possibility to sell branded fares through their network, and therefore enables to affect more passengers. This is taken positively also by LCC who previously were trying to avoid use of other than own GDS system, but now are able to use this strong market to deliver their product in a way their customer knows.

Acknowledgements

This contribution is part of project VEGA 1/0741/16 – Innovation controlling of industry companies for maintenance and improvement of competitiveness and project KEGA 002 TUKE - 4/2017 Innovative didactic methods in education at university.

References

- Sorensen, J. 2015. The CarTrawler Yearbook of Ancillary Revenue. IdeaWorks Company. 98 p.
- O'Connell, J.F., Warnock-Smith, D. 2013. An Investigation into Traveler Preferences and Acceptance Levels of Airline Ancillary Revenues. *Journal of Air Transport* 33: 12-21
- Tuzovic, S., Simpson, M.C., Kuppelwieser, V.G., Finsterwalder, J. 2014. From free to fee: Acceptability of Airline Ancillary Fees and the Effect on Customer Behaviour. *Journal of Retailing and Consumer Services* 21: 98-107
- Odegaard, F., Wilson, J.G. 2016. Dynamic Pricing of Primary Products and Ancillary Services. *Journal of Operational Research* 251: 586-599
- Bozogaň, M. 2017. Analysis and Prognosis of Development of Airline Auxilliary Services. Master thesis. 65 p..

THE POSSIBILITIES OF ELIMINATION THE INTERFERENCE IN THE LOGISTICS CHAIN

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ABSTRACT

The logistics chain consists of all processes and of participants, involved in supply the customer order. The logistical interface is the transition between two downstream links (processes) in the logistic chain. However, flow between two links (processes) in the logistic chain has problem, because adjacent cells have different properties. These differences can lead to complications and to cause transaction costs. They are mutual dependent. The aim of our contribution is to show the possibilities of optimization the logistics chain. The solution-way is concept of minimize interference between adjacent cells. It can possible by elimination the impact of the interference. Logistics requires integration, coordination and synchronization to achieve the harmonization. Integration, coordination and synchronization are based on economic balancing. By integrating, the number of logistical interfaces is reduced, or their sharpness reduce. Coordination is understood as inducting to follow-up activities. Synchronization is the time harmony of downstream processes in the logistics network to limit the occurrence of waiting for processing and waiting for the service elements.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: logistic chain, interference, optimization, transaction costs.

1. INTRODUCTION

The identification of characteristic logistical issues is, on the one side, very important for the enterprise and, on the other side, complex and difficult. With optimization based on economic balancing, an enterprise should focus on elimination the impact of interfaces between individual elements of the logistics chain. Logistics chain is a key concept of logistics. It is a set of tangible and intangible flows whose structure and behavior are derived from the requirement to satisfy the need for the final chain – the customer. The logistics chain includes production, transport, storage and waiting for the next operation. If we want to shorten the time from getting the raw materials to meeting the customer's needs to achieve savings and optimization, we need to shorten the storage time and the next operation, which is the main task of logistics. Finance, quality and information also affect the chain.

2. MATERIAL AND METHODS

2.1 Logistic interfaces and chain arrangement

The logistic interface is the transition between the two links, processes in the logistic chain, when adjacent cells have different properties (WATSON, 2012). These differences can lead to complications. We distinguish an internal interface, within a single organization and an external interface between organizations, between states.

Logistic interfaces may have the character of technical incompatibility or incompatibility of information systems, unmanaged time and batch modes, unified interfaces, and unreliable stimuli and motivational criteria, organizational, legal interfaces between enterprises, unmanaged rules for inclusion user requirements, differences in terminology used, customs and administrative borders between states and others.

Interfaces lead to differences in flow rates, differences in the permeability of individual cells, lead to the need to organize transfer processes, and cause increased costs. Costs caused by the existence of an interface are called transaction costs. An important role of logistics management is to

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systematically identify and manage these interfaces, respectively. Prevent them, try to reduce the number of interfaces and eliminate the differences between them.

2.2 Configuration of the logistics chain

Configuration of the logistics chain is a significant factor in total chain performance because it affects its reliability, the complexity of its management, its time and cost flow. Exists many of different configurations of logistic chain ranging from very simple with a single layer of suppliers to very complex with many layers. Reliability of each system depends on its layout, which may be connected serial, parallel or mixed. The larger the number of chain links that are interdependent (sorted in series), the marginal the reliability of the chain as a whole under otherwise the same conditions.

In today's dynamic business environment, it is important to periodically evaluate a company's logistics network by comparing its performance with customer and market requirements. The tool is an audit.

2.3 Logistics audit

Logistics audit is a method for complex and independent diagnostics of the enterprise logistics system. By author Kroker, "The logistics audit should provide information on options and directions to improve the current situation in the enterprise logistics system and the processes that are implemented in the system. Recommendations and advice issued should highlight processes in which optimization is possible, an increase in the level of customer service quality, and the acceleration of flow in the system of logistic units associated with the reduction of inventories." (TVRDOŇ et al, 2012). Before starting the audit, it is necessary to determine the objectives to be achieved by the audit. Based on these objectives, it is decided what the main audit objective is. This may be the entire logistic chain or its specific part. When processing the audit, it is essential to identify all relevant processes in the enterprise and describe their progress or create a process map.

Depending on the current business situation, the audit can generate potential savings at the level of 20% of total logistics costs. Savings can have a remarkable impact on profits. By reducing costs and increasing profits, an enterprise may expect a faster return on its investment.

Under the logistics audit, an enterprise can find a solution to optimize logistics performance. In the process of auditing, it is essential to identify all relevant processes in the enterprise, describe their progress or create a process map. In the first phase, relevant information is collected based on the objectives chosen. Based on the information, an objective picture of material, financial and information flows and their links will be created. The second phase is to assess the current status of the data obtained on the basis of quantitative and qualitative indicators. After the results are evaluated, limitations or a narrow place are identified and the auditor proposes measures to remove them.

2.4 Control questions for logistics audit.

The logistics audit provides answers to the questions: What cost units are use in logistic chains? Is a well-organized database of logistics information? Are the main logistics data needed to manage, control and optimize logistics processes complete, actual and correct? Are the downstream times in the synchronized chain? Are time strategies like synchronization or just-in-time used correctly? Are operating costs of different parts of the supply chain known and are they consistent? Is it an effective way to control logistics costs? What are the logistic cost of an item or stock, a customer order, a category, or a supplier? Where and how can enterprice reduce logistics costs without reducing service and performance? Are inventory levels at the various levels of the network necessary and appropriate? Is the safety supply sufficient to ensure efficient use and uninterrupted operation? How effective is communication and information exchange within the supply chain? Are the resources and capacities used efficiently available? What methods are used to process processes? How effective are current logistics processes? Are logistic processes complete and optimized for different flows of materials, parts and finished products? What are the criteria for implementing logistics processes?

2.5 Economic aspects of logistics

Efficiency in logistics reflects the relationship between the level of logistics services achieved and the total costs incurred for the relevant operations. Increasing efficiency in logistics can be achieved by economic balancing, in different ways.

- Increasing revenue by a better level of logistics services at the same logistics cost.
- Reduce overall logistics costs while maintaining the level of logistics services.
- The simultaneous increase in the level of logistics services and the reduction of overall logistics costs (MACUROVÁ, 2014).

The reality of system approach is to understand effect in contexts and tendency at the effects of the whole system, not to satisfy the isolated interests of particular processes. Applying a system approach also means that we do not stand on the surface of effect, but we know the causes of the effect. We examine relations "cause-effect" and we try to influence the causes. If we are trying to increase the level of logistics services or reduce overall logistics costs, then we should work on those processes that can affect the outcome most. On the other hand, if we are preparing a change in the partial process by introducing new technology, then side if we are preparing a change in the partial process by introducing new technology, then we need to examine and solve the impact of this change on downstream processes and overall outputs. Logistics requires integration, coordination and synchronization to achieve the necessary harmonization of the activities of individual articles and a positive synergy effect from synergy. Integration, coordination and synchronization are based on economic balancing.

Integration is unification, greater integration, inclusion, engagement in general. By integrating, the number of logistic interfaces is diminished or their sharpness diminishes. An example is linking suppliers and customers a common information system for monitoring the status of stocks, mutual exchange and use of information about production plans and customer, or stimulating and motivating various downstream units in favor of a common result.

Coordination is the accord of follow-up activities, provision coordination. For example, reconciliation of production plans, on the one hand, with plans for maintenance and repairs of production facilities, and for guiding component deliveries from different trader to joint assembly.

Synchronization is a time alignment of downstream processes in the logistics network to limit the occurrence of waiting for processing and waiting for the service elements. Full synchronization is manifested by the fact that the various follow-up operations are equally long. Continuous and dynamic improvement of the efficiency of logistics system processes is the basis for ensuring the competitiveness of the company. This means dynamic improvement of logistics processes in terms of reinforcement. The resources for improvement are obtained by analyzing all the indicators from the matrix model of the efficiency of the logistics system. Often a very wide range of logistics processes in an enterprise reduces its competitiveness. An enterprise can create a competitive advantage by providing outsourced inefficient logistics processes. The interfaces between the individual logistic chain elements can be referred to by the order break point.

3. RESULTS

3.1 Point of disconnection

Trend logistics is to deal with to interest point of disconnection, a point in the material flow into which the customer order enters. It represents the interface between the production and supply logistics area on the one hand and the distribution part on the other. This is the point where:

- It meets the order management process based on order and prediction and plan management.
- Hold supplies of raw materials, semi-finished products or finished products for timely customer satisfaction.
- It is a key point in terms of customer satisfaction for flexibility and personalization.
- There is some business risk. (PERNICA P. 1998).

Another definition is the transformation of independent market for the addicted. Independent market is the market for products that are random in nature, and development is only possible to

predict. With dependent market, the need for different components can be exactly determined by the bill of material.

3.2 Disconnect point location

The disconnection point may be located in:

1. Distribution warehouse (production and dispatch to warehouse) or in stock of finished products (production on stock). Most of the logistics chain is predestined. The characteristic is to satisfy the customer's needs quickly, when products do not reflect customer satisfaction too much and the risk of failure to sell inventory is maximized unless demand is changed. In the long run, an enterprise with such a disconnection point is not competitive.
2. In the production gap or stock of raw materials and various purchased parts in the production to order. Flexible is assembly and custom production reduces the risk of unsold stocks of finished products. The warehouse of finished products has a balancing role and the stocks can only be kept at a minimum level.
3. In supply articles for purchase and production on a contract basis. The entire chain is run according to the order, it is a synchro flow. There is no risk of failure to sell inventory of finished products but it is necessary to work with the possibility of canceling contracts or poorly estimated capacities. (PERNICA, P. 1998)

It is necessary for the disconnection point to be situated as close as possible to the suppliers and for the remaining elements in the chain to be controlled by the order. Consequences will be lower, respectively removable stock of material, semi-finished products and finished products, increased flexibility of the enterprise to customer requirements by expanding the product range, reducing the risk of stockpiling of obsolete material or products. These benefits are conditional on the proper management of the processes and the high flexibility of the cells in the chain so that the shift of the break point does not ultimately result in a decrease in the reliability of the supplies. (PERNICA, P. 1998)

4. DISCUSSION

4.1 A narrow place

A narrow space is also associated with the flow of material, which is defined as a location in the chain that limits the total chain performance. The principle for a narrow place:

- It must be maximally used.
- Significantly contributes to the level of customer service achieved.
- Management of all the system is necessary subordinate it.
- A certain supply should be created supply in front of this site to cover a one hundred percent coverage of a narrow space (GROS, I. 2004).

4.2 Push and pull steering system

Concerning the narrow place and the point of disconnection we meet with push and pull control system. Pull system (stroke system) is based on a way of managing production, when an enterprise waits for production to a specific customer demand for the product. The Push Pressure Management System is based on forecasting customer demand, which is projected into real production plans. The company pushes the stocks on the market and expects them to sell. (LAMBERT, D. 2000).

The point of disconnection and the narrow place have the following common points:

- They are the elements of the logistics chain that effect the level of customer service.
- Devide logistics chain to push and pull control system.
- Stocks are created before these places.

4.3 ABC analysis and Pareto optimum

ABC analysis is a tool used to classify activities according to relative importance. In relation to the production of products for customers, it is associated with the theory that the products depend on the size of the benefit they bring. Pareto's law says, that a relatively small number of critical

factors cause most of the problem situations. For example, 80% of problems in a logistics system can cause one interface to fail to become a link between the logistics chain links.

5. CONCLUSION

Interfaces in the logistics chain do not in themselves provide a solution for problem areas. However, on the basis of their identification, it is possible to create procedures for achieving the goal and to find the optimal solution for realizing potential improvement with tools to optimize the logistic chain and to reduce the transaction costs. that the interfaces cause.

References

- Gross, I. et. al: Postavení bodu rozpojení v moderních metodách řízení materiálových toku. In Logistika v teorii a praxi. Sborník příspěvku z 3. Mezinárodní konference. I. vyd. Liberec: TUL, 20014, s. 46-50 ISBN 80-7083-813-2
- Tvrdoň, L. et. al: A new approach of the logistics audit. Carpathian Logistics Congress, CLC: Congress proceedings: November 2012, Jeseník, ISBN 978-80-87294-33-8
- Lambert, D. M. et. al: Logistika. 2. Vyd. Praha: Computer Press, 2000, 589 s. ISBN 80722-6221-1
- Pernica, P.: Logistický management: Teorie a podniková praxe. 1. vyd. Praha: Radix. 1998, 660 s. ISBN 8086031136

CURRENT APPROACHES TO EMPLOYEE TRAINING AND THEIR APPLICATIONS IN BUSINESS

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ABSTRACT

Employee training is perceived as one of the central functions of human resources management. Businesses are compelled to devote adequate attention to knowledge and competence creation for their employees in their pursuit of competitiveness. The resources allocated to support training and development, however, are not efficiently utilised. This paper aims to focus on the current trends in employee training and development and examine their applications in Slovak businesses. The paper is result of research within grant project VEGA 1/0609/16.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Keywords: education, development, employees, human resources management.

1. INTRODUCTION

Human resources are perceived as one of the most important sources of competitiveness in business (Xiang, Bo, 2010; Mamedova, Dzhabrailova, 2015). The ability to attract and retain highly qualified employees, to form and develop their potential (Wenyuan, Xiuhong, 2013) and regulate their efficiency (Schuster, 2012) represent the key activities of human resources management in organisations. These and other related activities significantly contribute to the overall performance of the organisation, if they are carried out competently and professionally. Qualification and professional requirements for human resources management are modified by changes in the external environment (Mamedova, Dzhabrailova, 2015), which influences the organisation in many aspects. From a narrow perspective, it is possible to identify changes caused by the exponential speed of technological innovations, which are accompanied by sociological and demographic changes. These areas represent important challenges for human resources specialists. These challenges, however, presuppose a change in the way human resources management is perceived as well as a shift in the way human resources managers approach their own tasks and the overall business success. The rapid pace of change makes it necessary to overcome entrenched views and behavioural patterns that were created and used in the past, but have become insufficient today. It is inevitable to realize that human resources, people with knowledge, experience, abilities, and skills affect the value of the organization at present (Haldin, Herrgard, 2000). Human resources management should be viewed primarily through its contribution to business performance, as opposed to the traditional approach, which treated this area as some service facility and concentrated mainly on its contextual and procedural features. Thus, human resources management has gained a strategic character, since it creates added value for its stakeholders, i.e. the organisation, its employees as well as its clients.

Training is an essential part of life in the modern world, which perceives knowledge as a source of business competitiveness (Wang, Wang, 2012). The role of training in organisations is to ensure that employees possess the skills and knowledge needed to adequately carry out their job, to upgrade their technological skills in accordance with technical developments, to increase their satisfaction and strengthen their relationships with the organisation (Koubek, 2003). Through training

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businesses invest in their own flexibility and ability to adapt to a highly variable environment, and to shape their own competitiveness and success in the future. Therefore, as Koubek (2003) noted, businesses should focus on professional training to guarantee the adjustment of employees to the actual requirements of the job. Such businesses greatly augment the skills and knowledge of employees, and focus on their potential, efficiency, and career advancements.

Armstrong (2002) defines professional training as a systematic behavioural adjustment process that occurs as a result of training, mentoring and planned experiential learning. He describes it as investment in human resources which leads to higher performance and efficient utilisation of natural abilities. Through training businesses strive to:

- develop the skills and abilities of their employees and improve their efficiency,
- support employee development, and satisfy the future needs of human resources from internal resources,
- facilitate employee adaptation processes to ensure job performance at the highest efficiency and at the lowest costs (Armstrong, 2002).

Barták (2007) implies that the distinction between training and development also remains unclear. He defines training as a planned activity that helps an employee achieve the desired competencies, learn to carry out things adequately, and utilise the acquired knowledge and skills in practice. Development is understood as a complex set of activities aimed at increasing the potential of an individual; it is an ongoing process throughout the active life of an individual by means of continuous training, development, and change. The extent to which an employee is aware of his own responsibilities for personal development is perceived as a dominant factor. Tureckiová (2004) claims that development usually concerns a selected group of employees, involving business managers, specialists with high developmental potential, a talent pool as a basis for succession planning, and high-performers in strategic professions.

At present, employee training and development is not associated with the pragmatic notion of abilities, but with the concept of knowledge (Urbanec, 2012). Barták (2007) defines it as a resource that is not subject to amortisation or degradation, but rather as an enriching source which absorbs further knowledge. Knowledge represents a force-field that attracts more and more knowledge, and leads to development. Investment in knowledge generates high-yield returns. Knowledge-based development, however, significantly depends on the involvement of both the management and the employees.

Veber (2000) defines knowledge as a dynamic system, including the mutual interaction between experience, skills, facts, relationships, values, thought processes and meanings. It consists of information, experience, skills, intuition, personal preferences, and mental models of individuals. Knowledge is a two-dimensional system including explicit and tacit components (Hvorecky, et al. 2015). Mládková (2008) claims that explicit knowledge is expressed through formal and systematic language or data. It can be verbalised, written, stored and transmitted. Explicit knowledge refers to the informational dimension. Tacit knowledge is created through the interaction between explicit knowledge and experience, skills, intuition, visions, and mental models. It is linked to the activities, procedures, routines, ideas, values or emotions of an individual, therefore, it is very difficult to express and share. It is highly personalised, and thus remaining invisible even to the employee who possesses such knowledge. Mládková points out that the overall level of tacit knowledge predetermines the success of any business. Higher level of tacit knowledge and its enhanced utilisation greatly contribute to business success.

Training and development is closely related to competencies, which are defined as preparedness to perform a specific activity under standard conditions (Stýblo, 2006). Competencies refer to a set of skills, knowledge and capabilities gained through continuous learning. Stýblo claims that competencies are result-oriented, and relate to the application of knowledge and skills, rather than mere possession of knowledge and skills. Therefore, they are related to the activities of the employee and the requirements of the job, and determine the criteria for performance efficiency. At present, human resources management is focused on those competencies, which are crucial for business competitiveness and render competition difficult for potential competitors.

Adult training fundamentally differs from child and youth training (Dukakis, et al. 2013) due to differences in motivation, cognitive and emotional intelligence, experience, and the degree of responsibility for personal development. There are also differences in learning objectives and

contextual features. An adult learner not only becomes the object of the training process, but also an active subject, and exerts responsibility for the achieved results (Barták, 2007). Even though adult training has become a life-long learning opportunity, it can be affected by fear of failure in adult learners. Pitra (2002, in Tureckiová, 2004) reveals that 80% of employees exhibit passive resistance; they hesitate and prefer to wait. Thus, management should motivate employees to learn and provide them with necessary support. Barták (2007) defines adult training as a process of acquiring knowledge, skills and habits which involve both cognitive and conative components. These components shape the personality of an adult. This results not only in the acquisition of knowledge, skills and habits, but also in the modification of motives, personality traits and abilities of an individual.

Employee training and development is perceived as investment in human resources, which is naturally associated with high costs. To ensure cost-efficiency, the entire process of training should be viewed systematically, i.e. in the context of specific and predefined needs. Thus, the entire process should be thoroughly planned to appropriately select the type of training and its methods. This would considerably help its implementation and the subsequent monitoring and evaluation of its effectiveness.

2. MATERIALS AND METHODS

Human resources management in the Slovak Republic is subject to regular monitoring through annual surveys, which are carried out under the auspices of an international platform of universities and university colleges of business (the Cranfield Network on Human Resources Management – CRANET), coordinated by the Cranfield School of Management. Regular information on policymaking and the applications of human resources management tools serves as a valuable resource for the evaluation of human resources management development in Slovakia and its confrontation with theory- and practice-based global trends. A structured questionnaire survey served as the basis for this research, reflecting a research methodology of the CRANET network. The questionnaire included a series of questions to identify the organisation of human resources management, the position of human resources departments in business, the thematic blocks focusing on the creation of human resources potential and efficiency management. The questionnaire also included questions about human resources leaders.

A database of 262 businesses in Slovakia was used to identify and examine the role of training in human resources management systems. The survey questionnaire was completed and returned only by 387 out of 564 businesses. The sample satisfied the purposes of statistics. Small and medium-sized enterprises are typical business orientations in Slovakia, therefore, the survey sample involved businesses with over 50 employees, such as businesses in the private sector, businesses of large international organisations; businesses directly responsible for the development of human resources strategies; or businesses involved in the modification of human resources strategies according to local characteristics.

Strategies, concepts and practices of training in Slovak businesses were the focus of research. The following research questions were used to examine the approaches of human resources management to training in Slovakia between the years of 2015 to 2016:

- Does training support DNA competitiveness in Slovak businesses?
- What are the characteristic features of predominant approaches of businesses to employee training?
- How do businesses realise the different stages of the training cycle, with special focus on the preparatory phase and the training efficiency assessment phase?
- What are the current methods of training in the implementation phase?
- Is knowledge management a conceptual component in human resources management systems in Slovak businesses?

3. RESULTS AND DISCUSSION

The survey results showed that most attention was devoted to the training of specialists, i.e. systematic, planned, and continuous training for specialists was offered by more than 62% of businesses. This approach was applied by 42% of businesses to train managers, and only by 37% of businesses to train administrative staff and workers. Ad hoc approaches to employee training were

preferred by almost one third of businesses, which involved unplanned training activities. The ad hoc approach was used by 33% of businesses to train managers, and by 25% of businesses to train administrative staff and workers. Planned training activities for specialists were used by 37% of businesses, whereas 14% of businesses utilised such activities for training managers. Obligatory training for administrative staff and workers was preferred by 38% of businesses.

Table 1 Approaches to training for specific categories of employees

	Management	Specialists	Administrative Staff and Workers
Continuous training	28%	25%	13%
Obligatory training	25%	30%	38%
Ad hoc training	33%	28%	25%
Planned approach	14%	37%	24%

Source: authors' processing

Employee training and development remains underestimated by small businesses, which regard it as a matter of large organisations. They argue that they cannot afford to invest in training, thus shifting the burden of responsibility to their own employees. However, if a small business is willing to face competition, and flexibly respond to rapidly changing conditions, it should not neglect employee training and development. Koubek (2003) states that small businesses are disadvantaged in the provision of social benefits and job stability as compared to large organisations, and therefore they find it more difficult to gain highly qualified employees. They often need employees with a broad spectrum of professional skills, since flat organisational structures do not allow for a high degree of specialised activities. Small businesses are then dependent on the provision of extra training for their own employees and their adaptation to the specific conditions of business.

The approach to employee training and development from a territorial perspective reflects the educational level of the population. Hajko (2011) noted that citizens of Bratislava demonstrated the highest level of completed education, whereas the eastern regions of Slovakia indicated a low level of education. The most intense provision of employee training characterised businesses based in Bratislava. Businesses with nationwide involvement exhibited active employee training (Stachová, 2013).

Systematic investigations were used to identify training needs by 71% of businesses, training and career development plans were used by 58% of businesses, and performance appraisals on employees were used by 36 % of businesses. One third of businesses considered the requirements of their own employees, and mere intuition was used to identify training needs by 18% of businesses. These results reflected positive approaches to training employees. In terms of training domains, businesses focused on language training (50%), and managerial skills development (40%).

Table 2 Training domains in businesses

Training domains in businesses	% of business participation
Foreign languages	50
Management skills	40
Technical education	25
IT skills	22
Economics and Marketing	20
Qualification enhancement and extension	15
Utilisation of EU funds	7
Legislation	4

Source: Kachaňáková, Stachová, Stacho, 2013

Utilisation of Teaching Methods

A wide range of teaching methods can be utilised in employee training. They can be classified as follows:

- teaching methods on the job, including instructions, coaching, mentoring, consulting, assisting, job rotation, consultative meetings, and project work,
- teaching methods off the job, involving formal training programmes such as lectures, demonstrations, workshops, simulations, case studies, role plays, assessment centres, e-learning, and outdoor training (Porvazník, 1999 In: Kachaňáková, 2007). Pros and cons of these methods are summarised in Table 3.

Training on the job is provided by managers or mentors entrusted with the task. Line managers should also be directly and actively involved in their employees' training, thus bringing reality into training and promoting the application of obtained knowledge in practice (Armstrong, 2002). Training off the job can be organised by the training and development department of the business, or outside consultants, lecturers and educational institutions.

Table 3 Pros and cons of diverse teaching methods

Pros of training on the job	Cons of training on the job
costs	risk of decreased efficiency of the trainer
tailored approach	lack of suitable trainers
practical experience and skills	unfavourable conditions for continuous training
training under specific business conditions, business techniques, and procedures	transfer of certain tasks from the trainer to employees, which is perceived as a demotivator
Pros of training off the job	Cons of training off the job
training carried out in leisure time, without influencing employee performance	theory-based training
professional level	low-level of motivation in leisure time
transfer of new ideas into business	incompatible with the needs of business

Source: Koubek, 2003

Armstrong (2002) claims that the creation of training programmes requires the right combination of training on the job with other teaching methods. There are no exact rules, individual needs should always be taken into consideration. Armstrong recommends to give preference to training on the job, which highlights the application of knowledge in practice. Training off the job should only be complementary to obtain knowledge and skills that cannot be gained otherwise.

The selection of training methods partly depends on employees as the targets of these activities. In general, businesses prefer self-directed training for employees, thus transferring the burden of responsibility to employees. The survey showed that training off the job was mostly carried out through lectures, which was viewed rather negatively. One quarter of the surveyed businesses exploited e-learning and Internet-based training programmes. Training on the job was mainly realised through coaching and mentoring, however, they reflected a declining tendency. Coaching and mentoring for managers were used by 45% of businesses, for specialists by 38% of businesses, and for administrative staff and workers by 31% of businesses. Project work as a form of training on the job was also widely spread; it was used to train managers and specialists by 40% of businesses, whereas rotation was applied by 20-30% of businesses. The current approaches to training through extensive utilisation of teaching methods are viewed positively, since they integrate training into the daily activities of business and support knowledge sharing and knowledge management applications in practice, thus contributing to the development of training-based businesses.

Coaching is one of the most controversial methods of employee training and development within both the academic sphere and business practice. Urban (2003) defines it as a two-dimensional construct, which involves learning and motivational support. It is based on long-term direction, support, and encouragement of employees to help them acquire, develop, and apply new skills. Blažek (In: Čempelová, 2011) claims that coaching promotes personal development, increases self-confidence and performance. Tureckiová (2004) claims that the essence of coaching lies in supporting employees to competently perform increasingly demanding tasks. Coaching is a form of long-term interaction between the coach and the employee, which leads to the advancement of both participants through

interviews and the interrelated activities. A coach acts as a counsellor, supporter, and guide throughout the entire process.

Employees receiving precise instructions from their superiors do not develop sufficient knowledge. Similarly, training is perceived as ineffective, if an employee attains a new task without any instructions and support. Time and energy are wasted on such tasks. The ideal approach supporting both employee development and business success lies in the middle ground between the two extremes. That is the space for coaching (Urban, 2013). Coaching links learning with practical requirements. Learning means achieving a result. The method of action learning relies on the learning cycle. It consists of four interconnected phases in which learners gradually discover new knowledge, consider and form their own conclusions, which are then tested on their own performance in the job. However, to make sure that coaching meets the expectations of employee training, hot spots should be thoroughly considered.

Approaches to Knowledge Management in Business

Research findings regarding knowledge management with the aim to increase training on the job are not very positive in the Slovak Republic. Ward (2005, In Collinson, Parcel) notes that knowledge management does not mean the creation of encyclopaedias, but rather it means monitoring those employees who are knowledgeable and willing to develop a corporate culture and technologies favourable to the process of knowledge-sharing.

A learning organisation's strategy lies in the pursuit of anticipated business results. Barták (2007) directs attention to efforts leading to human capital appreciation and improvement, which generate return on investment in human resources development. These efforts involve setting personal goals, personal development plans, learning and developing capabilities, and career development plans with respect to efficiency management. Furthermore, they incorporate continuous opportunities to experiment and the right to errors. Willingness, motivation, personal development, and responsibility for obtaining results are perceived as the main prerequisites.

The value of knowledge and its sharing are still underestimated by businesses. Responses about the benefits of knowledge-sharing, however, reflected its positive impact on efficiency (56%), cost reduction (26%) and performance efficiency (45%). It was regarded as irrelevant and unbeneficial only by 11% of businesses. However, the loss of knowledgeable employees was not regarded as a threat to performance efficiency by 63% of businesses, and thus they did not motivate these employees to knowledge and experience sharing. The systematic utilisation of tools for recording and storing knowledge and facilitating knowledge sharing was practiced only by 20% of businesses. One third of them did not utilise such tools, the rest used them only to a limited extent. Stachová (2013) claims that knowledge sharing and utilisation between businesses has decreased in recent years. While in 2010 knowledge sharing as a prerequisite was declared by 21% of businesses, in 2012, it was only 12%. Tureckiová (2004) noted that transition from business training to a learning organisation presupposes continuous, shared, and reflective learning that leads to skills development and behavioural changes in the entire business.

The survey results revealed contradictory results on the integration of training processes into human resources management systems and their relatedness to other human resources functions. Current theoretical knowledge indicates that effective human resources management requires the interrelatedness of employee training and the processes of remuneration and assessment. This implies that performance appraisals on employees should provide background information for the identification of training needs. Training activities develop employee competencies and affect efficiency, which should then be reflected in employee remuneration, ideally in its fixed and variable parts. Such connections, however, are not regarded as obvious in Slovak businesses. The integration of performance appraisals into remuneration was applied by 82% of businesses, the interrelatedness between performance appraisals and employee training, however, was reported only by 76% of businesses. Knowledge of employees was neither appraised nor remunerated by 55% of businesses. Quality and quantity monitoring systems were used to assess and remunerate knowledge only by 18% of businesses. The rest of businesses used non-financial tools for remuneration.

Training was positively viewed by employees; a negative approach to it was demonstrated by only 9% of employees; they either attended training out of duty, or tried to avoid it. Stimulating demand for employee training has become a global trend, and employees have become aware of the

need to possess a wide range of knowledge and skills to expand their competencies as prerequisites for competitiveness on the labour market. Therefore, they welcome training opportunities offered by employers; they even show interest in continuous training in the phase of recruitment and selection. Thus, training and development have already been incorporated into employee benefit systems and offered to employees as a lucrative part of their total remuneration in many businesses.

4. CONCLUSION

Training is one of the key human resources management functions in businesses. Koubek (2003) refers to it as the most important activity for human resources management in modern businesses. The survey results reported that only 5% of businesses avoided investing in employee training. One half of businesses spent less than 4% of staff costs on training; and 6% of businesses spent over 10% of staff costs on employee training. The average number of training days per employee amounted to 5 days. Both investments in training and their efficiency should be considered as important. Spending time and energy on training does not automatically lead to efficiency and high performance. Therefore, assessment and evaluation of training efficiency should become an essential part of the entire process. However, the survey results show that businesses in Slovakia do not make good progress in this direction. Stachová (2013) reveals that in 2010, training was systematically evaluated by 56% of businesses, whereas in 2012, their number dropped to 41%. Methods of formal evaluation still prevail and are being used as dominant tools at the expense of evaluating and assessing real changes in job performance as a result of training.

This paper is a partial result of a VEGA project funded by the Scientific Grant Agency of the Ministry of Education of the Slovak Republic, no. 1/0609/16 "Exploring the Concepts of Human Resources Management Systems in Relation to the Specifics of Business Models in Competitive Organisations of the European Economic Area".

Aknowledgements

This paper aims to focus on the current trends in employee training and development and examine their applications in Slovak businesses. The paper is result of research within grant project VEGA 1/0609/16 Examination of Conceptual Frameworks of Human Resource Management Systems in relation to the Specifications of Business Models in Modern Competitive Organisations of the European Economic Area.

References

- Armstrong, M. 2002. *Řízení lidských zdrojů*. Praha: Grada publishing, 2002. ISBN 80-247-0469-2.
- Barták, J. 2007. *Vzdělávání ve firmě*. Praha: Alfa Publishing, 2007. ISBN 978-80-86851-68-6.
- Collinson, Ch. – ParcelL, G. 2005. *Knowledge management*. Brno: Computer Press, 2005. ISBN 80-251-0760-4.
- Dukakis, N., Valkanos, E., Brinia, V. 2013. Adult vocational training and the project technique. *Industrial and Commercial Training* 45(2), pp. 99-109
- Hajko, J. – Klátik, P. – TUunega, M. 2011. *Konkurencieschopné regióny 21*. Bratislava: Devin printinghouse, 2011. ISBN 978-80-89493-05-0.
- Haldin-Herrgard T (2000): Difficulties in diffusion of tacit knowledge in organizations. *Journal of Intellectual Capital*, 1, 357–365.
- Henych, M. 2010. *Action Learning: propojení učení a praxe*. HRM, Ročník VI, číslo 3, vydavatel'stvo Economia, máj – jún 2010, str.55. ISSN 1801-4690.
- Hvorecky, J., Simuth, J., Lipovska, A. 2015. Ways of delivering tacit knowledge in e-learning. *Proceedings of 2015 International Conference on Interactive Collaborative Learning, ICL 2015*, 7318083, pp. 523-526
- Kachanákova, A. – Stachová, K. – Stacho, Z. 2013. *Riadenie ľudských zdrojov v organizáciách pôsobiacich na Slovensku*. Bratislava: Iura Edition, 2013. ISBN 978-80-8078-606-9.
- Kachanákova, A. a kol. 2007. *Riadenie ľudských zdrojov*. Bratislava: Sprint, 2007. ISBN 978-80-89085-87-5.
- Koubek, J. 2003. *Personální práce v malých podnicích*. Praha: Grada Publishing, 2003. ISBN 80-247-0602-4.
- Mamedova, M., Dzhabrailova, Z. 2015. Multi criteria optimization of human resource management problems based on the modified topsis method. *EasternEuropean Journal of Enterprise Technologies* 2(4), pp. 48-62

- Schuster, T. 2012 Balanced resource allocation 18th Americas Conference on Information Systems 2012, AMCIS 2012, 3, pp. 1755-1765
- Tureckiová, M. 2004. *Řízení a rozvoj lidí ve firmách*. Praha: Grada Publishing, 2004. ISBN 80-247-0405-6.
- Urban, J. 2003. *Řízení lidí v organizaci: personální rozměr manažmentu*. Praha: ASPI Publishing, 2003. ISBN 80-86395-46-4.
- Urbancová, H., Urbanec, J. (2012) 'Internal Factors Influencing the Knowledge Continuity Ensuring', *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, Vol. 60, No. 4 pp. 387-395.
- Wang, Z. and Wang, N. (2012) 'Knowledge Sharing, Innovation and Firm Performance', *Expert Systems with Application*, vol. 39, no. 10, pp. 8899-9808.
- Weberova, D., Hitka, M., Lizbetinova, L. (2017). Age and Gender Motivating Differences of Slovak Workers. *International Review of Management and Marketing*. Vol 7, No1 (2017), ISSN 2146-4405
- Wenyuan, S., Xiuhong, D. 2013. On human resource management of Chinese colleges: From the perspective of knowledge management. *Proceedings of 2013 6th International Conference on Information Management, Innovation Management and Industrial Engineering, ICIII 2013*, 1,6702967, pp. 436-439
- Xiang, G., Bo, W. 2010. RETRACTED ARTICLE: Research on enterprise human resource competitiveness based on BP ANN Proceedings - 2010 3rd IEEE International Conference on Computer Science and Information Technology, ICCSIT 2010, 4, 5564907, pp. 90-93

STABILITY OF THE FOREST AND WOOD PROCESSING SECTOR IN THE CZECH REPUBLIC

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ABSTRACT

An industry often consists of one big and dominant company accompanied with several smaller ones. In the economic theory, such an imperfect market structure is called an oligopoly with a dominant company and a competitive fringe. Providing that the dominant company controls 60-80% of the market, it can choose from various possible strategies including monopolising the sector and crushing the competitive fringe using suitably selected selling techniques.

Considering the conditions in the Czech Republic, the state enterprise Forests of the Czech Republic, state enterprise (FCR) is often used as an example of such a market structure, the FCR being a dominant company which raises fears that the industry might be monopolised; consequently, it is criticized for the low competitiveness of the wood processing industry and for instability of the sector. The aim of the contribution is to describe the market structure existing in the forestry and wood processing sector. The process of church property restitutions having been almost completed and the change in the structure of the ownership of forests in the Czech Republic having been made, it is possible to hypothesize that there is no risk of monopolisation of the sector; the competitive fringe is strong enough even in case of change in selling techniques – in the sales channels of the dominant company and a significance of the impact of the FCR on the low competitiveness of the wood industry in the Czech Republic can be excluded.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: forestry, economics, market structure, state enterprise, oligopoly, wood industry.

1. INTRODUCTION

The accession of the Czech Republic (CR) to the European Union in 2004 triggered a gradual transformation of the monopolistic market into an oligopolistic market due to strengthened influence of small and middle-sized companies (for more see Kraft, 2007). When researching the oligopolistic behaviour of companies, most mainstream economists assume the basic theoretical model of oligopolistic competitive behaviour in the conditions of post-industrial society as created by Samuelson and Nordhaus (2004). This theory of oligopoly was further elaborated for the conditions of market industries by Varian (1992).

Oligopoly can be defined as a market model of the imperfect competition type, assuming the existence of only a few companies in a sector or industry, from which at least some have a significant market share and can therefore affect the production prices in the market (Severová et al., 2011). The oligopoly theory usually refers to the partial equilibrium study of markets in which demand side is competitive, while the supply side is neither monopolized nor competitive (Friedman, 1982).

Neoclassical and Neo-Keynesian schools of economics provide models of oligopolistic competition defined in various ways (see Schiller, 2013). Šrédľ and Svoboda (2011) argue that, above all, these oligopoly models differ in the character of the behaviour of the competing companies; this is confirmed by Severová et al. (2011). However, Samuelson and Nordhaus (2004), as well as Soukupová (2006), have found some correspondences in the assumptions of those varying models.

Currently, an industry often consists of one big and dominant company accompanied with several smaller ones. In the economic theory, such an imperfect market structure is called an oligopoly with a dominant company and a competitive fringe (see e.g. Samuelson and Nordhaus 2004; Severová

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et al. 2011; OECD 2002; Tasnádi 2010). Hořejší et al. (2008) describe a modified oligopoly model, in which the dominant company is accompanied by several mid-size companies and a bigger number of small companies representing the competitive fringe. The companies in the competitive fringe behave as perfectly competitive companies: they can sell any volume of their outputs for the price set by the dominant company. The Organisation for Economic Co-operation and Development (OECD) defines a dominant firm in the glossary of statistical terms. A dominant firm is one which accounts for a significant share of a given market and has a significantly larger market share than its next largest rival. Dominant firms are typically considered to have market shares of 40 per cent and more. (OECD 2002) Providing that the dominant company controls 60-80% of the market, it can choose from various possible strategies including monopolising the sector and crushing the competitive fringe using suitably selected selling techniques (Samuelson, Nordhaus 2004).

Considering the conditions in the Czech Republic, the state enterprise Forests of the Czech Republic, state enterprise (FCR) is often used as an example of such a market structure, the FCR being a dominant company which raises fears that the industry might be monopolised; consequently, it is criticized for the low competitiveness of the wood processing industry and for instability of the sector.

The aim of the paper is to describe the market structure existing in the forestry and wood processing sector through the positive approach and using the main market attributes. It will be found out what market share the FCR has and how strong the competitive fringe is. Since the process of Church restitutions is almost completed and the ownership structure of the forests in the Czech Republic has been changed, and with regard to the extension of the spectrum of selling techniques—the trading channels of the FCR – since 2011, it is possible to hypothesize that there is no threat of monopolization of the industry; the competitive fringe is strong enough even if a change in selling techniques occurred—the trading channels of the dominant company. It is also possible to rule out a significant influence of the FCR on the low competitiveness in the Czech timber industry. Yet, there may be barriers blocking the entry into the industry, such as economies of scale or product differentiation costs. Nevertheless, those issues are not addressed in the model described in this article due to the extent of the article.

2. MATERIAL AND METHODS

Both primary and secondary research methods have been employed during the elaboration of this article. Concerning the secondary research, it mainly included the method of bibliographic research, which created the theoretical foundation for the results of the primary research and for the method of describing the market division among the individual subjects. As for the primary research, the mathematic method (percentages) has been used together with an analysis and a consequent synthesis of the identified data and with the comparative method.

The main surveyed entity was the state enterprise of Forests of the Czech Republic, which was founded by the Deed of Incorporation of the Ministry of Agriculture of the Czech Republic in 1991 pursuant to Act No. 111/1990 Coll. on State Enterprises. Information about this enterprise was obtained from its websites and its annual reports.

The organization of the FRC is divided into the Directorate and organizational units, which are represented by 4 forest enterprises, a seed enterprise, 6 flow administrations, and 12 regional directorates. The directorates manage 74 forest administrations. The main activity of the organization is to manage more than 1.3 million hectares of forest assets owned by the state (almost 86% of the area of all state forests). The annual logging rates fluctuate around 7 million m³ on average. In 2015, the total revenue of the enterprise was ca CZK 13 billion, its total costs accounted for CZK 7.7 billion, the profit or loss after tax was CZK 5.4 billion, the added value was CZK 7.8 billion, and the total value of its assets was CZK 70.3 billion. (FCR, 2015)

Concerning the primary research, the Economic Accounts for Forestry and Logging (EAFL) published by the Czech Statistical Office (CSO) were the most important source of information. The materials and data sources for the creation of the EAFL comprised CSO publications and reports and documents from the FCR, the Ministry of Finance of the Czech Republic, the Ministry of Agriculture of the CR, the Ministry of Environment of the CR, the Support and Guarantee Agricultural and Forestry Fund, the Forest Management Institute in Brandýs nad Labem, the Forestry and Game Management Research Institute, private companies, and from others.

The EAFL follow the Summarizing Account for Forestry published earlier; however, there are certain differences in the methodology (such as in the case of standing timber). The EAFL are a part of the Integrated Environmental and Economic Accounting for Forests, which is the basic methodological tool for measuring the economic size and the performance of the sector, or for forestry primary production within the national economy. The main purpose of the accounts is to analyse the production process and the primary income achieved by it. The elaboration of the EAFL is governed by the rules of the European System of Accounts (ESA); thanks to it, their data are comparable with other European countries (EU). (CSO, 2017)

The following indicators were used to determine the dominant position of the FCR on the market and to describe the position of the FCR in the oligopoly model:

- forestry branch output – includes the sales of products and services,
- total output of forestry – expressed as a value, it represents the total final production of the forestry sector which leaves this sector. It is the production of timber. The production is assessed with a basic price, i.e. the amount which the producer obtains from the buyer for a unit of the products and services produced by them plus the subsidies obtained for the product and minus the tax levied for the product (CSO, 2017). Namely, it means the incomes from realising the possessions and services of forestry, mainly from realising timber; financial and exceptional earnings are not included.
- gross value added forestry branch – represents the final effect of the forestry sector measured by the difference in the final production of intermediate consumption by the forestry sector (CSO, 2017),
- factor income – represents the reward from all the production factors and the total value which the units produce by their productive activity (CSO, 2017); in other words, it is the gross operating result.

If there is a competitive fringe which is strong enough, then there is no risk of monopolisation of the forestry sector. The companies in the competitive fringe can maximize their profits at the level of the adopted output prices (P) and of their individual marginal costs (MC):

$$P = MC_i(q_i) \quad (1)$$

wherein: $i = 2, \dots, n$.

(Hořejší et al. 2008)

The years 2009 – 2014 were chosen as the reference period for the article because of the availability of the data. The data were processed using Microsoft Office Excel.

3. RESULTS AND DISCUSSION

In the Czech Republic, forests cover approximately 2.7 million hectares. Almost 60% of the forests are owned by the state. In 2015, 16.16 million m³ of raw timber was logged in total in the Czech forests; the total timber reserve accounted for 692.6 million m³ (MoA, 2016). Compared with the preceding years, there was a slight increase in logging. The development of logging in the Czech Republic in the reference period of 2009 – 2014 is shown in Table 1.

Table 1 Roundwood logging in the Czech Republic in million m³

Year	2009	2010	2011	2012	2013	2014
The total logging by the forestry sector	15.5	16.74	15.38	15.06	15.33	15.48
The logging by the FCR	7.72	8.05	8.02	7.84	8.04	7.98
Proportion of logging by the FCR in the total logging by the forestry sector	49.80%	48.10%	52.10%	52.10%	52.40%	51.60%

Sources: FCR, 2009 – 2014

The Table 1 clearly shows that the share of the FCR in logging is more than 50%. In 2015, 91% of the total volume of timber sold by the FCR was in the form of whole trees. The technological timber product range for further industrial processing is created by business entities in the position of contractual partners of the FCR under complex contracts. These contractual partners buy whole trees

on the legal basis of complex contracts and subsequently launch timber onto the market. The contractual obligations of the FCR and their contractual partners arise from public tenders pursuant to the provisions of Act No. 134/2016 Coll. on Public Procurement. Together with non-public owners of forests in the Czech Republic, these business entities create the competitive fringe of the raw timber market as well as of the whole forestry sector in the Czech Republic.

Table 2 demonstrates the structure of timber realisation by the FCR according to the individual trading channels. It follows from Table 2 that more than three-quarters of the timber volume is sold under long-term public contracts for complex activities concluded for the periods of 5 years. The second most important trading channel is auctions of standing timber, either in the form of attendance auctions or in the form of electronic auctions. The year 2010 was important with regard to the evaluation of timber sales by the FCR in the P area – stem (whole trees) and the OM area – log landing (technological product ranges). Since 2011, the portion of the FCR's sales of finished technological product ranges from the OM area has been decreasing while its portion of tree sales from the P area has been increasing. The portion of sales via other sales techniques – trading channels – has been increasing since 2011, too.

Table 2 The structure of timber realisation in thousand m3

Years	2009	2010	2011	2012	2013	2014
Comprehensive contracts	3,080	3,291	7,154	6,054	6,119	6,142
Electronic auctions	0	0	0	956	1 151	1 011
Auctions in person	0	0	0	0	0	55
Commodity exchange (FMU)	127	0	302	332	291	249
Electronic auctions (FMU)	4,236	4,939	154	152	110	101
Regional sales (FMU)	1,030	1,007	0	0	0	81
Own production	0	0	79	89	76	283

Sources: FCR, 2009 – 2014; Note: FMU – forest management units

The Czech timber market is apportioned among the entities owning forest capital – forest plots with forest covers – and business entities trading in timber. The share of the FCR in forest plot ownerships in the CR was 1.313 million ha (i.e. 50.65%) in 2009, 1.305 million ha (i.e. 50.16%) in 2014, and 1.283 million ha (i.e. 49.25%) in 2015 (MoA, 2010, 2015, 2016). The decrease in the share of ownership results from the ending process of the property settlement between the state and Churches and religious societies, known as “Church Restitutions”, pursuant to Act No. 428/2012 Coll. The ownership relations concerning the forests in the CR in 2009 and 2014 are stated in Figure 1.

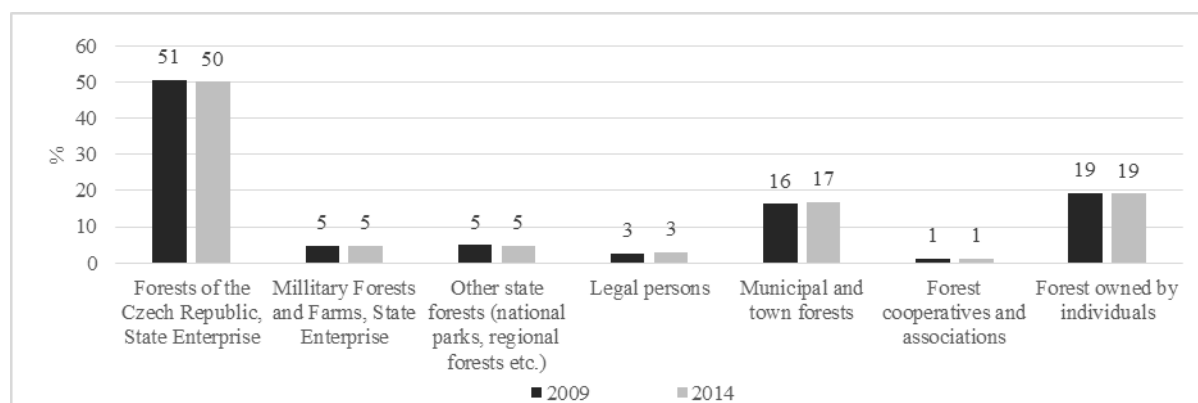


Figure 1 The ownership relation concerning the forests in the CR in 2009 and 2014

Source: MoA, 2010, 2015

Furthermore, the indicators of the market share of the FCR were determined. They were the indicators of forestry production, total production, gross value added, and income from production factors. The values identified in the FCR were compared with the data from the Economic Accounts

for Forestry and Logging. The results of the comparison are in Table 3. The share of the FCR in the total production of the Czech forestry industry is crucial for the description of the model of oligopoly with a dominant company and for the verification of the formulated hypothesis. The size of the competition fringe is demonstrated in Figure 2.

Table 3 Comparison selected economic accounts for forestry and logging, years 2009 – 2014

Indicator	2009	2010	2011	2012	2013	2014
<i>current prices, in million CZK</i>						
Forestry branch output	36,440.6	43,878.0	49,570.8	51,020.4	52,891.7	55,242.3
State-owned enterprise FCR forestry output	7,760.2	9,774.5	11,756.7	11,611.8	11,537.1	12,101.3
Share of FCR on forestry branch output	21.3%	22.3%	23.7%	22.8%	21.8%	21.9%
Total output of forestry	43,955.2	52,785.2	57,275.1	58,448.5	60,252.8	62,598.7
State-owned enterprise FCR total output	8,437.0	10,818.0	12,832.0	12,281.0	12,144.0	12,513.0
Share of FCR on total output of forestry	19.2%	20.5%	22.4%	21.0%	20.2%	20.0%
Gross value added forestry branch	14,354.1	16,622.3	17,861.5	20,338.6	21,922.2	24,501.3
Gross value added State-owned enterprise FCR	2,359.0	4,267.6	7,069.6	7,356.3	6,842.1	7,876.8
Share of FCR on gross value added forestry branch	16.4%	25.7%	39.6%	36.2%	31.2%	32.1%
Factor income	12,457.3	14,744.0	15,900.9	18,198.9	19,505.5	22,066.5
State-owned enterprise FCR factor income	783.9	3,159.7	5,275.2	5,478.3	4,956.7	7,963.2
Share of FCR on factor income	6.3%	21.4%	33.2%	30.1%	25.4%	36.1%

Sources: CSO, 2017; FCR, 2009 – 2014; managerial accounting of FCR

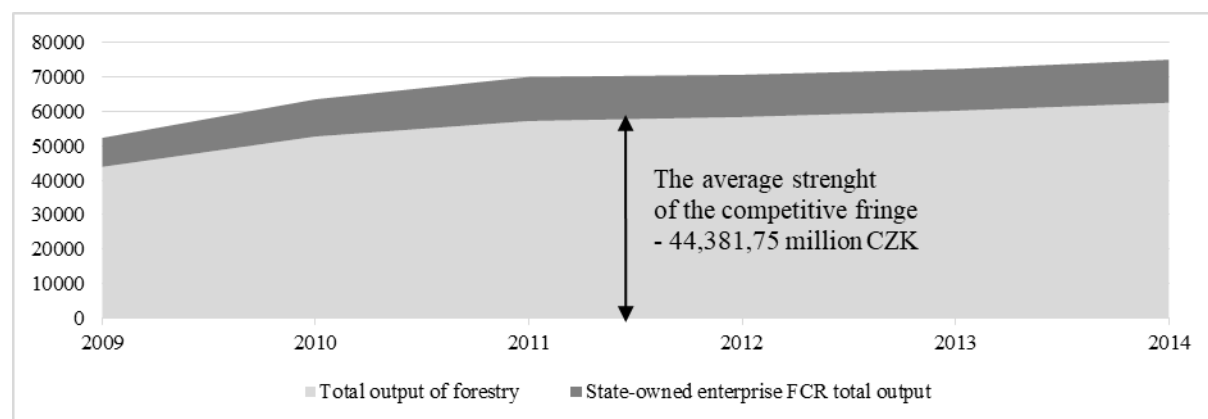


Figure 2 Share of the FCR on the total output of forestry sector in CR (in million CZK)

The second indicator of Table 3 shows the total share of the FCR, specifically the portion of the FCR in the production of the forestry industry in the CR. It is obvious from the Table 3 that their total market share fluctuated around 20% in 2009 – 2014, being the highest in 2011 when it accounted for 22.4%. If the values are averaged, it is possible to say that the average market share of the FCR over last six years was 20.6%. When this value is compared with bibliography, it turns out that the FCR does not have big enough a share in the market so as to endanger the market with monopolisation; to endanger it; their share would have to be 60–80% (according e.g. Samuelson and Nordhaus, 2004). Nevertheless, the FCR are not even a dominant company of an oligopoly in the real meaning of it, since the share of a dominant company in an oligopoly should be approximately 40% (see OECD 2002).

4. CONCLUSION

The aim of this paper was to describe the market structures of the forestry and wood processing sector. For the purpose of this article, a hypothesis was formulated stating that there is no

risk of monopolisation of the forestry industry since the state enterprise FCR does not have such a significant share of the market and the competitive fringe is strong enough, even if the FCR extends their selling techniques—their trading channels. Financially expressed, the strength of the competitive fringe over the surveyed reference period is CZK 44,381.75 million on average. The parameters of the identified actual state of the market structure of the Czech forestry does not correspond with the oligopoly with a dominant company as described by Hořejší et al. (2008). Thus, the formulated hypothesis is not rejected. The protection of the market and the market competition, as well as the elimination of some barriers blocking the entry into the industry, are guaranteed by the state by means of legal instruments.

Acknowledgements

The paper was prepared with the support of the Ministry of Agriculture project called Current and Strategic Possibilities of Sustainable Provision of Forest Functions and Services of polyfunctional forestry to the Public in terms of Socio-Economic, Political and Legal in the Czech Republic, No. QJ1530032.

References

- Act no. 111/1990 Coll., on state enterprise, as amended.
Act no. 136/2016 Coll., on public procurement, as amended.
Act no. 428/2012 Coll., on property settlement with churches and religious societies and on the amendment of certain acts, as amended.
CSO. 2017. Economic accounts for forestry and logging. Czech Statistical Office. [online] [cit. 2017-02-15]. Available at: <<http://www.czso.cz>>.
FCR. 2009 – 2014. Annual Reports 2009 – 2014. Forest of the Czech Republic, state enterprise. [online] [cit. 2017-03-10]. Available at: <<http://www.lesycr.cz>>.
FCR. 2015. Annual Report 2015. Forest of the Czech Republic, state enterprise. [online] [cit. 2017-04-10]. Available at: <<http://www.lesycr.cz>>.
Friedman, J. 1982. Oligopoly theory. In Arrow, K.J., Intriligator, M.D. (eds.): Handbook of Mathematical Economics, 2. Elsevier Science and Technology: 491-534.
Hořejší, B., Soukupová, J., Macáková, L., Soukup, J. 2008. Mikroekonomie. Praha: Management Press.
Kraft, J. 2007. Perspektivy firem oligopolního lemu v podmínkách ekonomicky se sjednocující Evropy a jejich vliv na makroekonomické veličiny. Trendy ekonomiky a managementu [online] [cit. 2017-02-20]. Vysoké učení technické v Brně, I(1): 33-38. Available at: <<http://hdl.handle.net/11012/19973>>.
MoA. 2010, 2015, 2016. Information on Forests and Forestry in the Czech Republic by 2009, 2014, 2015. Prague: Ministry of Agriculture of the Czech Republic. [online]. Available at: <<http://eagri.cz>>.
OECD. 2002. Glossary of Statistical Terms. Organisation for Economic Co-operation and Development. [online] [cit. 2017-02-28]. Available at: <<https://stat.oecd.org/glossary/detail.asp?ID=3199>>.
Samuelson, P.A., Nordhaus, W.D. (2004). Economics. McGraw Hill Higher Education, Columbus.
Schiller, B.R. 2013. The Micro Economy Today. 13th edition. Business and Economics.
Severová, L., Kopecká, L., Svoboda, R., Brčák, J. 2011. Oligopoly competition in the market with food products. Agricultural Economics – Czech, 57(12): 580-588.
Soukupová, J. et al. 2006. Mikroekonomie. 4. vyd. Praha: Management Press.
Šréd, K., Svoboda, R. 2011. Oligopolní konkurence s dominantní firmou a obchodní řetězcem. Trendy ekonomiky a managementu [online] [cit. 2017-02-21]. Vysoké učení technické v Brně, V(9): 99-105. Available at: <<http://hdl.handle.net/11012/19606>>.
Tasnádi, A. 2010. Quantity-setting games with a dominant firm. Journal of Economics, 99(1): 251-266.
Varian, H.R. 1992. Microeconomic analysis. 3rd edition. London: W. W. Norton & Company, Ltd.

PERCEPTION OF CERTIFIED WOOD PRODUCTS BY CONSUMERS IN CZECH REPUBLIC

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ABSTRACT

The current situation in the field of certification is oriented rather towards popularization through an appropriate marketing strategy, and the emphasis is placed primarily on making information accessible to the general public. What, however, can be taken as a significant margin is insufficient monitoring of consumer perceptions and changes when it comes to demand for certified products. Consumer perceptions of certification, and in particular brand awareness itself, play the most important role in this respect. The main monitored parameter is consumer behaviour in case of knowledge, respectively failure to recognize certification marks and the potential to a pay price premium for the added value of products. Main parameter is finding and locating potential target audiences in terms of age structure, education, income structure, and other benchmarks that have a significant impact on the main monitored parameter.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: consumer perceptions, certification, woodworking sector.

1. INTRODUCTION

The marketing strategy of FSC and PEFC certification systems is currently primarily modelled to provide information about options, Attributes, obligations, benefits, partial problems and current issues in this area in general, but above all in relation to woodworking enterprises, forestry operators and businesses trading in wood. Within attending the "workshop on the European Timber Regulation" (EUTR) and several other promotional events, whether on university grounds or at public events, it is possible to draw a very clear perspective that the current long-term strategy of certification systems is more oriented towards perceiving certification as an instrument of rationalization and efficiency of management (in relation to the philosophy of these systems) for forestry, timber and other legal entities using these systems in their trade policy. However, a major question remains about consumer perception, which clearly affects the demand for eco-friendly products, which can be eliminated by using simple economic connections.

**No demand from consumers = low demand = small production = reduced interest in certification
by manufacturing entities**

Even though the main aim of certification systems is to increase awareness and attract interest especially from legal entities, economic operators and companies with a wood-based trade policy, it is important to take into account the significant element of the whole chain, namely consumers for whom these companies and entities are not a sufficient source of information and an incentive for preferring a certified product. Apart from organizing public meetings and expert seminars (usually rather for professional audience), there are several other ways of rationalizing the marketing of certification systems that impact the knowledge and consumer behaviour in general and do not require significant financial interventions in the marketing strategy.

To analyse market changes in the field of environmental products, it is necessary to place significant emphasis on the importance of the choice of the marketing strategies of individual certification systems. Environmental policymaking also more often focuses on decision regarding the

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market or even voluntary instruments despite being uncertain about their actual impact.(Bernstein, 2001).

Researching consumer behaviour in the segment of pro-environmental election was also devoted (Steiner et al. 2017). Although the research and subsequent publishing does not primarily explore the perception of consumer certification systems but rather the facts about research in the field of psychology and the development of psychological prejudices to characterize consumer segments in the environmental sector. Finding preferences by gender, depending on the price, education or age structure of respondents is a very important criterion when it comes to deciding on the process of choosing environmental products.

The analysis of merits when it comes to using certification as an ecological or economic tool for streamlining corporate governance was devoted to Cashore et. al., (2005) and their findings suggest that market access is an important reason for forest certification, but it is an insufficient reason to choose the FSC system despite public opinion polls that have the opinion of preferring FSC certification. Companies prefer FSC certification because they believe that they bring environmental benefits, while those who choose another certification system do so because of economic reasons. It can therefore be argued that even though the idea of the PEFC and FSC certification systems is based on the same purpose, its fulfilment ultimately cannot be ensured for both systems for the same reasons. These reasons, however, are evidently dependent on public opinion and thus the recognition of individual certification systems, which further underlines the importance of consumer awareness and the continual monitoring of changes in this sector.

Based on the studies on the environmental impact of consumer behaviour, it can be anticipated that consumers will increase their spendings on "green" products and that the interest in certification systems by the manufacturers will be expanding. For example, spending on organic products in 2009 amounted to \$ 500 billion (CBS News, 2008) and a large number of consumers claim to be willing to pay a "price premium" for these products (Veisten, 2007; Vlosky et al., 1999; Wüstenhagen, 1998).

The growing number of publications that focus on consumer behaviour and marketing in this sector is evidence that this issue is receiving increasing attention (McDonagh a Prothero, 2014; Von Meyer-Höfer et al., 2015; Akehurst et al., 2012).

The publication output, which to a certain extent co-ordinates with the results, means and methods of quantification of individual critical areas in certification systems in relation to consumer behaviour is the research of authors Shukri, M., Awang, N. A. G., (2010), who analyzed the willingness of Malaysian consumers to pay a price premium for certified products that are made from wood and the factors that affect their willingness to pay a price premium.

2. MATERIAL AND METHODS

Quantifying and analysing the perception of certified products by consumers was devoted the research carried out in the Czech republic at the end of 2016 on a nationwide sample of respondents in the form of a questionnaire survey. The survey focused on the analysis of consumer behaviour in case of deciding their preference or clarifying reasons for disinterest in non-certified timber products and certified timber products.

The basic prerequisite for the correctness of the data was the definition of the exact range of the sample of respondents that are of working age in their respective country (Czech Republic) for the preservation of the research value. The sample of respondents was statistically significant when it comes to the working age population in the Czech Republic. In the case of calculating a representative sample of respondents and the subsequent determination of the minimum number for the acceptance of the questionnaire survey, the last evaluated figure for the population of working age 2015 (CZSO) was used, the exact number being 6 997 700. The productive age group is in the range of 15-64 years old, which was also the target group in the case of data collection from the questionnaire survey (i.e. the respondents in these age groups were addressed almost exclusively). Percentage of error rate was set to 5% as the default statistically used value.

The calculation of this sample is as follows:

Sample size

$$SS = \frac{Z^2 * (p) * (1 - p)}{c^2} \quad (1)$$

Where: Z = Z value (e.g. 1,96 with 95% reliability) – which also applies to the sample that is being examined

p = Percentage of error rate, expressed as a decimal number (5% = 0,5 in the case of sample that is being examined)

c = Confidence interval, expressed as a decimal number (0,04 = ± 4 retained from the formula)

Correction for the final population

$$new\ SS = \frac{SS}{1 + \frac{SS - 1}{pop}} \quad (2)$$

Where: pop = population

Using the formula, a representative sample was characterized in this case by 384 respondents. The questionnaire survey was completed by a little over 400 respondents, and so it was ensured that a representative sample was met in 100% extent.

The questionnaire survey was conducted on a selected national sample of respondents, with all the criteria and the conditions for the verifiability of the entire project proposal being met. Respondents were always addressed with respect not to violate their personal rights in any way and to make sure the data cannot be associated with the individual in any way. The questionnaire was collected in the form of a personal interview, mediated by the students of LDF Mendel on the basis of a working agreement, an electronic way of completing the questionnaire using e-mail and also a personal interview with the competence of the main project developer.

Data evaluation was distributed via the contingency that evaluates dependencies between qualitative (plural) features that acquire a number of variations. The use of this method was applied because of the interest in tracking the relationship of multiple statistical features.

3. RESULTS AND DISCUSSION

The primary objective and the target output of the processed data was to mediate information on partial problems in the knowledge of consumers when it comes to certification systems and to find reasons for deficiencies in encouraging interest in certified wood products.

The monitoring of the dependence of the connection between the individual statistical features was significant in the selection of respondents who think more environmentally from those who do not prefer the environmental aspect of the products. All this information is important in the process of creating a long-term strategy for certification systems in the Czech Republic.

One of the most fundamental questions that resonate in the area of pro-environmental preference is the relationship and consumer attitudes when it comes to environmentally friendly products. The analysis of attitudes that were evaluated was formulated in the questionnaire survey which was directed towards the wood industry and the criterion pursued was the relation of preferring a certified wood product.

In Figure 1, the attitudes that show up the most in the selection or rejection of purchasing a certified wood product are evaluated.

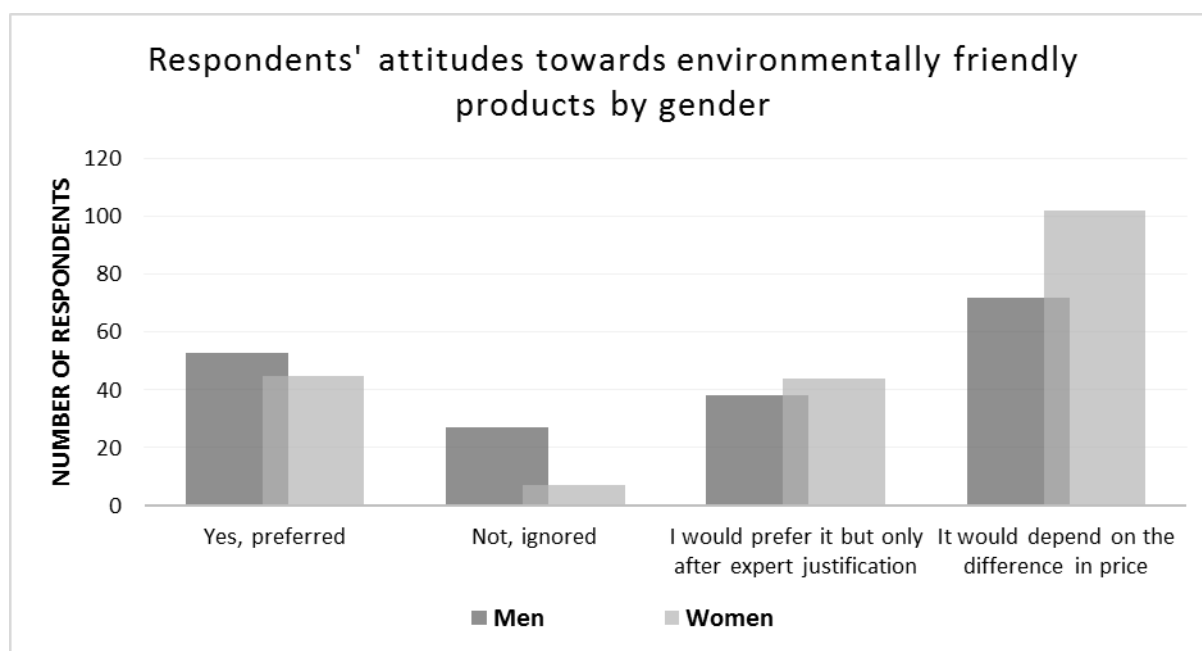


Figure 1 Attitudes of respondents to environmentally friendly wood products, by gender

Source: Author's own construction

Based on the gender responsiveness, differences are noticeable especially in the case of men's lack of preference, and in contrast, in the case of a price difference, female respondents appear to be more indecisive.

The choice of gender, price, education, age and other preferences is crucial when it comes to the consumer decision process. This observation was also applied in the data processing shown in Figure 1 and Figure 2 and give an accurate picture of the merits of these assertions. Preference for age group dependency is used to select the structure of the potentially most eco-minded group of respondents.

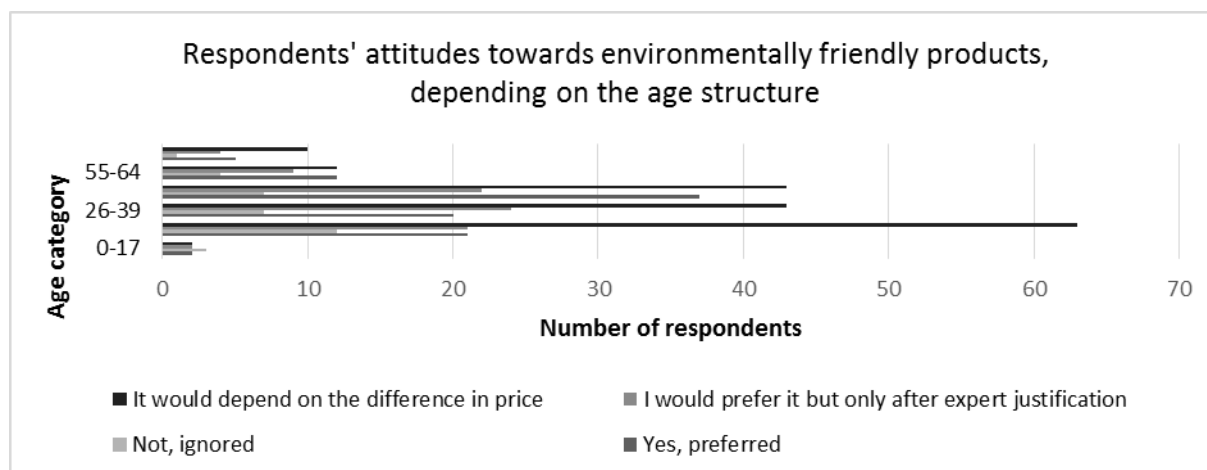


Figure 2 Respondents' attitudes towards environmentally friendly products

Source: Author's own construction

Based on information from Figure 2 it is possible to claim that the age limit of ecological interest prevails especially at the age of 40-54 years and in the opposite case in the same age category there is just under 19% of respondents. Conversely, the opposite attitude can be seen in the 18-25 age category, where over 57% of respondents expressed a negative attitude towards preferring a certified product. The correctness of these results is, of course, supported by a significant portion of respondents. However, taking into account the unequal age distribution of the respondents, it is impossible to draw a clear conclusion that this age category is the most pessimistic in relation to the

preference of environmentally friendly production but statistically significantly different in relation to environmental behaviour. A significant criterion of this statistical significance is also the financial situation of the respondents, which is diametrically different from respondents that are aged 40-54. (See Figure 3).

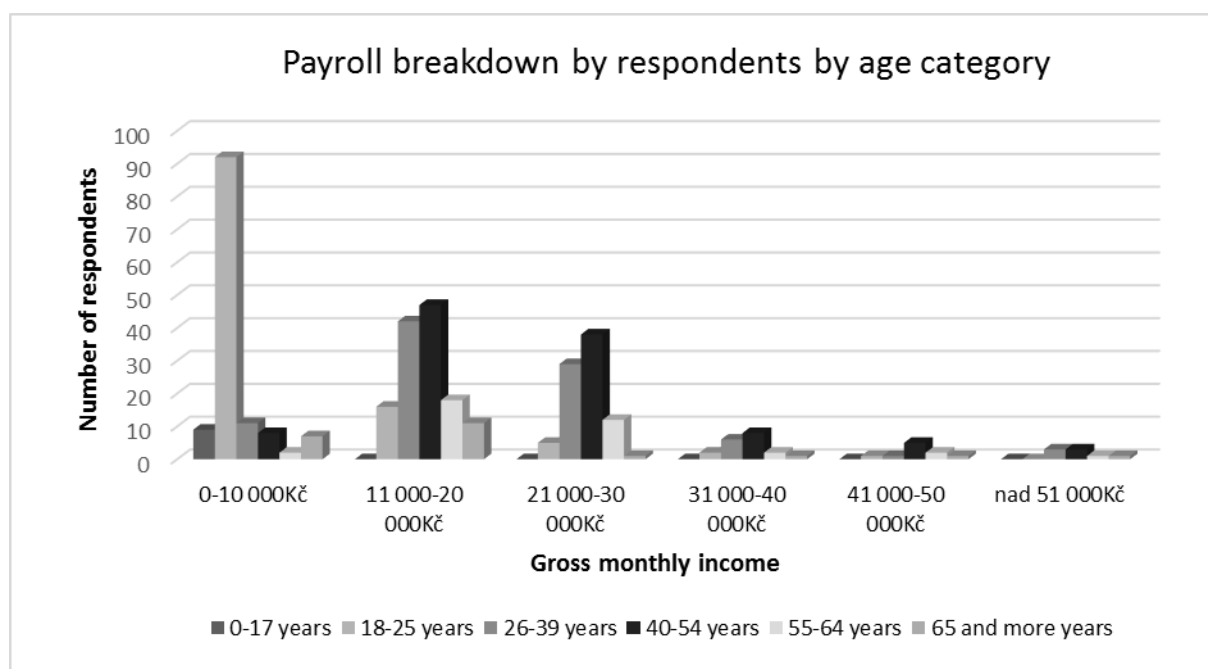


Figure 3 Revenue breakdown based on age category

Source: Author's own construction

Studies on environmental sustainability by purchasing the "green products" based on the respondent's answer show that it is possible to monitor a significant increase in the production of goods and their consumption. To some extent, it is possible to see the perception of the global climate and environmental problems play their part. Consumers, on the other hand, cannot establish a connection based on the brand of a product with ecological features and many times don't perceive any significant difference apart from the "green premium" as opposed to non-green alternatives and thus the interest in a greener alternative fades.

These facts can also be backed up on the basis of numbers shown in Figure 4, which clearly demonstrate that consumer interest in the Czech Republic exists, but the problem arises in identifying and creating preference for "green products" what is emphasized in Figure 5. In the case of brand recognition, the important parameters of creating a connection with a brand are its benefits, whether functional, experienced or symbolic, and with the current awareness when it comes to brands like FSC or PEFC, the connection seems insufficient.

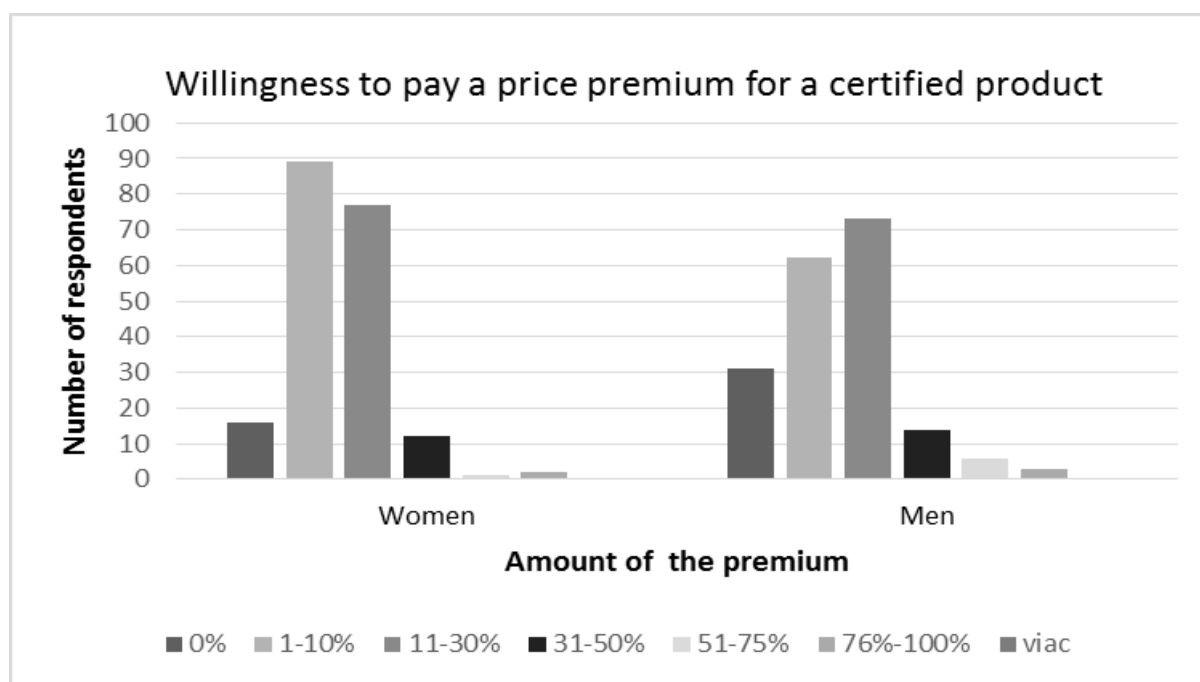


Figure 4 Willingness to pay a premium for a certified product

Source: Author's own construction

By comparing the data obtained in the Czech Republic with the data from a questionnaire survey conducted in Malaysia in 2010, it is possible to claim that the willingness to pay a price premium is not even a criterion in Europe, which prevents the implementation of certification in the market for wood products. In the Czech Republic, almost 87% of respondents said that they would be willing to pay a “price premium” for a wood product with added value. However, the difference between Czech consumers and consumers in Malaysia is the willingness to prefer a more environmentally friendly, cheaper product as opposed to a cheaper one without added value. Out of the all the respondents, only 25% said that they would prefer it, less than 21% would decide on the basis of expert opinion and for almost 45% the price difference would be the main deciding factor. The connection among the differences in the results can be found in the differences in the market, diverse woodland and also the perception of the sustainability of the Malaysian forest ecosystems, which the consumers obviously perceive, too. Since the 1970s, a 90% increase in palm oil production has been concentrated in Indonesia and Malaysia and palm oil production is also growing in other Asian countries as well as in Africa and Latin America. The size of the Malaysian forest has increased since 1990, but it is still possible to monitor the negative indicator of the current deforestation rate in Indonesia with a rate of -0.5% total losses every five years. (European Parliament, 2017)

In Malaysia, 74% of respondents said that they prefer wood products made from certified wood materials. However, only 57% said that they would be willing to pay a price premium for the products. It was discovered that the willingness to pay a price premium is influenced by their knowledge and perceived importance of forest certification as well as the tendency to select wood products made from certified wood. A positive link exists among the willingness to pay, the education of the respondents, their income and the current ownership of wooden furniture.

All of these facts are an important indicator of the range for correction in the marketing concept when it comes to certification systems and their perception by their consumers. The fact that it differs from the present requirements is apparent based on Figure 5 as well as the reality that almost 50% of respondents do not recognize the logo or its significance even despite the fact that the logo was shown in a graphic form in the questionnaire survey.

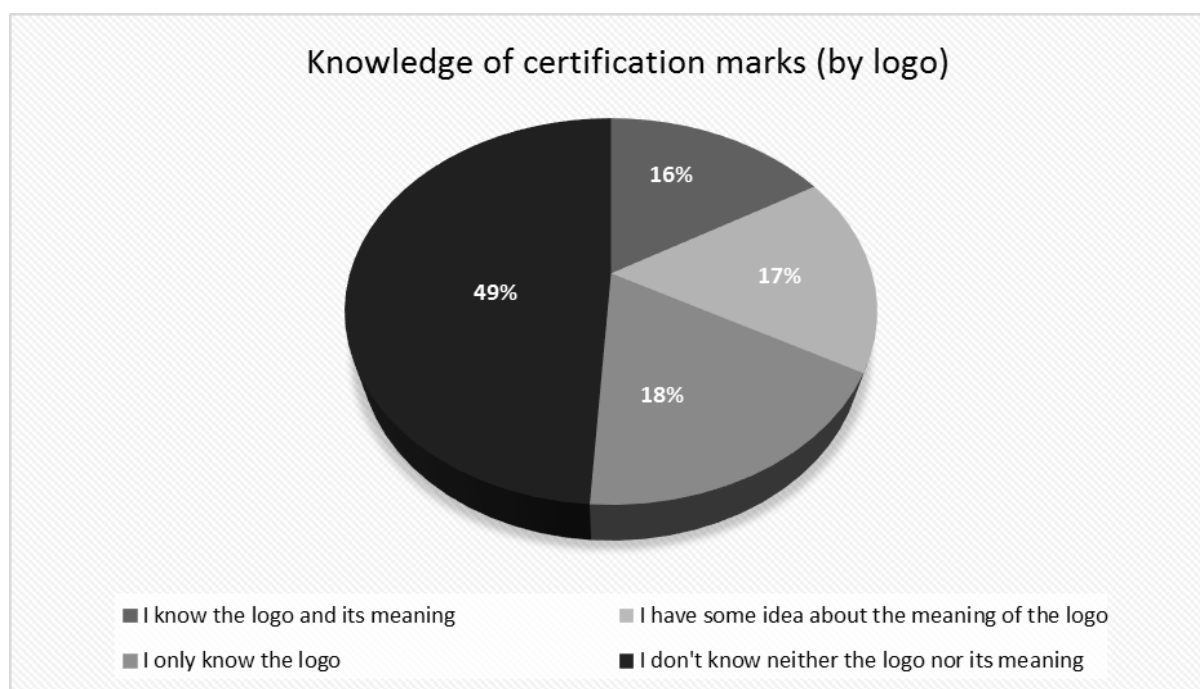


Figure 5 Knowledge of certification marks (by logo)

Source: Author's own construction

Recognizing the logo, however, is not the only parameter to evaluate the marketing strategy. A very important factor is also the result of the answer on the security question, in which the respondents, even though they knew the logo and its significance in the previous questions, identified only the logo or marked the answer "I have a certain idea about the meaning of the logo" could not associate the logo with protection and conservation of nature, despite the fact that this option is mentioned in the questionnaire. Concrete numbers speak clearly to the detriment of certification systems where up to 82% of respondents failed to identify the connection of certification systems such as FSC and PEFC with nature conservation and preservation. On the contrary, of the total number of respondents, almost 51% of them knew the logo based on a graphic display. However, it is evident that it is only the ability to identify without any further characterization of the brand's features and connection of the brand with the environmental sector and the pursuit of permanent sustainability of forest ecosystems.

The paradox is also the fact that many of the respondents who wanted eco-labels also considered the names of the businesses, state entities, civic associations or the World Nature Conservation Fund. Specific examples are given as: WWF, Ekofol, IKEA, Swedwood, Fair trade, Holz 100, Real Wood, Trepp-art, Tectona, Wild Nature Friendly, FSC MIX, Lesy CR. In addition to these answers, the coherence of the products made of wood or wood materials in accordance with nature protection and conservation certification systems FSC and PEFC was correctly assigned in less than 20% of respondents. A very weak interest is also felt in the advertising, where only 6% of respondents identified the logo on the basis of advertising in the media (Internet, television, radio). Nearly 6% of the respondents have identified the logo based on promotional materials (ad slots, commercials, advertisements in shopping centres such as OBI, BAUHAUS, IKEA and various markets or bazaars). A little over 10% was promotion at schools, whether within a classroom, a lecture or a conference. Indirect advertising placed on cars, buildings or forestry and woodworking documents accounted for almost 9%. The last area where the promotion of the logo was directly on paper and wood products showed the highest identification success rate, almost 27%.

4. CONCLUSION

The choice of certification systems is an important step for sustainable development in the forestry and woodworking industry. The principle of maintaining forestry for the next generations also has a direct impact on ensuring forestry production and, to a certain extent, sales in the long run.

The use of certification systems is expected to deliver efficiency across a wider spectrum of business opportunities, which is not always easy to establish, and therefore certification is often considered to be unwarranted in terms of benefits even though in most cases it serves at the very least as a market stimulus. Building market potential is one of the main priorities of marketing certification systems and it is necessary to constantly form it based on the feedback and requirements of the consumers (Businesses, economic operators, legal entities).

All of the analysed data points to the fact that there are shortcomings in the marketing concept of certification systems that need to be found and removed in regard to market requirements and with regard to consumer behaviour.

Acknowledgements

The paper was prepared with the support of the Internal Grant Agency project of the Faculty of Forestry and Wood Technology, Mendel University in Brno No. LDF_VP_2017003.

References

- Akehurst, G., Afonso, C., Gonçalves, H.M.: Re-examining green purchase behaviour and the green consumer profile: new evidences. *Manag. Decis.* (2012). 50 (5), 972–988.
- Bernstein, S.: *The Compromise of Liberal Environmentalism.* (2001). Columbia University Press, New York (2001)
- Borin, Norm, Doug Cerf and R. Krishnan.: The Consumer Effects of Environmental Impact Included in Labeling Information. (2011). *Journal of Consumer Marketing*, Vol. 28 Issue 1, 76– 86.
- Cashore, B., Cornelis van Kooten. G., Vetinsky, I., Auld, G., Affolderbach, J.: Private or self-regulation? A comparative study of forest certification choices in Canada, the United States and Germany. 2005. *Forest Policy and Economics* Volume 7, Issue 1, January, 53-69
- Konečná, K.: “O palmovom oleji a odlesňovaní dažďových lesov (2016/2222(INI))”. (2017) Európsky parlament, Výbor pre životné prostredie, verejné zdravie a bezpečnosť potravín. Správa 20.03.2017. [online] 2017. [cit. 2017-20-06] Dostupné na internete: <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+REPORT+A8-2017-0066+0+DOC+XML+V0//SK>
- McDonagh, P., Prothero, A.: Sustainability marketing research: past, present and future. *J. Mark. Manag.* (2014). 30 (11–12), 1186–1219.
- Shukri, M., Awang, N. A. G.: Willingness to Pay a Price Premium for Certified Wood Products among Consumers in Malaysia. (2010). *Pertanika J. Trop. Agric. Sci.* 33 (2): 159-165
- Steiner, B.E., Peschel, A.O., Grebitus, C.: Multi-Product Category Choices Labeled for Ecological Footprints: Exploring Psychographics and Evolved Psychological Biases for Characterizing Latent Consumer Classes. (2017). *Ecological Economics* 140 (2017) 251–264
- Veisten, K.: Willingness to pay for eco-labelled wood furniture: choice-based conjoint analysis versus open-ended contingent valuation. (2007). *Journal of Forest Economics*, Vol. 13 No. 1, 29-48.
- Vlosky, R. P., Ozanne, L. K., Fontenot, R. J.: A conceptual model of US consumer willingness-to-pay for environmentally certified wood products. (1999) *The Journal of Consumer Marketing*, Vol. 16 No. 2, 122-40.
- Von Meyer-Höfer, M., von der Wense, V., Spiller, A.: Characterizing convinced sustainable food consumers. (2015). *Br. Food J.* 117 (3), 1082–1104.
- Wüstenhagen, R.: Pricing strategies on the way to ecological mass markets. (1998). *Greening of Industry Network Conference*, 1-24.

NONPARAMETRIC STATISTICAL PROCESS CONTROL

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ABSTRACT

Control chart is the basic tool of the statistical process control (SPC). The SPC is an integral part of the production management necessary for achieving a high product quality. Just the quality of the product decides the customer satisfaction and thus the success of the whole organization. Classical Shewhart control charts can be used only if there are met certain basic assumptions. These assumptions include data normality, independence and constant mean and variance. In practice, those assumptions about the data are not always met. In the case that these conditions are not met, there may be used non-parametric and robust control charts. This article aims to define the difference between robust and non-parametric methods. Other aim of this article is to define the various deviations from normality that cause problems in the use of classical parametric methods of statistical process control. At the end of this article, selected non-parametric control charts are presented on a specific case.

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Key words: statistical process control, control charts, nonparametric methods, robust methods.

1. INTRODUCTION

Statistical process control (SPC) is an immediate and continuous process control based on the mathematical-statistical evaluation of the product quality. If a company wants to achieve the high quality consistently, it has to collect, process and analyze systematically data available from the production and conclusions of the analysis must be used for continuous improvement. Statistical process control allows interventions in the process based on the early detection of deviations from a predetermined process level. It is implemented by regular monitoring of the controlled process variable or output variable. It is found out whether it corresponds to the process level required by the customer. Achieving the desired level of the process requires a thorough analysis of the process variability. To use the classic Shewhart control charts, the certain basic assumptions about the data must be met. In the manufacturing practice, however, it is not always possible to meet these basic assumptions (normal distribution, constant mean and variance, independence of data).

The main tool of statistical process control is the control chart. In case, the process is affected by a assignable cause of variability, the control chart should signal as soon as possible that the process is out of control. Obviously, the faster the effect of the assignable cause of variability is identified, the more effective the control chart is. [Nenadál 2008]

One of the main aims of statistical process control is to distinguish between two sources of variability in a given process. These are sources of variability that cannot be economically identified and corrected (common causes) and those that can be identified and subsequently removed (assignable causes). [Chakraborti 1999, Nenadál 2008]

- Common causes: The causes that are inherently connected with the process, affect it every day. [Ion 2001]
- Assignable causes: The causes that do not affect the process continuously, but they arise under various circumstances. [Ion 2001]

If the process is affected only by the random causes of variability, it is said to be in a state of statistical stability (in-control).

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2. VIOLATION OF BASIC DATA ASSUMPTIONS

In manufacturing practice, however, these basic assumptions (normality, independence, constant mean and variance) cannot always be met. Non compliance with these assumptions may be due to various problems during production (tool wear, change of input material, violation of manufacturing procedure, change in temperature or pressure, etc.). For some processes, it is natural that they do not meet one of the assumptions. When measuring physical quantities such as strength or viscosity, we encounter an asymmetric distribution (e.g. when monitoring emissions and trace impurities, we encounter the logarithmic-normal distribution). When we monitor continuous processes in chemistry, pharmacy, food or metallurgy, data often show a strong dependence. The raw material quality that can hardly be affected (e.g. rocks) can result in fluctuations or non-constancy in the mean value. In all of these cases, this is a process property that either cannot be affected or is counted on in technology. Typical violations of the basic assumptions about data for different industries are summarized in the following table 1. [Meloun 2004]

Table 1 Typical violations of basic assumption about data

Industry/Technology/Quantity	Normality	Independence	Constant Mean	Constant Variance
Mechanical Engineering, Automotive Industry (dimension)	-	-	-	-
Mechanical Tests (strength, flexibility,...)	x	-	-	x
Chemistry, Metallurgy (concentration, contents,...)	-	x	x	x
Environment (different concentrations)	x	x	x	x
Electrical Quantities	-	-	-	x
Energy	x	x	x	x
Plastics, Polymers, Textiles, Physico-mechanical Quantities	x	-	x	-
Biochemistry, Pharmacy, Food Industry	x	x	-	-
Economic and Financial Indicators	x	x	x	-
Sociology, Human Resources	x	x	x	x

Source: [Meloun 2004]

The "x" denotes a violation of the assumption, and the "-" designation then determines the predominant fulfillment of the assumption.

- Violation of the assumption of normality

Unlike the normal probability distribution, the data file may be sloping right or left, or may have different spikes. These violations of normality can be clearly seen for example on the Q-Q graph or histogram.

- a) the concave curve of the Q-Q graph shows a slope to the right and a greater variability of higher values
- b) the convex curvature indicates a left slope and a greater variability of lower values
- c) the convex concave curve indicates a division with less tails (heavy tails)
- d) the concave convex curve shows a division with higher tails (light tails) [Sebera 2012]
- e) this image indicates the occurrence of an outlier value

- Violation of the data independence assumption

Independence of data can be verified by the autocorrelation test. Measurement dependency is usually caused by instability of the measuring device, inconstant measurement conditions, neglecting factors that significantly affect measurement results or improper (non-random) sampling. There is a negative and a positive independence. [Meloun 2004]

- Violation of the assumption of constant scattering

Constant scatter can be verified using a residual graph. With increasing x, the value of the residue should not increase or decrease, it should still be equidistant from the x-axis. [Meloun 2004]

- Violation of the assumed constant mean value

Non-compliance with the assumed constant mean value can occur, for example, when changing inputs or technology. The t-test can be used to assess the significance of the difference between the mean values. [Meloun 2004]

3. NONPARAMETRIC OR ROBUST STATISTICAL METHODS

Robust statistics attempt to provide appropriate methods that replace commonly used parametric statistical methods but are not affected by remote values or other small deviations from model assumptions. In statistics, classical parametric estimation methods rely on data assumptions (normality, independence, constant mean and scattering) that often are not met in practice. Unfortunately, if data do not meet these assumptions, classical parametric methods often do not provide the right results. For these cases, robust statistical methods have been developed that are not affected by the failure to meet the basic assumptions about the data.

Nonparametric methods are not based on any particular probability distribution and can thus be used when the assumption of normality is not met. Non-parametric methods are more robust than parametric methods. Nonparametric methods can thus be classified as robust.

Roughly speaking, a nonparametric procedure is a statistical procedure that has certain desirable properties. The rapid and continuous development of nonparametric statistical procedures over the past 7 1/2 decades is due to the following advantages enjoyed by nonparametric techniques: [Hollander 2014]

- conclusions obtained are independent of the distribution shape,
- they can be used even when the type of distribution is unknown,
- they are used in cases where sample size is too small,
- they can be used for ordinal (serial) variables, some also for nominal (verbal) variables,
- for small sample size the calculation is relatively simple,
- they have a greater robustness to the occurrence of outliers.[Chakraborti 1999, Štiglic 2009]

With regards to the use of these methods at statistical process control, non-parametric and robust control charts have been developed. These control charts are not only suitable for processes that do not meet normality and independence of the data, but especially in the beginning of the SPC implementation, when there are not enough data available. [Chakraborti 1999]

4. EXAMPLE

The following example illustrates the application of nonparametric and robust control charts Chart on the data obtained from the steelmaking process. The measured values are recorded in the table 2, in the columns x_1 to x_5 .

Table 2 The measured values

subgroup	x_1	x_2	x_3	x_4	x_5	subgroup	x_1	x_2	x_3	x_4	x_5
1	33.63	32.75	32.37	33.28	32.76	11	32.48	33.54	31.84	32.18	32.23
2	33.62	32.00	31.33	34.04	32.34	12	32.94	32.74	32.69	32.29	32.64
3	32.93	33.49	32.75	32.75	32.97	13	32.87	32.87	33.28	33.65	32.78
4	33.49	33.47	32.87	32.52	33.15	14	32.07	33.36	32.77	33.24	34.04
5	32.37	32.78	34.13	32.94	33.12	15	33.56	32.40	32.86	31.68	33.02
6	33.44	31.24	32.50	33.50	33.53	16	32.25	31.24	30.75	31.94	32.64
7	33.79	33.54	33.33	33.73	32.07	17	32.89	33.19	33.54	34.23	32.25
8	31.37	33.01	33.24	32.81	33.24	18	32.58	33.13	33.24	31.97	32.66
9	32.03	31.77	31.92	32.30	32.68	19	32.74	31.97	32.53	33.70	32.93
10	33.26	33.05	32.53	33.27	32.33	20	33.68	32.69	32.25	32.56	33.55

4.1 Robust Control Chart MAD

An example of robust methods has been selected Control Chart MAD. The control chart is based on the mean absolute deviation from the median (MAD - median absolute deviation). This characteristic is more robust than the determinant standard deviation. MAD for random selection of n is defined [Geyer 2006, Ion 2001]

$$MAD_j = \frac{1}{n} * \sum_{i=1}^n \text{median } |X_i - MD_j|; \quad i = 1, 2, \dots, n \quad (1)$$

$$LCL = B_5^* \overline{MAD} \quad (2)$$

$$CL = c_4^* \overline{MAD} \quad (3)$$

$$UCL = B_6^* \overline{MAD} \quad (4)$$

$$\overline{MAD} = \frac{\sum_{j=1}^m MAD_j}{m} \quad (5)$$

Value c_4^* , B_5^* , B_6^* can be found in the table. [Geyer 2006, Ion 2001]

In Figure 1 is example of Robust Control Chart MAD.

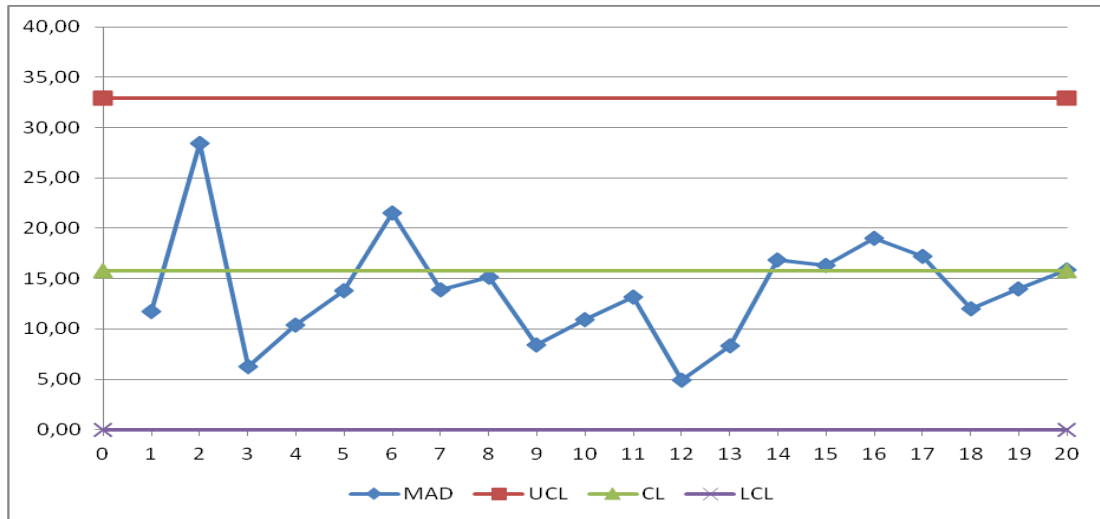


Figure 1 Robust Control Chart MAD

Source: own

4.2 Nonparametric EWMA Control Chart

It is a nonparametric control chart of exponentially-weighted moving averages. It combines the properties of the classical EWMA chart with the robustness of nonparametric charts. Some important questions about the practical application of this chart and its effectiveness still remain unanswered. Hackl and Ledolter [Hackl 1992] considered the use of nonparametric control chart for individual observations using a standardized series of the observations. The simulation studies showed that the method is resistant to the outliers and works well even with sudden changes in the process. In Figure 2 is example of Nonparametric EWMA Control Chart. [Chakraborti 1999]

$$G_t = \lambda N_t + (1 - \lambda) G_{t-1} \quad (6)$$

$$LCL = \frac{n}{2} - k * \sqrt{\frac{\lambda}{2 - \lambda} * \left(\frac{1}{4n}\right)} \quad (7)$$

$$CL = \frac{n}{2} \quad (8)$$

$$UCL = \frac{n}{2} + k * \sqrt{\frac{\lambda}{2 - \lambda} * \left(\frac{1}{4n}\right)} \quad (9)$$

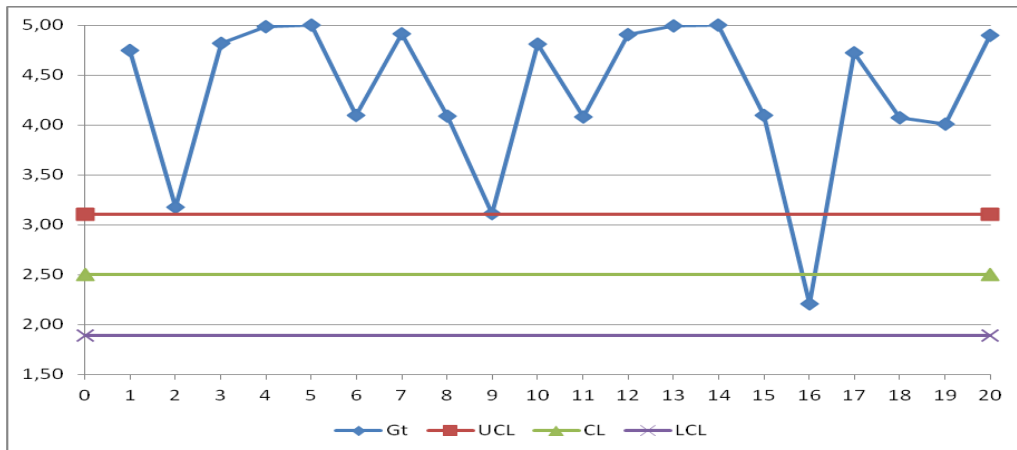


Figure 2 Nonparametric EWMA Control Chart

Source: own

4.3 Nonparametric Progressive Mean Control Chart

We use the progressive mean (PM) as the process monitoring statistic. PM is defined as the cumulative average of the sample values observed over time. [Abbasi 2013]

In Figure 3 is example of Nonparametric Progressive Mean Control Chart.

$$PM_t = \frac{X_1 + X_2 + \dots + X_t}{t} = \frac{\sum_{j=1}^t X_j}{t} \quad (10)$$

$$LCL_t = \mu_0 - 3 * \frac{\sigma_0}{\sqrt{t}} \quad (11)$$

$$CL_t = \mu_0 \quad (12)$$

$$UCL_t = \mu_0 + 3 * \frac{\sigma_0}{\sqrt{t}} \quad (13)$$

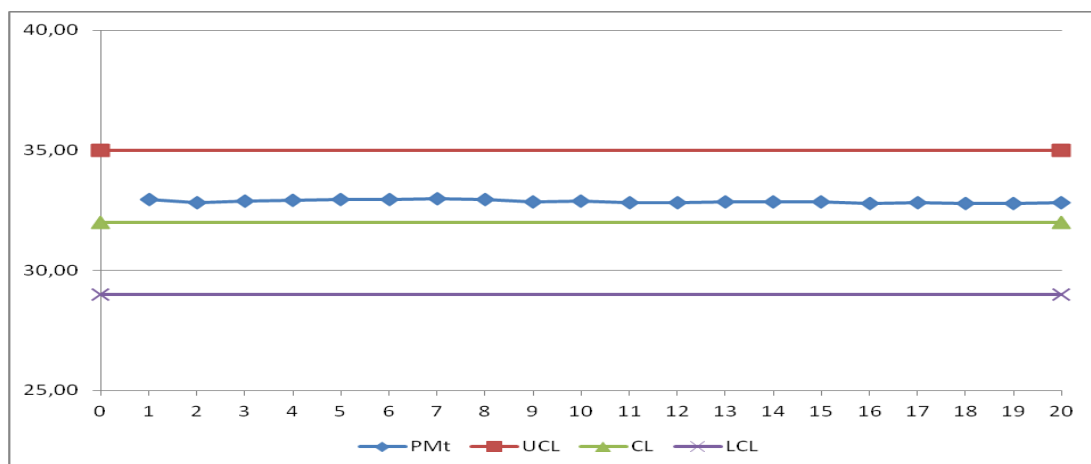


Figure 3 Nonparametric Progressive Mean Control Chart

Source: own

5. RESULTS AND DISCUSSION

The results show that the Nonparametric EWMA Control Chart has more points out of control limits and therefore it has a bigger risk of a false signal and is less effective than the Robust Control Chart MAD and the Nonparametric Progressive Mean Control Chart.

In recent years, non-parametric and robust control charts have received more attention than it used to be in the past. It is indisputable that they deserve this attention because they form an important part of statistical process control. It's a pity that, this area of statistical process control is not used in practice, it is not a part of courses and publications on statistical process control. There is not even the necessary software support, which could change in the future and these simple methods could become a match for the classical parametric methods. In the future, I would like to test different non-parametric control charts on data that violate in different ways basic assumptions for using classical Shewhart control charts. And based on the results, I would elaborate their overview, including a software support.

6. CONCLUSION

This article summarizes shortcomings of classical parametric methods (such as the need for normal data distribution, mutual data independence, and more). It offers the possibility to use nonparametric methods to eliminate these deficiencies. It presents the advantages of nonparametric methods. On a short example, some nonparametric methods of statistical process control are presented.

Acknowledgements

The work was supported by the specific university research of the Ministry of Education, Youth and Sports of the Czech Republic No.SP 2017/63.

References

- Nenadál, J., Petříková, R., Plura, J., Noskiewiczová, D., Tošenovský, J., 2008. Moderní management jakosti: principy, postupy, metody. Praha: Management Press., ISBN 978-80-7261-186-7.
- Hollander, M., et al., 2014. Nonparametric statistical methods. Third edition. ISBN 978-0-470-38737-5.
- Chakraborti, S., et al., 1999. Nonparametric statistical process control : an overview and some results. (Memorandum COSOR; Vol. 9908). Eindhoven: Technische universiteit Eindhoven.
- Ion, R. A., 2001. Nonparametric statistical process control, Ph.D. Dissertation, Korteweg-de Vries Institute for Mathematics, Amsterdam, Netherlands,
- Meloun, M., et al., 2004. Kompendium statistického zpracování dat. Dostupné z: <https://meloun.upce.cz/docs/books/kompendium.pdf>
- Meloun, M., et al., 2004. Statistická analýza experimentálních dat. Vyd. 2., upr. a rozš. Praha: Academia., ISBN 80-200-1254-0.
- Sebera, M., 2012. Vícerozměrné statistické metody [online]. [cit. 2017-08-28]. Dostupné z: http://www.fsps.muni.cz/~sebera/vicerozmerna_statistika/pojmy.html
- Štiglic, M., 2009. Neparametrické štatistické metódy a ich ekonomické aplikácie. Košice, Dostupné také z: <http://web.ics.upjs.sk/svoc2009/prace/3/Stiglic.pdf>. Studentská vedecká konferencia. Slovenská technická univerzita v Bratislave, Stavebná fakulta. Vedoucí práce Prof. RNDr. Magda Komorníková CSc.
- Geyer, C. J., 20006. Breakdown Point Theory Notes [online]. In: . s. 6 [cit. 2017-05-09]. Dostupné z: <http://www.stat.umn.edu/geyer/5601/notes/break.pdf>
- Hackl, P., et al., 1992. A new nonparametric quality control technique. Communications in Statistics-Simulation and Computation, 21.2: 423-443.
- Abbasi, S. A., et al., 2013. Nonparametric Progressive Mean Control Chart for Monitoring Process Target. Quality and Reliability Engineering International, 29(7), 1069-1080. DOI: 10.1002/qre.1458. ISSN 07488017. Dostupné také z: <http://doi.wiley.com/10.1002/qre.1458>

KEY DIFFERENCES IN PERCEIVING INNOVATION BETWEEN BUSINESSES WHICH SEE THE STRATEGIC IMPORTANCE OF INNOVATION AND THOSE WHICH ONLY CLAIM TO BE INNOVATIVE

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ABSTRACT

Changes in the business environment, caused by the transition to a knowledge economy have highlighted the importance of innovation in enterprises. Innovation is not considered solely in terms of technology and investment in research and development, but also in terms of business processes, services, and strategies. Availability of skills has thus become the key to achieving innovation. Development perspective on innovation and its present shape best describes the transition from a closed to an open innovation model. But the lack of information about open innovation hampering their innovation potential. The aim of the paper is to present the research focused on the determination main characteristics of innovative businesses, with comparative analysis of innovative enterprises and those who only consider themselves as innovative. The study indicates the different understanding of the notion innovation between those who see strategic importance of innovation and those who do not.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: Innovation; Open Innovation; Determinants of Innovation.

1. INTRODUCTION

Promoting innovation is now a topic not only of the national level, but also the level of the European Union. The Europe 2020 Strategy is one of the main stated objectives of smart growth based on knowledge and innovation. The Horizon 2020 supports these goals through activities focused on excellent science and achieving industrial leadership through innovation. (Ministry of Justice, SR)

However many countries are still struggling with low innovativeness in some areas, sectors, or in some size types of businesses. Often large companies reach better innovation performance and thus the focus of researches is usually on SMEs. To the benefits of large businesses, which are reflected in innovation activities points the evaluation of innovation of the European Commission in a report on innovation, 2014. An analysis of the businesses within the EU28 shows that 26% of small businesses (1-9 employees) introduced new or significantly improved processes compared to 65% of large firms (500 or more employees). Similarly outweigh large companies in the category of new or improved services (52% vs. 37-46%) as well as marketing strategies (49% vs. 31-38%). (European Commission, 2014)

However, given the dynamism of the current environment and the trend of globalization and internationalization, innovation is now a necessity for the survival of all businesses (Hvizdova, et al., 2016). Innovation therefore cannot be seen as in the definition of voluntary enhancement of products, services, marketing, technology or processes, but as a necessary part of organizational dynamics (Bajzikova, et al., 2014; Gubiniova, Pajtinkova Bartakova 2014; Stachova, et al., 2015; Gregus, Karovic 2015). Innovation is the improvement, enhancement, and creation of something new, covering all parts of the existence of the organization from employees to customers, to create a value added which allows an organization to gain competitive advantage. Drucker perfectly describes the need of innovation to the company's survival, by stating: „Innovation is the life blood of the organization.” (Vohra, et al., 2009) Level of investments into technologic innovation lead to the new set of performance indicators and methods. (Gavrysh, Boiarynova, 2017; Dmitrieva, Guseva, 2017)

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1.1 Process of innovation

The key to creating successful innovation, which create value added, is the effectiveness of innovation process. Innovation processes can generally be described as a mix of activities, from technical, commercial, financial to organizational, which lead to innovation, whether in the form of something new, or improved. These activities may be derived either from research and development activities, or even those that are not of R & D character. (Dvořák, 2006)

Models describing the innovation process have been analyzed by many authors (Goffin, Pfeiffer, 1999; Narvekar, Jain, 2006; Cooper, 2001). However most of them are based on the basic stages as the collection and analysis of ideas, selection and development and commercialization and diffusion of innovation. Koen although focusses more on the early stage of the innovation process, which is called the fuzzy front end of innovation. (Koen, et al., 2002). The initial phase generally consists of the primary activities such as acquisition and creation of ideas to the decision on their further use, develop or termination. The aim of the first phase is to create enough space for creativity and gaining sources for of ideas, in the system of managed activities, which together lead to increased efficiency (Herstatt, Verworn, 2007). Model of innovation process according to Koen is displayed on the figure number 1.

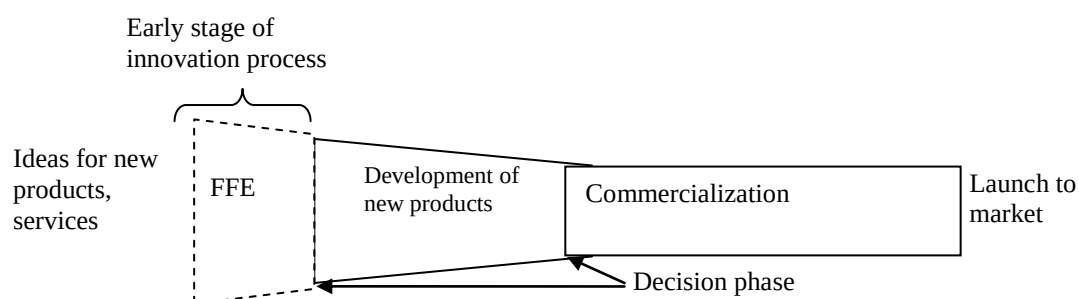


Figure 1 Innovation process according to Koen

Source: Koen, et al., 2002

Authors lay great emphasis on this stage, because quantity, quality and effective idea management ideas affect all other phases of the innovation process. In the past, companies managed the innovation process on the basis of randomly emerging ideas. In fact, the effectiveness of the innovation process is growing rapidly, when ideas are adequately managed, and therefore the ideas do not come into the innovation process at random. (Herstatt, Verworn, 2001).

1.2 Modern approach to innovation and openness

Historically, companies used closed approach to innovation, or closed model. Meaning they used their own internal resources, material, and human capital for innovation development, and presented innovations themselves on the market. The idea was to protect their know-how, together with the innovations that were not released to the market. This approach, however, prevented a number of good ideas and technology to reach the market or come into the innovation process (Herzog, 2011).

Modern approaches to innovation are however mainly based on openness of the innovation process (Chesbrough, 2003). In other words, constantly changing environment, competitive pressure and rapid advances in technology caused the closed innovation model to become insufficient. Therefore, leaders in innovation cooperate with internal resources, as well as with external in exchanging and gaining ideas for innovation. Similarly, the emphasis is on the quality of inputs into the innovation process, meaning that entries must not be based on a random factor. The entire innovation process is based on the premise that innovation should have a long term effect. The last part, which is characterized by a modern approach to innovation is called a learning organization. In this case, it is understood in terms of sorting and storing ideas, and documentation of innovative processes, which collectively serve to the use in other innovative projects or other processes.

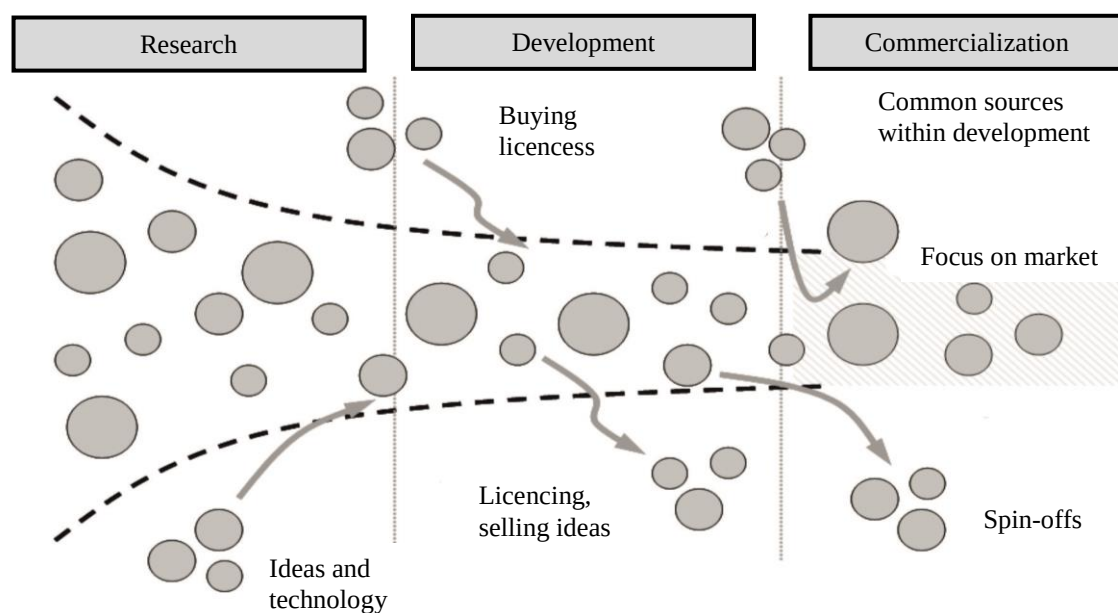


Figure 2 Open innovation process

Source: Chesbrough (2003)

The model of open innovation (figure number 2) is now regarded to a phenomenon, a novelty in the field of innovation management. The concept of “open innovation“ was first introduced by professor and executive director of the Centre of Open Innovation at the Haas University, California, Henry Chesbrough in 2003, in his book "Open Innovation: The New Imperative for Creating & Profiting from Technology". Open innovation is defined as “the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively.” (Chesbrough, 2003)

When focusing on the early stage of innovation, ideas and technology can be gathered from internal or external sources. Sources for ideas can be divided into six main groups, including other sub-groups (Baumgartner, 2009; Alam, 2003):

- Employees / internal resources
- Customers
- Organizational Resources
- Suppliers
- Competition
- Other businesses

Other businesses may include many types of organizations with which businesses can interact. For example, non-profit organizations, research centers, universities, interest groups, society and consumers.

The low innovation performance may be caused by mistrust in the idea of sharing knowledge, while many companies believe, that their know-how will be stolen and used by competitors. Also ethical issues and the responsibility for negative consequences need to be taken into consideration, when we talk about cooperation in innovation process. (Demeter, Szegedi 2013; Hvizdova, et al., 2014) Therefore there are still organizations, which believe in in-house innovation, the closed model, or do not know how to engage in activities concerning external subjects. As Mortara and Minshall (Mortara, Minshall 2011) claim, „innovative processes are not fully closed or fully open and businesses tend to cooperate if they believe that the collaboration with the external environment will be beneficial for them."

2. MATERIAL AND METHODS

The aim of the research is to determine main characteristics of innovative businesses, while distinguish truly innovative from those, who only consider themselves as innovative businesses.

Analysis in this paper will provide a closer look on perception and understanding of innovation concept by each category.

Research sample consists of 67 Slovak companies which are sized from micro, small, medium to large businesses. Data were collected by an electronic questionnaire, where interviewees were asked to answer set of questions divided into three topics: organizations objectives, activities and strategic importance. Within each topic interviewees answered on scale from 1 to 4:

- 1 - No importance; does not apply; insignificant
- 2 - Small importance; sometimes applies; no very significant
- 3 - Medium importance; usually applies; significant
- 4 - High importance; always applies; very significant

Separate question was focused on organization's perception of itself as innovative, where they could answer on the scale 1 to 4 meaning, 4-yes, 3-quite yes, 2-no too much or 1-no.

For the research purposes the sample was divided into two groups based on their innovation perception and consideration of innovation as strategic importance. Separate groups were found in order to compare and determine main characteristic of those who set high strategic importance to innovation compared to those, which only see themselves as innovative, but do not set high strategic importance.

In order to determine main characteristics of truly innovative businesses we used specific statistical methods. For each sample group statistical correlation was used to find strong dependencies. For the purpose of this research we focused on these types of organization's objectives:

- Quality of human resources
- Process optimization and ICT
- Culture of sharing knowledge within organization
- Innovation, change/improvements of products, processes
- Building brand name, image
- Relations with customers
- Relations with external subjects

Results in these objectives were correlated with objective of innovation, change/improvements of products, processes in order to find important differences between truly innovative businesses and those who only consider themselves as innovative.

3. RESULTS AND DISCUSSION

Research sample of 67 businesses was divided into two specific groups. Based on question focused on organization's perception of itself as innovative we discovered, that 83% consider themselves as innovative as shown in figure number 3.

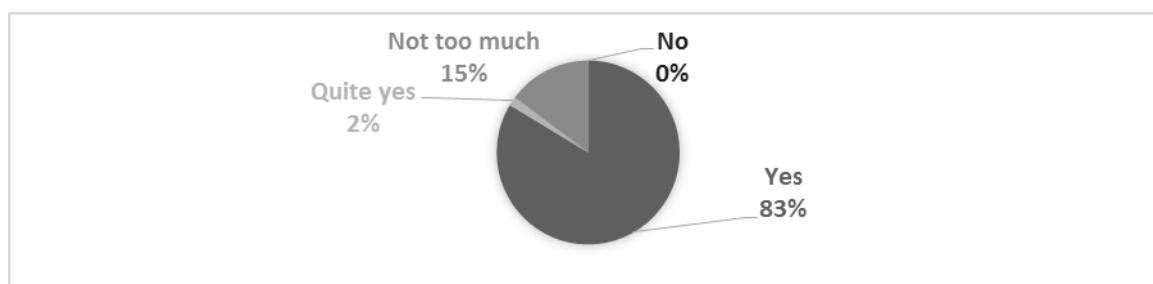


Figure 3 Division of organizations, based on perception of themselves as innovative

We need to take into account that innovativeness is considered to be the new trend of modern knowledge era. However even while it is important to be innovative in current dynamic environment, a lot of companies still may consider themselves as innovative while they are not truly innovative, or see innovation activities from different perspectives. When looking at question of innovation as strategic importance, we see that division among answers in figure number 4 changes rapidly compared to previous question. Only 22% of businesses answered that they really see innovation as

important for long term sustainability and financial goals, followed by 30% of those who quite see this strategic importance.

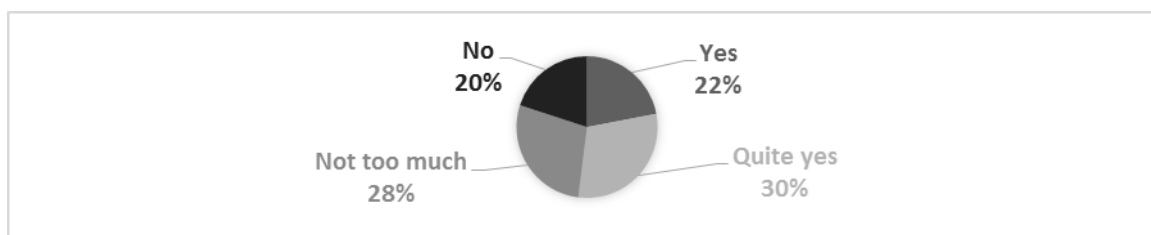


Figure 4 Division of organizations which perceive themselves as innovative, based on question: “for long term sustainability and financial goals, it is important to “invest in research and development and innovation processes”

In order to determine main characteristics of innovative businesses, we focus on businesses which consider or quite consider themselves as innovative, which consists of 52 businesses. These are divided into two groups based on previous graph. 48% which do not see innovation as of strategic importance and 52% of those who see innovative of strategic importance. Distribution of businesses based on their size can be seen in figure number 5. Category of businesses which do not see the strategic importance of innovation is shifted more to the smaller sized businesses or SMEs. Strategic importance of innovation is mainly seen by larger sized businesses.

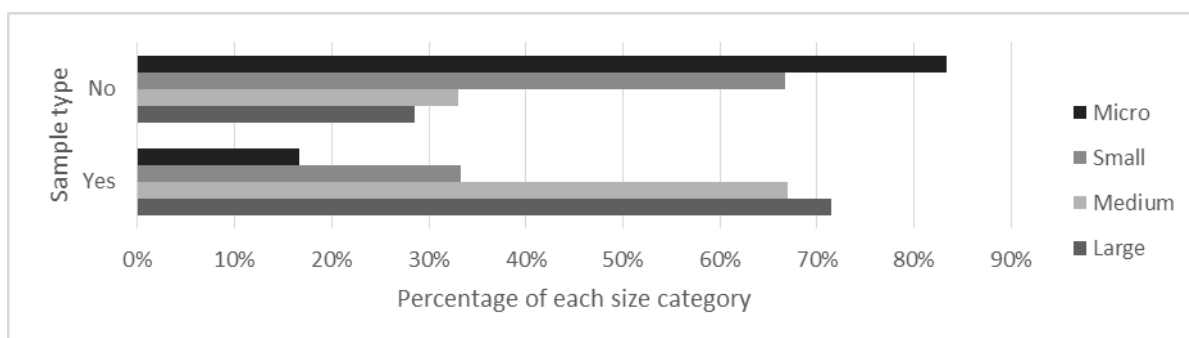


Figure 5 Division of each type of business size within sample group of truly innovative organizations (Yes) and those, who do not see strategic importance of innovation (No)

For the purpose of this research we focus on analyzing the attributed significance to specific organization’s objectives by each sample group. Comparison of average answers for each group is shown in figure number 6. For both sample groups, highest average evaluation was achieved in relations with customers, meaning highest overall importance for meeting organization’s objectives. Following most important for organization’s objectives was building brand name and image. The main and most significant difference however occurs in the area of knowledge sharing within organization. Businesses which do not see strategic importance of innovation (No – group) see here the lowest importance for organization’s objectives with average of 2,9 compared to 3,4 average answer of Yes-group.

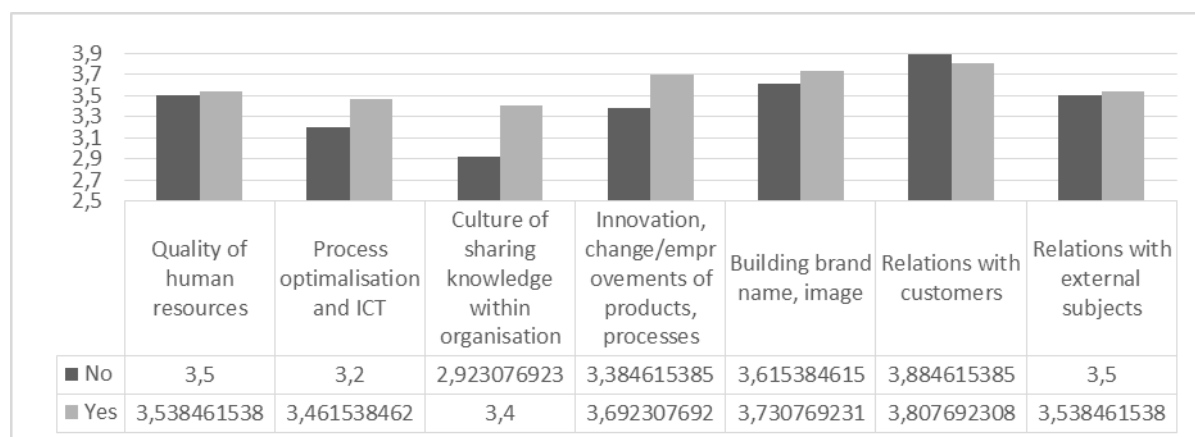


Figure 6 Average answers of both sample groups, regarding types of organization's objectives

Interesting however is the perception of each type of activity in the process of meeting organization's objectives, while being an innovative organization. Based on statistical correlation, to find the dependencies of selected factors, table number 1 shows, that companies that we see as truly innovative (Yes – group) see innovation as important for organization's objectives together with culture of sharing knowledge (correlation of 0,52), relations with customers (0,33) and relations with external subjects (0,39). On the other hand, not truly innovative organizations (No- group), as the second sample group combine different types together, such process optimization and ICT (0,43) together with relations with customers (0,31) when thinking about innovation as objective.

Table 1 Table of correlations between each type of organization's objective together with innovation as objective, for both sample groups

Attributed significance in order to meet organization's objectives	Innovation change/impr ovements of products, processes	
	No	Yes
Quality of human resources	0,184907	0,249676
Process optimisation and ICT	0,435088	0,212959
Culture of sharing knowledge within organisation	0,035512	0,521383
Innovation, change/improvements of products, processes	1	1
Building brand name, image	0,135978	0,24154
Relations with customers	0,310308	0,33265
Relations with external subjects	0,184115	0,390621

These dependences indicate, that there is a different understanding of the notion innovation between those who see strategic importance of innovation and those who do not. Following the model of open innovation, it is clear that the "Yes group" understands and uses the principles of openness more, such sharing knowledge or external relations, in order to enhance generation of quality ideas for innovation. In other words, these companies see the linkage of external relation and culture of sharing knowledge to innovation, which however which does not apply for the "No group".

4. CONCLUSION

Today, the importance of promoting innovation plays an important role in the overall policy of the European Union and also individual countries. Innovation is the key to achieving competitiveness, and the very necessity for the survival of the company. Nowadays, innovation is widely discussed, but the question is whether companies properly understand what innovativeness is, along with what constitutes an effective innovation process. In order to support innovative companies it is necessary to identify whether they properly understand innovation, or, how companies, which perceive themselves as innovative really approach innovation. Thus, the aim of this paper was to determine the main

characteristic of innovative organizations while distinguishing those who are truly innovative from those, who only consider themselves as innovative businesses.

The fact, that companies like to perceive themselves as innovative is not surprising. In a sample of 67 firms, 83% identified themselves as innovative. It is the timeliness of the topic, as well as awareness of the need for innovation for the survival of the company, why companies do not like to be labeled as non-innovative. Striking, however is, that the actual strategic importance of innovation sees only 22% of those who perceive themselves as innovative. Another 30% quite see this strategic importance. It confirms the assumption that companies do not like to be referred to as non-innovative, while in fact they do not see the main benefits of innovation activities for the company. Interesting is the distribution of these groups on the basis of size. The sample we call No-group, meaning they do not see innovation in terms of strategic importance are rather small businesses, on the other hand sample of innovative, Yes-group is more close to the larger size of the business. This can be justified by better access to information of larger companies, as well as their involvement in the larger amount of business relations that force or motivate these companies to be innovative.

Drawing from the theory on innovation management and open innovation, it is clear that innovation process consists not only from specific phases, but also specific inputs and subjects which interact with this process. Thus, it is interesting to see the differences in perceiving innovation as objective by each sample group. Sample group of so called innovators, who do not see innovation as of strategic importance, think of innovation as objective linked to mostly process optimization and ICT, followed by relations with customers. On the other hand, innovators who see innovation as strategically important link innovation as objective together with culture of sharing knowledge within organization, relations with customers and relations with external subjects. Interestingly, AT Kearney research indicates that leaders in innovation devote about 40% of the time in the innovation process to activities of the first phase of the innovation process, thus obtaining and assessing ideas, however their followers engage to this phase only 13% of the total time devoted to the process of innovation.

The discovered dependencies between innovation and culture of sharing knowledge, relations with customers and relations with external subjects for the Yes group indicate that seeing the strategic importance of innovation brings companies to more open innovation process, where it is necessary to ensure a sufficient number of quality ideas which are the basis for successful innovations. The fact, that No-group link process optimization and ICT to innovation may divert the activities at collecting ideas to create better processes, however this slows down the innovation process and may not be essential for successful innovations. It also indicates that companies who do not see the strategic importance of innovation, but see themselves as innovative may employ more in closed innovation activities, which is definitely not suitable and sufficient for current dynamic environment and may cause the low innovation performance.

References

- Alam, I. 2003. Commercial innovations from consulting engineering firms: An empirical exploration of a novel source of new product ideas. In: *Journal of Product Innovation Management*, 20(4), 300-313.
- ATKearney. 2008. *Innovation Management. Strategies for success and leadership.*
- Bajziková, L., Šajgalíková, H., Wojčák, E., Poláková, M. 2014. Dynamics of changes toward knowledge-based economy in Slovak SMEs. *Procedia - Social and Behavioral Sciences*. Amsterdam, Elsevier. pp. 637-647 ISSN 1877-0428
- Baumgartner, J. 2009. The Corporate Innovation Machine – A Model for Implementing an Idea Management Based Innovation Strategy in Your Firm. online: <http://www.jpb.com/creative/innovationMachine.pdf>
- Cooper, R.G. 2011. *Winning at New Products: Creating Value Through Innovation*, 4th edition, Basic Books, New York, NY. ISBN: 978-0465025787
- Demeter, L. D., Szegedi, K. 2013. Some Ethical Issues of Innovation. *Proceedings of the International Interdisciplinary Conference. IISES. Italy*. pp. 195-201 ISBN: 978-80-905241-5-6
- Dmitrieva, E., Guseva, M. 2017. Justification of approach to classification of innovations in public-private partnership. *Economic Annals-XXI: Volume 163, Issue 1-2(1), Pages: 64-70, ISSN 1728-6220*, 2017
- Dvořák, J. a kol. 2006. *Management inovací*. Praha: Vysoká škola manažerské informatiky a ekonomiky, Gprint. p. 246. ISBN 80-86847-18-7.
- European Commission. 2014. *The role of public support in the commercialisation of innovations. Flash Eurobarometer 394 Report.*

- Gavrysh, O., Boiarynova, K. 2017. The methodological approach to monitoring of the economic and functional state of innovation-oriented machinery engineering enterprises at the modern technological modes. *Economic Annals-XXI: Volume 164, Issue 3-4, Pages: 65-70, ISSN 1728-6220*, 2017
- Goffin, K., Pfeiffer, R. 1999. *Innovation Management in UK and German Manufacturing Companies*, Anglo-German Foundation for the Study of Industrial Society, London, ISBN 1-900834-17-0
- Greguš, M., Karovič, V. 2015. Practical Implementation of private Cloud based on open source own Cloud for small teams - Case study. 10th International conference on P2P, Parallel, Grid, Cloud and Internet Computing: Proceedings Piscataway. IEEE. pp. 183-187 ISBN: 978-1-4673-9473-4
- Gubíniová, K., Pajtínková Bartáková, G. 2014. Customer experience management as a new source of competitive advantage for companies. Proceedings of the 5th international scientific conference on trade, international business and tourism. Bratislava. *Ekonom.* pp. 164-168. ISBN 978-80-225-3994-4
- Herstatt, C., Verworn, B. 2001. The "Fuzzy Front End" of Innovation. Working paper published In: Technical University of Hamburg.
- Herstatt, C., Verworn, B. 2007. *Management der frühen Innovationsphasen: Grundlagen – Methoden – Neue Ansätze*, 2nd edition, Gabler, Wiesbaden.
- HERZOG, P. 2011. Open and closed innovation. Different cultures for different strategies. 2nd edition. Germany: Gabler, p. 20.
- Hvizdová, E., Mokrišová, V., Polačko, J. 2016. Changes in research and development after crisis in selected countries. *Economic Annals-XXI: Volume 160, Issue 7-8, Pages: 31-34, ISSN 1728-6220*, 2016
- Hvizdová, E., Mokrišová, V., Radvanská, K. 2014. Comparative analysis of ethics in marketing communication of higher education institutions 1. vyd. - Mainz : Logophon Verlag GmbH, 84 s. ISBN 978-3-936172-31-7
- Chesbrough, H. 2003. *Open Innovation: The New Imperative for Creating & Profiting from Technology*. Boston: Harvard Business School Press.
- Koen, P. Chapter 6: The Fuzzy Front End for incremental, platform, and breakthrough products, In A. Kahn, K. B., Castellion, G., Griffin, A. 2005. *The PDMA Handbook of New Product Development: 2nd (81-91)*. Hoboken, New Jersey: John Wiley & Sons. Inc.
- Mortara, L., Minshall, T. 2011. How do large multinational companies implement open innovation? In: *Technovation*, no. 31, 586-597.
- Narvekar, R. S., Jain, K. 2006. A new framework to understand the technological innovation process, In: *Journal of Intellectual Capital*, vol. 7, no. 2, pp. 174-186.
- Stachová K., Stacho Z., Gasperová J. 2015. Continuous performance evaluation is an integral part of continuous management process, *Human potential development* Klaipėda: Klaipėda University, pp. 179-186, ISBN 978-9986-31-466-0
- Vohra, N., Mukul, K. 2009. Relevance of Peter Drucker's Work: Celebrating Drucker's 100th Birthday. *Vikalpa*, Vol. 34 No. 4.

IDENTIFICATION OF PERSONNEL CHANGES BASED ON PERSONNEL AUDIT

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ABSTRACT

The everyday life is accompanying by changes. It is very important to have a control over changes and to be able to manage them. The aim of the paper is optimizing staff occupation of manager positions on the base of personnel audit in a chosen company. A personnel audit is focused on analysis of qualification and other requirements fulfilment and on competence analysis in aim to evaluate adequacy of middle management structure in a chosen company. The result is an identification of needed personnel changes which present starting points for elaboration of change management project. Personnel audit has shown a need to perform changes towards improvement of managerial competencies and personnel structure optimization. Specialized education courses for managers, cancellation of four positions and creation of two new managerial positions were suggested in the analysed company.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: change management, personnel audit, staff optimization.

1. INTRODUCTION

Change management is in modern enterprise a basic prerequisite for survival competitive environment. Substance of change management is planning and realization of changes on the base of continual monitoring the external or internal reasons for change with aim to secure a permanent increase of internal potential in enterprise (Burns 2000, Drdla-Rais 2001; Palán et al. 2002; Sujová 2011, 2012). Change management includes a methodology for organizational processes by leading a change and deals with particular models of change management which come from the view of human resources management. Managers must monitor strategy, processes and systems to detect needed changes in the enterprise. However, to monitor influence of changes on employees is necessary too, because employees implement changes into practice (Mabey et al., 1993).

Personnel changes are connected with organizational changes, there exist a close coupling. Management of organizational changes belong among the most difficult managerial tasks. Their incorrect implementation can cause a chaos leading to lowering the motivation and loyalty of employees. (Kotter 2000) To identify needed personnel changes a detail analysis is needed. One of the effective tools a personnel audit is.

Personnel audit presents assessment of staff quality as one of important elements and prerequisites for effective running and performance of each company (Lubelec, 2001). By means of audit it is possible to find out abilities of employees to carry out the job, their potential, strengths and weaknesses. It also helps by creating a correct personnel structure due to identification of need or overplus of employees. On the base of these findings it is possible to determine criteria in area of education needs, professionalism and skills on the working positions, to carry out needed changes in organizational structure, competencies and responsibilities of individual employees, to cancel or to create job positions. (Dobiasová, 2004)

The goal of personnel audit is to make the business activities more effective through complex review of existing human resources focused on analysis of job positions, potential of individual employees and teams, organizational structure and interpersonal relationships.

The paper is focused on determining starting points in process of personnel changes through personnel audit. The aim of this paper is present possibilities of using methods and results of personnel audit in the process of managing personnel and organizational changes in a chosen company. In

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connection with planning and realization of personnel changes, a personnel audit presents the first, analytical phase in the process of change management.

2. MATERIAL AND METHODS

The main aim of our study is optimizing occupation of middle management positions through identification of needed changes as the result of personnel audit. Required material for obtaining relevant outputs was obtained from a secondary research, on the basis of an analysis of available scientific literature dealing with change management and personnel audit and on the basis of researched information in a chosen company where analysis and a personnel audit was carried out.

The company is a large sized one with more than 1 000 employees. In organizational structure there is 6 top managers and 22 middle managers. All managers are men because of engineering industry requiring high technical level and experiences in the branch. The average age of managers is 38 years. The company has never performed personnel audit focused on quality of employees and their readiness to do job position. Only personnel audit of labour performance and fulfilling goals and tasks was carried out.

We proposed and performed a personnel audit of middle managers in the company. The audit was focused on following issues:

- Analysis of fulfilling the qualification and other requirements for position of middle manager. Base data was job descriptions and requirement specification which is different for each position in middle management. Common requirements for middle managers are university education, language knowledge, digital skills, managerial and communication skills.
- Competence analysis based on competence model in purpose to evaluate meeting individual competences by managers. Each competence was monitored in three situations. The methods used by competence analysis are: structured interview, individual model situations, psych diagnostic method and team work ability. The methods were selected so that 12 areas included in competences model could be evaluated. In each area the manager can reach from 1 to 5 points where 1 point is the lowest level and 5 points presents the highest level of fulfilment.
- Analysis and comparison of labour scope, authorities and responsibilities in aim to consider adequacy of middle management structure in the company.

The result is identification of needed changes in positions of middle management based on synthesis of theoretical knowledge and results of performed audit focused on optimizing the occupation of positions in middle management. Proposed changes represent starting points for elaboration of change project.

3. RESULTS AND DISCUSSION

In this part of paper the results of particular parts of personnel audit are presented: level of middle manager job requirements fulfilment and competence model analysis.

Table 1 presents results of analysis focused on fulfilment of requirements stated in job specification for middle managers. From 22 audited managers only 13 of them have university education, language requirements fulfil 13 managers, managerial and also social skills have only 9 managers. 16 managers meet requirements of social abilities. In total, the fulfilment of all requirements for middle managers is at the level of 53 % that cannot be considered to be satisfied. After comparison of labour scopes, authorities and responsibilities, several similarities were found out. It concerns 4 managers: TSP, VOLVO, Caterpillar, GHH, who have the care of customers in job description.

In the last part of audit the managers were evaluated by competence model consisting of 12 competence areas. The best results had a manager who reached the highest number of points. The maximum was 60 points, 5 points for each competence area. The results are shown in table 2. Data in table 2 show that middle managers in analysed company have reached from 37 to 56 points from 60 points. In average middle management reached 47 points that is meeting competences at the level 78 %. The most deficiencies appeared in abilities to lead staff and apply correct leading styles, in abilities to push own opinions and needs and in overtaking responsibility for decisions made. The second group of deficiencies concerns business skills: identify and analyse customer needs, ability of business negotiations. The third group of deficiencies is presented by disability to state strategy for

reaching the goals, priorities in goals and tasks. Middle managers have a lower flexibility by changes, partnership and team approach.

Table 1 Fulfilment of requirements for middle managers in the company

Manager's position	UE	LK	CS	MS	SS	PA	%
Production planning	1	0	1	1	1	1	83
Technologic preparation of production	1	1	1	0	0	1	67
Material preparation	0	0	1	0	0	1	33
Machining	0	1	1	0	0	1	50
Welding	1	0	0	1	1	0	50
Paint shop	0	0	1	1	0	0	33
Purchase	1	1	1	0	1	0	67
Investment	1	0	1	1	1	1	83
Maintenance	0	1	1	0	0	1	50
Input quality control and metrology	1	1	1	0	1	1	83
Output quality control	1	0	1	1	0	1	67
Marketing	1	0	1	1	1	0	67
Facility	0	1	1	0	0	1	50
Energetics	0	0	1	0	0	1	33
Labour economy and wages	1	1	1	0	0	1	67
Human resources	1	0	1	1	1	0	67
Labour and fire safety	0	1	1	0	0	1	50
Financial planning and costing	1	1	1	0	0	1	67
TSP manager	0	1	1	0	0	1	50
Volvo, Kom., Mont., J.D manager	1	1	1	1	1	0	83
Caterpillar, Sennebogen manager	1	1	1	0	0	1	67
GHH manager	0	1	1	1	1	1	83
% frequency	59	59	96	41	41	73	

Legend: 0 – nonfulfilment, 1 – fulfilment; UE – university education, LK – language knowledge, CS – computer skills, MS – managerial skills, SS – social skills, PA – personal abilities

Table 2 Competence model analysis

Managerial position	Competence												Total
	Strategic orientation	Orientation to changes	Orientation to results	Staff leading	Delegation of goals	Relationship building	Orientation to customer	Effective communication	Presentation abilities	Influence acceptance	Stress resistance	Business skills	
Production planning	5	5	5	3	5	4	5	4	5	4	4	3	52
Technological preparation of production	5	5	5	4	4	4	5	4	5	3	4	4	52
Material preparation	3	3	3	4	4	4	3	4	5	4	5	3	45
Machining	2	2	3	4	4	4	4	4	4	3	5	3	42
Welding	4	4	3	3	2	3	4	4	3	3	5	3	41
Paint shop	3	3	3	3	2	2	3	4	3	3	5	3	37
Purchase	4	5	4	4	5	5	4	5	4	4	3	5	52
Investment	5	4	5	5	4	5	4	5	5	4	5	5	56
Maintenance	3	3	3	4	3	4	3	4	3	4	4	3	41

Input quality control	5	4	5	3	4	3	4	5	5	4	5	3	50
Output quality control	5	5	5	3	4	3	5	4	5	4	5	3	51
Marketing	4	3	4	4	5	4	5	5	5	5	3	5	52
Facility	3	3	3	2	3	3	3	4	4	3	3	3	37
Energetics	2	3	2	2	2	3	3	4	3	3	5	3	35
Labour economy and wages	4	5	4	3	4	4	3	4	4	4	5	4	48
Human resources	4	4	4	5	5	5	4	4	5	5	5	4	54
Labour and fire safety	4	3	3	3	3	4	3	4	3	4	5	3	42
Financial planning and costing	5	5	4	4	5	4	4	4	5	5	4	5	54
TSP manager	4	5	4	4	5	5	5	4	5	4	5	4	54
Volvo, Kom., Mont., JD manager	4	5	4	5	4	5	5	5	4	4	4	4	53
Caterpillar, Sennebogen manager	5	5	4	4	4	4	5	4	5	3	3	5	46
GHH manager	4	4	4	3	4	5	5	5	4	3	5	5	46
Total	87	88	84	79	85	87	89	94	94	83	97	83	

Source: own processing

Based on personnel audit results the needed changes were identified in two areas:

- Improvement of competences of middle managers through education courses and specification of the courses.
- Optimization of middle management structure: cancellation of 4 management positions and creation of two new, the shift of 5 positions from middle to low management.

The overview of suggested changes is in table 3.

Table 3 Overview of proposed changes

Type of change	Managerial position
Replacement (selection of new employee)	Safety and fire protection manager Energetics manager Facility manager
Increasing competencies by existing managers	
- managerial course	All positions
- language course	Production planning manager Manager of welding Manager of investment Manager of input quality control Marketing manager Human resource manager
- digital/PC course	Manager of welding
Cancellation of position	Manager for TPS Manager for Volvo, Komatsu, Montabert, John Deer Manager for Caterpillar a Sennebogen Manager for GHH
Creation of new positions	Manager for CRM Manager for expedition and sale
Shift to low management	Manager of material preparation Manager of machining Manager of paint shop Manager of maintenance Manager of energetics

Source: own processing

4. CONCLUSION

A heart of each enterprise is a group of employees with adequate abilities and competences for performance of the job position. It is therefore important to monitor if the enterprise has job position occupied by right persons able to do work at required level and quality. All changes performed in an enterprise require also changes in labour competencies and skills.

This paper has shown possibility of using actual analytic methods and tools of personnel audit in management of personnel changes, which serves as input data for correct identification and preparation of needed changes.

The goal of changes performed in a company should be keeping an effective and competitive business. The paper deals with issue of change management in area of human resources. Nowadays, enterprises feel a need of permanent monitoring human resources as for required competences in aim to achieve an optimal personnel structure. The aim of complex personnel audit carried out in a chosen company was to answer three basic questions:

- How many middle managers are needed to master present and future volume of work?
- What employee should be the most suitable for the analysed job position?
- What management system is applied in a company?

The audit was performed in the middle management of a chosen company. It was focused on evaluation of present level of quality of middle managers, on correctness in range of authorities and responsibilities of managers, effectiveness of human resource utilization and determining optimal personnel capacities. Based on audit results the proposals of changes were elaborated. The proposed changes enable reduction of costs and optimizing organizational structure that can increase a flexibility of a company.

Acknowledgements

This paper is the partial result of the project Nr. 1/0286/16 Management of Change Based on Process Principles under support of VEGA agency, Slovakia.

References

- Burns, B. 2000. Managing change: a strategic change to organizational dynamics. Essex: Pearson Education Limited.
- Dobiasová, P. 2004. Význam personálneho a organizačného auditu pre podnik. Personálny a mzdový poradca podnikateľa, 1: 114 - 115.
- Drdla, M., Rais, K. 2001. Řízení změn ve firmě – reengineering. Praha: Computer Press.
- Kotter, J. P. 2000. Leading the process of change. Praha: Management Press.
- Lubelec, L. 2001. Personálny audit – nástroj rastu výkonnosti a spokojnosti zamestnancov. In "Personálny manažment". Organizačná zložka MO SR.
- Mabey, Christopher-Mayon-White, Bill 1993. Managing Change – 2 nd Edition, The Open University: Paul Chapman Publishing.
- Palán, J. et al. 2002. Řízení změn. 1. vyd. Praha: Credit.
- Sujová, A. 2011. Process restructuralization and its importance by increasing a competitiveness of an enterprise. Acta Univ. Agric. Silvic. Mendelianae Brunen., 59(2): 319–324.
- Sujová, A., Rajnoha, R. 2012. The Management Model of Strategic Change Based on Process Principles. Procedia-Social and Behavioural Journal, 62: 1286 - 1292.

PERFORMANCE AND INVESTMENT EFFECTIVENESS RELATED TO BIOMASS IN MANUFACTURING COMPANY

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ABSTRACT

The work is aimed at assessing the efficiency of investment in a manufacturing enterprise focused on the production of renewable energy. The quality of investment and financial decision-making is supported by two variants of a possible way of securing the needs of the production process related to biomass, wood chips and wood chipping machine. We used discounted cash flow methods considering discount rate for separate financial sources such as cost of equity as well as interests of debt. Based on application of mentioned methods for valuation of business investment effectiveness, the management can make an optimal decision. Implementation of the project supports the increase of the utilization rate of available renewable energy sources in Slovakia.

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Key words: Investments; Investment project; Manufacturing; Biomass; Slovakia.

1. INTRODUCTION

Within the investment and financial decision-making process, every business entity is interested in making the price of the wood chip as optimal as possible. The analysis of the production of the chips shows that the production of wood chips in its own direction, so in the undertaking concerned is economically the most advantageous. The production of wood chips, in its own right, eliminates a number of risks associated with the process of its production with suppliers, transport and storage. Of course, it is important to note that for each business, value added, profit, as well as the generation of a cash flow for the return of capital resources, rate of recovery of the capital invested. When deciding on the choice of suitable technology, the economic parameters as well as the acceptance of certain specific features that, in terms of the concept of enterprise development, create a space for further growth of business performance and efficiency in given market conditions. As a given issue, the company resolves from the framework characteristics of the project and its effectiveness. It is a decision-making process involving two key investments that can be evaluated separately. However, these investments, which within the enterprise are separate divisions, with clear economic rules of operating activity in the given environment.

Evaluation of projects - feasibility study, the present study differs from the preliminary study particularly with deep processing as well as financial and time demands. Basic filling of technical and economic study described for example Drábek, Polách (2008), Valach (2006), Scholleová (2009), Veber (2009) and others. If the company succeeds in improving the efficiency of its processes, part of the avoided costs can be reflected in the launch of new investment so far not provided services and products (Sujová, Simanová, 2013). Based on practical experience, knowledge from projects implementation it can be concluded that the role of pre-investment phase is primarily to ensure precision and maximum completeness of the basic economic parameters of the project, which crucially affects the efficiency of investment. After completion of the decision-making process about the implementation of the project or the most suitable variant of the project, implementation phase occurs. Investment decisions (how much, to what, when, where and how to invest) belong among fundamental decisions, which greatly affect the future development of the company and its efficiency (Sujová, Hlaváčková, Šafařík, 2015).

The growth of competitiveness in the business sector requires identification of all reserves that ensure the efficiency of the enterprise's entire business transformation process. Wood processing

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industry in Slovakia is influenced by the economic crisis causing stagnation in the construction industry and decrease in the customer demand for construction, woodwork and furniture products. Many companies are looking for different forms of cost savings (Vetráková, Potkány, Hitka, 2013). The cost reduction paths are essentially three, namely:

- reducing material costs,
- reducing wage costs,
- reducing energy costs.

These three cost groups and the potential for their reduction represent the key to increasing the efficiency and economy of the business in each manufacturing enterprise. One way to reduce the energy costs of an enterprise is to use alternative renewable sources. Efficient use of available resources is also biomass, which is available in individual regions of Slovakia. Biomass is a major renewable energy source to replace fossil fuels to a great extent.

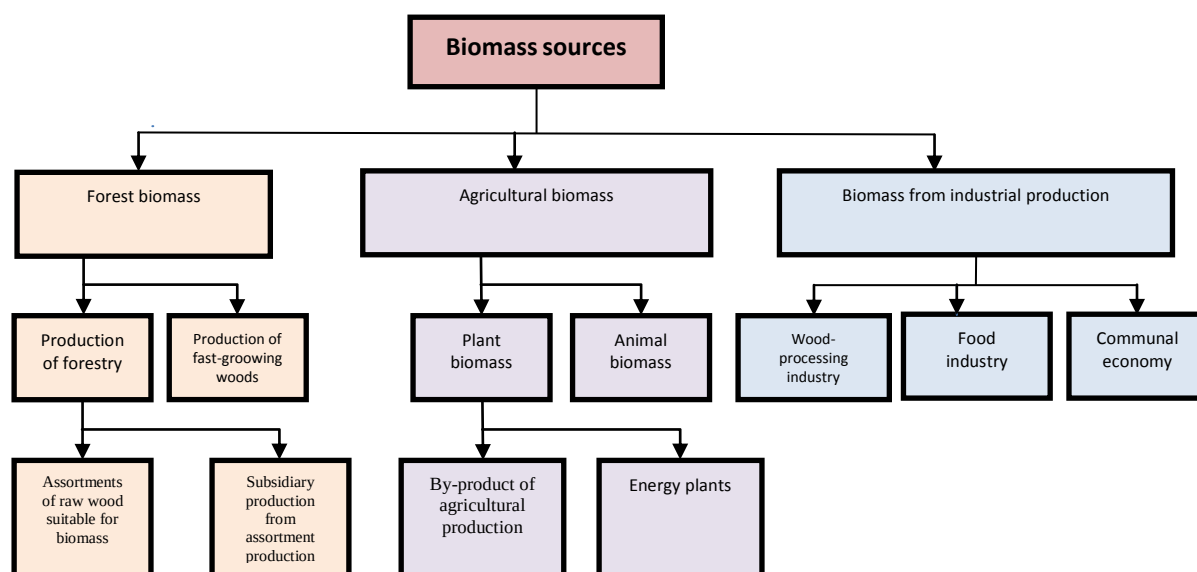


Figure 1 Sources of biomass from economy

Source: own

There is certainly a significant production of biomass from forestry and agriculture for Slovak economy. The key parameter of biomass is its humidity or dry matter content in biomass, which also influences the process of further processing, as documented in Tab. 1.

Table 1 The heat of deciduous and coniferous wood

	Relative humidity							
Wood	15	20	25	30	35	40	45	50
Heating in GJ/t (Heating 1 tone of wood stored for less than 30 days)								
Deciduous	15.5	14.1	12.9	11.7	10.5	9.4	8.3	7.2
Coniferous	15.5	14.4	13.4	12.3	11.3	10.2	9.1	8.0

Source: own

Companies that provide production of energy from forest biomass basically address several issues:

- a) ensuring raw material resources from the region (the gravitational area) for efficient energy production,
- b) transport of raw materials,
- c) efficient production of wood chips,
- d) storage of wood chips,
- e) an optimal energy production process,
- f) optimization of capital expenditures for investment activity,
- g) effective financing of the above mentioned processes.

This process, resp. the stages of biomass energy production can be expanded, narrowed, depending on the availability of resources (raw materials, spatial, human, financial). However, the most important factor is the financial resources, as the process of producing wood chips and producing individual types of energy is financially the most demanding, in this process, there are the most types of risk factors that need to be fully accepted, respectively projected into the process of economic evaluation.

Two key issues at the enterprise level are:

- effective production of wood chips,
- optimization of capital expenditures on own energy production (investment intensity of technology).

2. MATERIAL AND METHODS

Based on analysis of individual approaches to economical effectiveness evaluation, their abilities, dynamic abilities and estimation on capital expenses and investment project income in whole, such as evaluation of influence of project realization on enterprise management and development, **we decided to apply following methods for investment project economical effectiveness evaluation** (more in Drábek, Jelačić, Merková, 2014):

1. Net present value (NPV)
2. Internal rate of return (IRR)
3. Profitability index (PI)
4. Discounted payback period (DPP)

a) Net Present Value

In modern management this method is used as most accurate and most reliable, and also as a basic method of project evaluation. It is defined as a difference between discounted money income from investment (investment income) and capital expenses. Under the term investment income we understand estimated value of the cash-flow (i.e. net profit + amortization). Mathematically is possible to show this phrase as follows:

$$NPV = CVCF - IC \quad (1)$$

where:

NPV - net present value
CVCF - current value of cash-flow
IC - invested capital

Rules of NPV are:

- NPV > 0 - to invest (project is good, it increase the market value of enterprise)
NPV < 0 - not to invest (project is not good, it doesn't give estimated income rate)
NPV = 0 - investment is not to be recommended or declined

$$CVCF = \frac{CF_1}{(1+k)^1} + \frac{CF_2}{(1+k)^2} + \frac{CF_3}{(1+k)^3} + \dots + \frac{CF_n}{(1+k)^n} \quad \text{or} \quad CVCF = \sum_{i=1}^n [CF_i / (1+k)^i] \quad (2)$$

where:

CF_i - annual investment income during the project time of economic life cycle (estimated CF)
k - discount ratio (measure)
n - time of project life cycle

b) Internal Rate of Return

Internal rate of return method is based on the concept of net value, i.e. respects net value of money. Given method is presented in required discount rate which will equalize net value of estimated investment income (cash-flow) with net value investment expenses. IRR, in comparison to NPV could be defined as follows – it is market interest rate (measurement) where NPV is equal to 0. That rate

gives the real investment lucrativity, i.e. capital lucrativity, and current percentage of highest possible interest burden on a firm.

Oposing to NPV with this method we practicaly look for discount rate where:

$$CVCF = IM, \quad \text{or} \quad CVCF - IM = 0 \quad (3)$$

Practical calculation is made mostly by method of tries and errors (iterative approach), and then by method of linear interpolation:

$$IRR = d_1 + \frac{NPV_1}{NPV_1 - NPV_2} (d_2 - d_1) \quad (4)$$

where:

d_1 - discount rate where $NPV > 0$

d_2 - discount rate where $NPV < 0$

NPV_1 - positive NPV, at discount rate d_1

NPV_2 - negative NPV, at discount rate d_2

k - enterprise discount rate (required effectiveness measure)

Rules IRR:

$IRR > k$ - to invest

$IRR < k$ - not to invest

c) Profitability Index

Profitability index or ratio between money income and capital expenses, shows the relations between current net values of presumed future cash-flows (SHCF) and investment capital.

$$PI = CVCF / IM \quad (5)$$

PI rule is:

$PI > 1$ - to invest

$PI < 1$ - not to invest

$PI = 1$ - investment can not be accepted or declined.

Profitability index is mostly connected with NPV method and usually leads to the same decision as NPV. When net present value is equal to 0, profitability index is equal to 1. From that point of view, if $PI > 1$, project achieves positive net present value and enterprise can accept it, i.e. the higher profitability index the more economically successful project.

d) Discounted Payback Period

It is traditional and often used method of project evaluation, especially form the point of investor, forn instance bank. Method gives an answer to question how minimally long can project be alive and able, i.e. how many periods of time it has to bring income to be acceptable from the point of net present value. DPP gives time periods in which through discounted cash-flow returns equally invested capital. The shorter the time of return in comparison to life cycle, the more acceptable project for the enterprise.

$$DPP : \sum_{i=1}^{DDS} \frac{CF_i}{(1+k)^i} = IM \quad (6)$$

DPP rule is:

$DPP < t$ - to invest

$DPP > t$ - not to invest

t – presumed time of projects economical life cycle

Oposing to un-discounted payback period given method respects implemented rule of financing, which is that money unit has greater value at the beginning of payback period then the same

money unit at the end of payback period. But, un-discounted payback period method, as well as DPP ignores all cash-flows after the return period.

3. RESULTS AND DISCUSSION

Results are interested in presenting two variants of a possible way of securing the needs of the production process related to biomass, wood chips and wood chipping machine. We applied discounted cash flow methods described in methodology for valuation of business investment effectiveness.

3.1 Construction of storage areas for storage of fuel wood and energy chips

Characteristics of this variant are following:

- Fuel storage volume per year: 150,000 m³
- Storage capacity of the energy chips per year: 50 000 m³
- Covered storage capacity: fuel wood: 9,000 m³
- Capacity of sheltered warehouse: 1 400 m³
- Capital expenditure: € 390,000
- Life of the building for 20 years
- Project financing: Equity: 150 000, -€ Debt.: 240 000, - € Discount rate = 6,0%
- Estimated revenues: € 240,000
- Expected total costs:

Table 2 Evaluation of storage economic efficiency

Indicator (€)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Revenues	164 000	164 000	164 000	164 000	164 000	164 000	164 000	164 000	164 000	164 000	164 000	164 000	164 000	164 000	164 000
Costs	91 500	91 500	91 500	91 500	91 500	91 500	91 500	91 500	91 500	91 500	91 500	91 500	91 500	91 500	91 500
Amortisation	22 500	22 500	22 500	22 500	22 500	22 500	22 500	22 500	22 500	22 500	22 500	22 500	22 500	22 500	22 500
Interest of Debt.	10 800	9 450	8 100	6 750	5 400	4 050	2 700	1 350	0	0	0	0	0	0	0
Profit before tax	39 200	40 550	41 900	43 250	44 600	45 950	47 300	48 650	50 000	50 000	50 000	50 000	50 000	50 000	50 000
Income tax (21%)	8 232	8 516	8 799	9 083	9 366	9 650	9 933	10 217	10 500	10 500	10 500	10 500	10 500	10 500	10 500
Profit after tax	30 968	32 035	33 101	34 168	35 234	36 301	37 367	38 434	39 500	39 500	39 500	39 500	39 500	39 500	39 500
Funding (5%)	1 548	1 602	1 655	1 708	1 762	1 815	1 868	1 922	1 975	1 975	1 975	1 975	1 975	1 975	1 975
Disposable profit	29 420	30 433	31 446	32 459	33 472	34 485	35 499	36 512	37 525	37 525	37 525	37 525	37 525	37 525	37 525
Amortisation	22 500	22 500	22 500	22 500	22 500	22 500	22 500	22 500	22 500	22 500	22 500	22 500	22 500	22 500	22 500
CASH FLOW	51 920	52 933	53 946	54 959	55 972	56 985	57 999	59 012	60 025	60 025	60 025	60 025	60 025	60 025	60 025
Loan payment	30 000	30 000	30 000	30 000	30 000	30 000	30 000	30 000	0	0	0	0	0	0	0
NETT CASH FLOW	21 920	22 933	23 946	24 959	25 972	26 985	27 999	29 012	60 025	60 025	60 025	60 025	60 025	60 025	60 025
Discount rate (8,5%)	0.94340	0.89000	0.83962	0.79209	0.74726	0.70496	0.66506	0.62741	0.59190	0.55839	0.52679	0.49697	0.46884	0.44230	0.41727
Present value of Cash Flow	48 981	47 110	45 294	43 533	41 826	40 173	38 572	37 025	35 529	33 518	31 620	29 831	28 142	26 549	25 046
Present value of Cash Flow Total	552 748														
Net Present Value (€)	162 748														
Profitability Index	1.42														
Internal Rate of Return (%)	11.76														
Payback period (years)	9.36														

Source: own

3.2 Chipping machine's onset

Characteristics of the second variant and its evaluation:

- Production of wood chips for energy purposes - purchase of splitting machine
- Annual production of chips - 73 000 t, at a humidity of 30%,
- Valuing factors: - price and quality of the digest, the volume of timber supply, location and landing places (availability of wood), payment conditions, stability of deliveries in individual quarters of the year, references,
- In the initial decision-making process, two variants were assessed:
 - a) Delivery of the chips from the suppliers (evaluation of the 4 suppliers, the variant rejected due to the quality of the chips, ..)
 - b) Production of a self-directed cutter (by its own chipper)
- Making a chip with a proprietary chipper,
- Total capital expenditure: 700 000, - EUR, lifetime. project of 6 years,
- Cutter price: 58.00 EUR
- Estimated revenue: EUR 4,234,000
- Estimated total costs: € 4,080,000
- Project financing: Equity: 100 000, - EUR Debt.: 600 000, - discount rate = 5,5%,
- The quality of the chips fully meets the requirements of the division - energy production for market participants.

Table 3 Evaluation of the chipping machine's onset economic efficiency

Indicator (€)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Revenues	4 234 000	4 234 000	4 234 000	4 234 000	4 234 000	4 234 000
Costs	3 964 300	3 964 300	3 964 300	3 964 300	3 964 300	3 964 300
Amortisation	87 500	87 500	87 500	87 500	87 500	87 500
Interest of Debt.	28 200	24 675	21 150	17 625	14 100	10 575
Profit before tax	154 000	157 525	161 050	164 575	168 100	171 625
Income tax (21%)	32 340	33 080	33 821	34 561	35 301	36 041
Profit after tax	121 660	124 445	127 230	130 014	132 799	135 584
Funding (5%)	6 083	6 222	6 361	6 501	6 640	6 779
Disposable profit	115 577	118 223	120 868	123 514	126 159	128 805
Amortisation	87 500	87 500	87 500	87 500	87 500	87 500
CASH FLOW	203 077	205 723	208 368	211 014	213 659	216 305
Loan payment	75 000	75 000	75 000	75 000	75 000	75 000
NETT CASH FLOW	128 077	130 723	133 368	136 014	138 659	141 305
Discount rate (8,5%)	0.92166	0.84946	0.78291	0.72157	0.66505	0.61295
Present value of Cash Flow	187 168	174 752	163 133	152 262	142 093	132 583
Present value of Cash Flow Total	951 991					
Net Present Value (€)	251 991					
Profitability Index	1.36					
Internal Rate of Return (%)	19.79					
Payback period (years)	4.16					

Source: own

4. CONCLUSION

As we can see, the firm has a sufficient margin of maneuver for possible overall business risk in assessing both variants of investment project. Of course, the key risks in the supply of wood raw materials, in the choice of technology, are somehow eliminated to an acceptable level.

As the results of the evaluation of the economic effectiveness of both project variants also show, the company also achieves the required value added of the invested capital and, therefore,

realization of the projects fully fulfills the investment and financial objectives of the manufacturing company.

Acknowledgements

We wish to thank the Ministry of Education, Science, Research and Sport of the Slovak Republic, this paper is partial result of the grant project VEGA Nr. 1/0286/16 - Management of Change Based on Process Approach.

We wish to thank the Ministry of Education, Science, Research and Sport of the Slovak Republic, this paper is partial result of the grant project VEGA Nr. 1/0537/16 - Methods and Models of Strategic Business Performance Management and their Comparison in Companies and Multinational Corporations.

References

- Drábek, J., Jelačić, D., Merková, M. 2014. Substance of investment projects, in "Investments to forests and forest based production". In: Jelačić, D. (Ed.). Zagreb: WoodEMA, p. 1-31.
- Drábek J., Polách J. 2008. Real and Financial Investment of Companies/Reálne a finančné investovanie firiem (in Slovak). Zvolen: Technical University in Zvolen. 271 p.
- Scholleová, H. 2009. Investment controlling/Investiční controlling (in Czech). Praha: Grada. 285 p.
- Sujová, A., Hlaváčková, P., Šafařík, D. 2015. Analysis of Investment Effectiveness in the Wood Processing Industry of the Czech Republic. *Procedia-Economics and Finance* 26, 889 - 893.
- Sujová, A., Šimanová, L. 2013. Meranie a riadenie výkonnosti interných procesov, in "*Meranie a riadenie výkonnosti podnikov*". In: Rajnoha, R. et al. (Ed.). Zvolen: Technical University in Zvolen. p. 172-220.
- Valach, J. 2006. Investiční rozhodování a dlouhodobé financování (in Czech). 2nd Ed. Praha: Ekopress. 465 p.
- Veber, J. 2009. Management: základy, moderní manažerské přístupy, výkonnost a prosperita (in Czech). 2nd Ed. Praha: Management Press. 734 p.
- Vetráková, M., Potkány, M., Hitka, M. 2013. Outsourcing of Facility Management. *E & M EKONOMIE A MANAGEMENT* 16(1): 80-92.

LEVEL OF INFORMATION SUPPORT FOR MANAGEMENT IN FORESTRY AND WOOD PROCESSING SMALL AND MEDIUM ENTERPRISES

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ABSTRACT

Small and medium enterprises (SME) according to their unique characteristics have a special place in industry. An information transmission system based on integrated information systems is related with integrated flow of data and the flow of business organization and leads to the improvement of administrative and operational efficiency. Lack of such a system may lead to further problems such as long promotion time in business processes, long cycle times in transactions, excessive inventory and weak use of financial resources and other resources, low productivity and inventory shortages.

The following paper presents results from a study about the importance and use of information and communication technology (ICT) in Slovak small and medium- sized companies (SMEs) from forestry and wood processing industry. In an empirical survey, 156 questionnaires were collected and analysed (return rate 78%). The goal was to identify advantages and deficiencies dealing with ICT used by the above mentioned companies. The findings show that Slovak SMEs are satisfied with functionality and adaptability of ICT. The main deficiency identified by the companies were incompatibility and insufficient support in the process of ICT implementation and operation. The most important result seems to be the investment into complex and integrated information systems (IS). The main problem in application of these types of IS are the limited financial resources of SMEs.

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Key words: Small-Medium Enterprises (SME), Information and Communication Technology (ICT), advantages and deficiencies, forestry and wood processing industry.

1. INTRODUCTION

Big enterprises and corporations need latest managerial information systems (MIS) and technology which support strategic planning and management. These systems are based on information technology, various statistic processes and analyses. They can provide managers relevant information about business processes, they can analyse particular business processes and also they can present results from those analyses.

When compared with large enterprises, SMEs have a simpler organizational structure with less specialized tasks, poor human, financial and material resources. Also most SMEs are very dependent on their daily environment (suppliers, competitors, and customers). The owners or managers have not many people with whom they can discuss or consult their decisions. But when they want to survive they have to respond to longer term changes in the environment. SMEs also have more limited use of ICT and the employees have less ICT capabilities (Parker and Custleman, 2007).

This paper analyses current state of utilizing ICT in the selected SMEs. The goal is to identify major strengths and weaknesses of the currently used ICT based on the results of questionnaires.

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2. MATERIAL AND METHODS

The current business environment is characterized as highly turbulent, influenced by modern information and communication technologies, globalization, short innovation and production cycles and employees' mobility. It is not easy to compete in such an environment; organizations have to utilize their corporate resources to the greatest possible extent. Such resources include finance, employees, tangible assets, technologies and also knowledge (Powell et al. 2001).

2.1 Types of information systems

Information System is a system that handles the flow and maintenance of information, which supports the business operation. The components of information systems are people, equipment, procedures and data. Information Systems are used by organization for different purposes.

Today, technology has brought systems for business that can help to companies (Rezvani, Gilaninia, Mousavian, 2011, Gilaninia, et al, 2011). The use of computers, peripheral devices connected to it and communication tools for collecting, processing, storage and dissemination of information called information and communication technology. Information and communication technology is a term that applied to any communication device or program, such as: radio, television, cellular phones, computers, software, hardware, networking, satellite systems and the like it that is related numerous services, programs and services to them. Information and communication technology is often in specific concept and position in a more accurate review of application, such as information and communication technologies in education and health, libraries and so on, convergence between computer and communications. The most important feature of information and communication technology is storage method, processing and access to information (Malekian, 2010).

The following are the six types of information systems and functions (Bansal, 2002):

1. Transaction Processing Systems (TPS) serve the people in the operational level of an organization. It collects and stores information about transactions, and controls some aspects of transactions. A sale of item in the store is an example of a transaction.
2. Knowledge work systems (KWS) is used by technical staff as model functions to convert design specifications into graphical designs. It uses computer-aided design/manufacture (CAD/CAM).
3. Office automation systems (OAS) serve those that belong to the knowledge level of an organization. The system helps individuals in the processing of personal and organizational data, perform calculations, and create documents. e.g. word processing, spreadsheets, file managers, personal calendars, presentation packages.
4. Decision-support systems (DSS) help the strategic management staff (senior officers) in making decisions. The system uses information, models, or analysis tools in order for managers to make simulations and predictions. Example of DSS is the 5-year investment plan.
5. Management information systems (MIS) serve the management level of the organization. The system condenses and converts the TPS data into information for purposes of monitoring performance and managing the organization. Transactions that were recorded in the TPS are analysed and reported by an MIS. Example of an MIS output is the budget report.
6. Executive support systems (ESS) serve the strategic level of an organization. A system provides top-level executive of a readily accessible, interactive format to get the overview of the entire organizations performance.

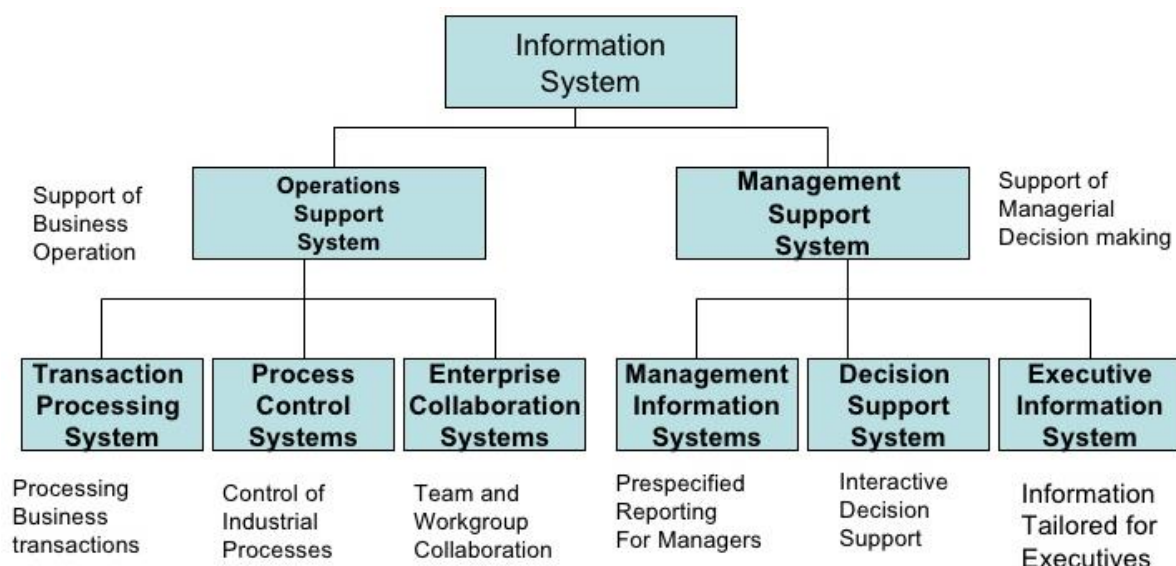


Figure 1 Types of Information Systems (IS)

Source: Ardales, 2003

2.2 Importance of ICT for SMEs

Business these days is becoming more and more competitive and business houses have to keep their eyes open for new and innovative technologies and techniques to save costs and improve performance to stay in the competition. The business world is abuzz these days with the latest high-end software solution termed Enterprise Resource Planning (ERP) that aims at integrating operations, processes and information flow in an enterprise, such that all the resources of an organization namely men, material, money and machine are registered and managed through a centralized database (Rajnoha, Lesníková, 2016) .

For those who came in late, ERP is a very useful software which brings all the core activities and resources of business under a unified system so that the management has a real-time view of various business resources like cash, raw materials, production capacity, etc. and the status of business commitments like orders, purchase orders, and payroll.

As such, the company can study its processes, earnings, and performance closely by merging its operational information with its financial information. This, in turn, helps the business to get accurate and integrated information, take speedy and effective decisions and improve performance as well as cut costs.

This integrated real-time system with a common database covers almost all the areas of business like financial, accounting, human resources, supply chain management, cost management, quality control, products, processes, supply lines, stocks, sales and marketing and any other aspect one can think of. With all the information under a single computer system, the company can reap quantifiable business benefits. An ERP is valuable not only for big businesses but also for small and medium scale enterprises.

Administration of the different receipts interdependence is very complex, such as invoices regarding a purchase of materials, salaries or general expenditures. All these things change with ERP implementation. Information flows constantly and allows you to follow a client's processes at any moment, no matter which part of the process they are going through. Purchases and expenditures in a centralized database allow you to have close control over these activities.

An ERP system which is powerfully integrated enables interactions of marketing, sales, quality control and many other areas. It eliminates the retyping errors as it would be in a single database. It integrates all departments and functions across a company in a single computer system that is able to serve all those different department's particular needs.

It works to better integrate each division within the organization, helping it to function as one unified entity. Processes and transactions between different divisions are made smoother and faster and are less prone to human error. But this is not enough on its own – an organization's agility and productivity also largely depends on how well it integrates with its whole ecosystem – its partners,

suppliers, and customers. The more integrated the business is both internally and externally, the better it's overall performance.

According to the report published by Aberdeen Group, the leading provider of fact-based research, an effective ERP system leads to these five benefits to SMEs (Ardales, 2003):

- 22% reduction in operating costs
- 20% reduction in administrative costs
- 17% inventory reductions
- 19% improvement in complete and on-time delivery
- 17% improvement in schedule compliance

Small and medium business houses have an added burden of competing with large scale businesses which are more cost efficient. In such a scenario, a well-managed ERP implementation can lead to long-term cost reduction and improved productivity, which will not only help SMEs survive and thrive but also promote future growth and expansion.

There are many different types of ERP that serve businesses' varying procedure types and can bring an immediate success. An ERP solution has numerous benefits depending on the type of business that it serves; these are business solutions and industry solutions.

Once you have decided to implement an ERP one need to have a clear strategy for its implementation. Here is an infographic that can help you in ensuring successful implementation of the ERP Software.

2.3 Methodology

In the case of SMEs, it is possible to identify some problems and specifics in relation to ICT:

- They usually do not have the appropriate skills available in-house and thus have to train existing staff or purchase those skills in the marketplace (Valkokari, Helander 2007)
- Although the technology is much cheaper than before, it still represents a considerable investment for SMEs, that traditionally lack such funds (Levy et al. 2002, Sedliačiková, et al., 2016)
- They prefer one-time purchases, they are not ready to invest time in ICT projects
- They prefer the simplest maintenance with minimum of additional operating costs
- They definitely prefer to buy products that work immediately after installation with minimum configurations or modifications ("box software", "off the shelf software")
- SMEs tend to use computers more as tools and less as a communications medium (Levy, 2005)

The analysis of the present state concerning the utilization of ICT by small and medium-sized enterprises in the conditions of the Slovak Republic was carried out by the means of questionnaires distributed among selected companies. The questionnaires were collected from November 2016 to April 2017. They were, for the most part, distributed by students directly into companies (82%) and then they were supplemented by electronically distributed questionnaires (18%). All in all, out of 200 companies addressed, 156 (78%) participated.

Minimal respondent sample was determined based on the formula for marketing research (Kozel et al., 2006):

$$n \geq \frac{z^2 \cdot p \cdot q}{\Delta^2} \quad (1)$$

Where:

n	- minimal number of respondents
p, q	- proportion of respondents familiar and unfamiliar with the studied issue (in this case 90:10)
z	- probability value of the statement (in this case equals 2 – representing reliability of 95.4%)
Δ	- maximum permissible error (5%)

The number of collected responses – 144 companies – passes the requirements for the minimal respondent sample.

Companies were chosen according to the following criteria:

- Group SME classification (according to the EU Commission Recommendation No. 96/280/ES)
- Dominant business activity: forestry, logging and related-services (NACE 0200), wood-processing industry and production of wood-related products and cork (NACE 20100, 20200, 20300, 20400, 20500) or furniture production (NACE 36100).

The questionnaires were filled in by the person responsible for the area of ICT and in cases where such an employee wasn't appointed – by a primary user.

The questionnaire consisted of:

1. Company identification (place of business, legal form of business, dominant business subject, size of business – the number of employees, information about proprietary structure etc.)
2. Organizational structure of a company regarding ICT.
3. Current software equipment.
4. Analysis of the satisfaction concerning the current state of ICT in a company.
5. Identification of additional (supplemental) services utilized by a company in the area of ICT (e.g. cloud computing, e-Marketing, Time management, etc.).

For the needs of this paper the results of the fourth part of the questionnaire were used. It was focused on the identification of strengths and weaknesses of the currently used ICT. Respondents had following two tables at their disposal (Table 1 and Table 2).

Table 1 Advantages of used ICT

Question: What are the advantages of your currently used ICT? (select all that apply)

Quality

Software functionality
 Accessibility of the high-quality local support
 Possibility to adjust according to the company's needs
 Functionality in accordance to the business processes
 Compatibility with other systems
 Utilization by other similar companies
 Language localization (Slovak)
 Communication and support of a consultant (supplier)
 Price
 Others (please, state)

Table 2 Deficiencies of used ICT

Question: What are the deficiencies of your currently used ICT? (select all that apply):

Quality

Unsatisfactory functionality
 Unsatisfactory training
 Problems concerning installation
 Functionality does not correspond to the business processes
 Incompatibility with other systems
 Insufficient capacity possibilities
 Insufficient language localization (Slovak)
 Communication and support of a consultant (supplier)
 Price
 Others (please, state)

The addressed employees had the possibility to fill in random number of attributes and could also write down their own. They also had the space for additional notes and observations.

3. RESULTS AND DISCUSSION

The results of the analysis can be seen in the following tables (Table 3 and Table 4).

Table Advantages of used ICT - results

Question: What are the advantages of your currently used ICT? (select all that apply)

Quality	Abs. number	Relat. number
Software functionality	139	89,10%
Accessibility of the high-quality local support	42	26,92%
Possibility to adjust according to the company's needs	98	62,82%
Functionality in accordance to the business processes	96	61,54%
Compatibility with other systems	24	15,38%
Utilization by other similar companies	66	42,31%
Language localization (Slovak)	120	76,92%
Communication and support of a consultant (supplier)	78	50,00%
Price	48	30,77%
Others (please, state)		

The results point out high level of companies' satisfaction with the functionality of software. The high value – 89.10% – is affected by the fact that purchase of ICT is based on the real needs of companies. The wide scale of products for this market segment enables companies to choose according to the needs of their company. Existing software solutions can also cover even the specific requirements of SMEs resulting from specific business entity. This is confirmed by the answers of respondents, which in 62.82% cases checked the ability to adapt to the needs of a company to be the strength of the used ICT. Prevailing way of purchasing the software products by SMEs ("box software", "off the shelf software") is reflected in the low level of satisfaction of users with the accessible support provided by the supplier. By this form of purchase, customer obtains only the product itself without any additional services (implementation, training and following support in actual operation).

Table 4 Deficiencies of used ICT - results

Question: What are the deficiencies of your currently used ICT? (select all that apply):

Quality	Abs. number	Relat. number
Unsatisfactory functionality	18	11,54%
Unsatisfactory training	48	30,77%
Problems concerning installation	30	19,23%
Functionality does not correspond to the business processes	12	7,69%
Incompatibility with other systems	66	42,31%
Insufficient capacity possibilities	6	3,85%
Insufficient language localization (Slovak)	18	11,54%
Communication and support of a consultant (supplier)	24	15,38%
Price	42	26,92%
Others (please, state)		

Incompatibility with other systems used by the company is stated to be the biggest weakness. I.e. the used systems and modules work either in isolation, or are very little or not at all compatible among themselves and to the core of IS. Often, they are purchased in different time and from different suppliers. This causes increase of expenses, loss of time and loss of flexibility as well as insufficient information support for operation.

The questionnaires confirmed interdependence between quality of a system and its price. Respondents who selected price to be a weakness (see Table 4) also expressed a high level of satisfaction with the functionality and compatibility of the system. After a more detailed analysis, it was found out that this related only to the companies with the implemented complex integrated IS with

ERP (Enterprise Resource Planning) management. Price of such an ICT solution is higher than continual purchasing of individual systems. However, if such an integrated IS is implemented into company with precise quality, there are savings concerning additional costs for administration and management control of a system. At the same time, it eliminates aforementioned weaknesses identified in isolated systems.

Comparing strengths and weaknesses of individual attributes of ICT is also interesting. On one hand, high satisfaction with the functioning of a software was stated (89.1%), but at the same time dissatisfaction regarding the compatibility of individual systems was also rather high (42.31%). This is connected with the way of purchasing and implementing ICT in SMEs. In many cases, companies solve urgent need to cover specific IS-related company processes by simply purchasing only the basic versions of ICT. Such a solution will meet the narrowly defined requirement; however, it won't support some specialized processes such as automatic reporting into other systems. Purchases of the systems are often based on short-term strategies, which will become evident later, e.g. when the company is growing and their information needs increase. In many cases, the isolated sub-systems are then slowing the progress as well as decreasing the quality of management. Then there is a requirement of higher degree of ICT integration, by which a high compatibility is achieved. However, the problem of complex solutions is their expensive price and also the extent of additional costs for administration and system maintenance, or securing of appropriate personal resources. Considering the financial and personal sources of SMEs, it poses, in many cases, a very difficult problem.

4. CONCLUSION

Success of companies is mostly given by their business performance. Business performance can be measured by various indicators which are influenced by various risk factors.

An essential component for effective management and decision-process within the risk conditions is relevant and prompt information. Business entities acquire it from information sources. Quality information system is a precondition of effective management and in many cases also represents a competitive advantage. Regarding the case of SMEs, it is possible – in relation to ICT – to identify certain features, which arise from limited access possibilities to financial and personal resources.

Based on the sample of 156 companies from forestry and wood processing industry, the paper analysed the opinions of authorized company employees concerning the strengths and weaknesses of implementation, use and security of ICT in respective companies. The results show a high level of satisfaction with the functionality of systems and with their ability to adjust to the process of company. The main problem was identified to be incompatibility of partial systems and modules. This weakness is a logical outcome of the limited sources, as well as of planning process of systems used to secure information needs of companies.

Possible solution is to support investments into complex integrated software solution which would cover all business process. However, such solutions are financially demanding – a substantially limiting factor for SMEs.

Acknowledgements

This paper is the partial result of the Ministry of Education of Slovak Republic grant project VEGA No. 1/0537/16 - Methods and models of Strategic Business Performance Management and their comparison in companies and multinational corporations and also VEGA No. 1/0570/16 Mathematical modelling the specific risk of forest land management.

References

- Ardales, M. 2003. *Information Systems in the Enterprise*. Bicol University. Available in: https://www.slideshare.net/mannyardales/types-of-information-systems?next_slideshow=1
- Bansal, S., K. 2002. *Information System Management*. APH Publishing, pp. 280
- Gilaninia, et al. 2011. *Evaluation of Effective Factors to Improve Productivity Transport System in Domestic Manufacturing Companies*, Kuwait Chapter of Arabian Journal of Business and Management Review, Vol. 1, No.5; p. 55-65.
- Kozel et al. 2006. *Moderní marketingový výzkum*. Grada Publishing, a.s. pp. 280
- Levy M., Powell P. 2005. *Strategies for Growth in SMEs*, Butterworth Heinemann, Oxford, England.

- Levy M., Powell P., Yetton, P. 2002. *The Dynamics of SME Information Systems*, Small Business Economics, 19, p. 341-354.
- Malekian, A. H. 2010. *What is Information and Communication technology?*, Available in: <http://ict-qom.blogfa.com/post-3.aspx>
- Parker, C.M., Castleman, T. 2007. *New directions for research on SME e-Business*, Journal of Information Systems and Small Business 1(2-2), p. 21–40
- Powell, P., Levy, M., Duhan, S. 2001. *Information System Strategies in Knowledge-Based SMEs*, European Journal of Information Systems, 10, p. 25-40.
- Rajnoha, R., Lesníková, P. 2016. *Strategic performance management system and corporate sustainability concept - specific parameters in Slovak enterprises*. In: Journal of competitiveness. p. 107 - 124.
- Rezvani, M., Gilaninia, Sh., Mousavian, S.J. 2011. *Strategic Planning: A Tool for Managing Organizations in Competitive Environments*, Australian Journal of Basic and Applied Sciences, 5(9): p. 1537-1546.
- Sedliačiková, M., Hajdúchová, I., Krištofik, P., Vízslai, I., Gaff, M. 2016 *Improving the performance of small and medium wood-processing enterprises*. In: BioResources. Vol. 11, No. 1, p. 439 - 450.
- Valkokari, K., Helander, N. 2007. *Knowledge Management in different types of strategic SME network*, Management Research News, Vol. 30, No. 7, p. 597-608.

GENERAL PROCESS OF IMPLEMENTATION OF HUMAN RESOURCE OUTSOURCING IN SME'S COMPANIES

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ABSTRACT

The use of outsourcing principles is nowadays a common approach for every manager in business management. Successful use of outsourcing can bring benefits in terms of orientation on core activities, cost savings and improving the quality of outsourcing activities. Risks in the form of hidden costs, potential dependence on the service provider, or failure to comply with contractual terms can be eliminated in the process of preparing the service level agreement. The article deals with the use of human resources outsourcing in the conditions of SME'S companies at the woodworking industry in Slovakia. Its aim is to inform about the basic results of research on the use of outsourcing and to present a proposal for a general process of implementation of human resources outsourcing in practice.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: Outsourcing, Human resource outsourcing, SME'S.

1. INTRODUCTION

Outsourcing is the modern trend in management of companies which offer the possibility of cost saving and increase of efficiency by concentrating on core business, provides of the availability a new knowledge's and use of technology from provider of outsourcing contract. For many companies that don't have the time or the resources to manage many kinds of human resources functions, HR outsourcing is a cost-effective alternative solution of this business area.

Outsourcing as a concept comes from the American economic life and represents a combination of the words - *outside*, *resource* (s) and *using* to the one artificial word. Kakabadse and Kakabadse (2005) say that the one of the first example of outsourcing can be observed in the Antic Rome, where the process of tax-collection was outsourced. According to Hirschheim et al. (2006) the concept of outsourcing (as an agreement with the external entity for providing of goods or services) is being here for centuries. Outsourcing is not a new concept and we can find its origin in the sub-contracting of production activities. According to Corbett (2004), outsourcing was first used in the 1970s by manufacturing executives and it has been gradually adopted since then by the executives in just about every other business function. Jyoti et al. (2015) state that, to sustain in the current environment and for successful, the organizations consider outsourcing as an important strategy of the organization, which helps in improving performance by reducing costs, creating new products and services, enhancing quality and productivity (Nayak *et al.* 2007). As a state Liu and Tyagi (2017) in their study, a key economic benefit of outsourcing mentioned prominently by both sellers and buyers of this practice is that it allows the outsourcing firm to reduce its fixed cost and convert it into variable cost (Kremic, Tukel, Rom, 2006). Specifically, the outsourcing firm can avoid a significant part of the fixed costs of facilities, equipment, information technology, rents, personnel salary, insurance, and logistic and overhead expenses. These reductions in fixed costs are replaced with increases in variable costs in the form of purchasing prices that the outsourcing firm must pay the outside industry.

Outsourcing is an effective form of outreach business management, which aims to provide relevant, cost-effective services to support the main business activities (core business) and allow them

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to optimize. As follow from several studies Potkány et al. (2016), Stachová and Stacho (2013), Vlacseková and Mura (2017), Simanová and Gejdoš (2015), Marcinekova and Sujová (2015) at present, marked by the financial crisis, is the application of outsourcing most current because it provides savings and optimization of operating costs promotes increased employee performance and thus contributes to increase the profitability of the enterprise. Most common form of use outsourcing services is their utilization by outsourcing principles. The primary motivation for using an outsourcing is certainly the ambition of reducing total cost level. The decision making process, whether ensure the processes “in house” or entrust them to the hands of external operators is already applied for several decades. The model “make or buy” is from the view of cost a useful tool and businesses actuate it routinely. On the other hands, as outsourcing is evolutionally developing, companies should review the impact of “make or buy” tools in question the decision of outsourcing. Make a decision for outsourcing sorely based on costs is in modern environment wrong. Spotts (2006) notes that the outsourcing relationships became over time more complex and therefore companies need to rethink their “core” competency and the model “make or buy ignores the strategic dimension of outsourcing.

A number of academic papers and a vast number of industry publications make the point that outsourcing allows a firm to save costs and to focus on its core competencies (e.g., Arnold, 2000; Laarhoven, Berglund, Peters, 2000). Qu and Brocklehurst (2004) highlight the trade-off of outsourcing benefits against the increased coordination and transaction costs. Although it is believed that outsourcing arose from the IT sector, according to Blumberg (1998), any activity can become the subject of this practice. Outsourcing covers many types of activity, which the literature tends to analyse in three groups: information technology, business processes, and manufacturing. The outsourcing of business processes covers certain activities that we repreviusly carried out within the company being taken on by an external company. Halvey, Murphy, Melby (2007) identify seven activities in this area. According to the authors, these cover all tasks that can be attributed to this type of outsourcing, namely:

1 Finance and accounting;	2 Investment and capital management;
3 Human resources;	4 Purchases;
5 Logistics;	6 Real-estate management;
7 Other areas (energy services, customer-management services, e-mail delivery and food supplies).	

Various types and levels of manufacturing and service outsourcing presented figure 1 according to Žitkienė and Blusytė (2015).

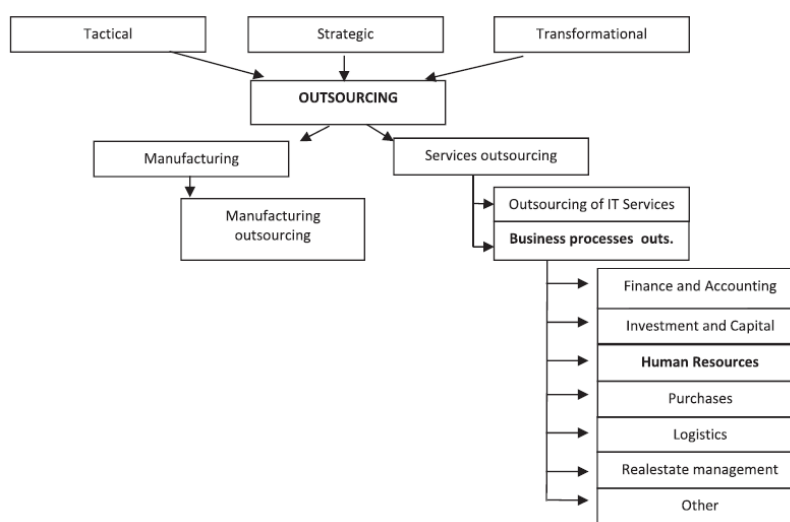


Figure 1 Outsourcing levels and types of activity

Source: Žitkienė and Blusytė, 2015

One type of the most common outsourcing activity is human-resource outsourcing (HRO). Although this has been used by organisations for about 50years, its practical application is growing all the time. Human-resource outsourcing, as a part of business-process outsourcing, includes all activities

related to human resources, starting with hiring and ending with the payroll and other benefits (Halvey, Murphy Melby, 2007). In the opinion of Bakanauskienė and Brasaitė (2011), HRO can be complete or partial. Under full HRO, responsibility for all HR functions is transferred to a group of people outside the organisation—leading to a comprehensive and fully fledged succession. Partial outsourcing can occur in two ways: one or a few HR management activities can be permanently outsourced – as with complete outsourcing, but for a limited number of functions; or single HR management activities or parts of them can be outsourced for a short period of time for one-off external operation. This means that the company can decide whether to manage its human resources itself or transmit them to the external entity. The organisation also decides how much to participate in the management of delegated activities. The literature indicates no clear agreement as to which HR activity should be outsourced because what constitutes a core or noncore activity is subject to the judgement of individual organisations (Gilley & Rasheed, 2000). Accordingly, the HR functions outsourced might differ across different countries due to varying degree of HRO maturity characterised by different needs (Siew-Chen, Seow-Voon, 2015). Today, outsourcing is used primarily as a tool of strategic business management. Priority task of outsourcing is been becoming the providing and increasing of the quality level of performing activities and cost savings to pay the attention to core business. Companies frequently point to the cost savings for labour and training, but also cite the benefits of releasing corporate resources for alternative uses and allowing corporate resources for alternative uses and allowing the business to focus on its core competencies.

The main aim of this article is to present a proposal for a general process of implementation of human resources outsourcing in the conditions of small and medium-sized companies, by its specification on the several steps.

2. MATERIAL AND METHODS

Small and medium sized enterprises (SMEs) are crucial not only for the Slovak economy. Their sustainable growth is important for the economy of the most European countries. SMEs are crucial to competitiveness and productivity; they seem to be better fit for survival and may even thrive in a changing and integrated environment. Small and medium-sized enterprises (SMEs) are defined in the EU recommendation 2003/361. Úradníček and Zimková (2009) and Hajduchova et al. (2016) wrote that SMEs division depends on the size of the national economy and on the branches of the national economy they belong to. The main factors determining whether a company is an SME are the number of employees and either turnover or balance sheet total (Satanová, Krajcirova, 2012). Small businesses have a number of specific market, financial, location, organizational and technological characteristics that define their operational and strategic behaviours, separate from large entities (Lorincová et.al, 2016). This separateness is due to other, weaker market position in relation to large enterprises, their greater vulnerability to changes in the environment, the need for more rapid adaptation to changing external conditions, or to other objectives structure and motives of an activity, which reflects the personal characteristics of the company's owner/manager. Lorincová, Schmidtová and Javorčíková (2016) and also Teplická et al. (2012) writes that, limitations in the operation of small and medium-sized enterprises define the role of the state, which should promote actively the conditions for the functioning of the SMEs sector. According to data of the Statistical Office of the SR, 531,729 active business entities were registered in Slovakia in 2015, of which 531,063 were small and medium-sized enterprises. Of the total number of active business entities, 96.9% of micro-enterprises (515,236), 2.4% (12,984) of small enterprises and 0.5% (2,843) of medium-sized enterprises. The share of large enterprises was 0.1% (666). As our survey was focused on the wood-processing industry, we used the comparison of the Slovak Association of Wood Processors. Based on data of the Slovak Association of Wood Processors, there are more than 7,000 wood-processing companies, with revenues of about 700,000 thousand EUR (SAWP 2017).

Through the research which was done as a combination of a questionnaire and personal interviews, at the years 2015-2016, we wanted to get responses to questions which characterize basic areas of outsourcing in selected wood processing companies in Slovakia. Our aim was to map the current situation in areas utilizing outsourcing and to find out potential opportunities, interest and barriers of practical utilization of outsourcing in a company practice of wood processing companies in Slovakia. The basic set of the research was represented by SMEs at wood processing industry located

in Slovakia. Due to the large size of the basic set it was not possible to include all the small and medium enterprises in this research, and it was also the reason for using sampling through survey data. In the aim of establishing the basic set of the research sample, a deliberate choice based on the criteria defined by the directive EK No 2003/361/EC was done. For the purpose of collecting useful data for the research, a random sampling of 80 small and medium size manufacturing enterprises from the sector of wood processing industry. The empirical research was specifically targeted to find the current level of outsourcing use. Determination of the scope of the sample set resulted from the following relation (Sheer, 2007):

$$n = \frac{z_{\alpha/2}^2 \cdot p(1-p)}{\Delta_p^2} \quad (1)$$

- n is scope of sample set,
- $z_{\alpha/2}$ are values of standard random quantity from (reliability specified at the level of 95%, i.e. that the value $\alpha = 0.05$ corresponds to $z = 1.96$),
- Δp is required exactness, error of estimation (determined at 5.65%),
- p is ratio (relative frequency) quality sign in the basic set (50%).

For the valuation of statistical reliance of individual questions correlation analysis was used. Correlation means the linear dependence between random variables. Statistical dependence is the correlation coefficient in the case of linear dependence between the variables degree of tightness. This coefficient takes its values in interval $(-1,1)$. Pearson correlation coefficient (r) can be determined by variables x (y) and s_x , s_y standard deviations of variables x (y) Rimarčík (2007):

$$r = \frac{\overline{xy} - \bar{x}\bar{y}}{s_x s_y} \quad (2)$$

According to Cohen correlation is trivial under 0.1, from 0.1 to 0.3 correlation is small, from 0.3 to 0.5 correlation is medium and over 0.5 correlations is large. Correlation from 0.7 to 0.9 is very large and then is almost perfect.

3. RESULTS AND DISCUSSION

The actual scope of the sample set was at the level of 71 businesses due to the fact that 47% of the questionnaires were returned. Despite the reduced scope of the sample set the real scope of the sample set may be considered representative.

As the primary goal of the task the response to the question “*To which rate and in what areas is outsourcing utilized in companies of wood processing industry in Slovakia and what are preferred reasons of its utilization?*” may be determined. This way defined goal is quite wide and that is why it was necessary to divide the research into several partial questions. Since we made an effort we succeeded to summarise 49 completed questionnaires which present about 34% return. Representation of individual companies which were willing to provide information for the research in a structure of classification due to company regional location and due to the size of companies. This classification is presented at the table 1.

Table 1 Structure of database of presented research enterprises

Size/ Region	Micro enterprises	Small enterprises	Medium-size enterprises	Total
West	8	8	7	23
Middle	10	12	11	33
East	4	5	6	15
Total	22	25	24	71

Source: own study

Questions in questionnaire were aimed for identification: the region covered by the company, marked as a question A), sizes of the company (B), the use of HRO (C), reasons of use/non-use of outsourcing (D/E), assessment potential of economic efficiency of outsourcing use (F) and interest in the use of outsourcing services in the future (G). All of questions in questionnaire were compared each

other through correlation analysis of pairs and then the correlation dependence was expressed. Table 2 presents the correlation matrix of the individual questions with expression of its levels depending.

Table 2 Correlation matrix of the individual questions of questionnaire

	A	B	C	D	E	F	G
A	-	0,09	0,33	0,21	0,37	0,12	0,16
B	trivial	-	0,28	0,39	0,13	0,16	0,14
C	medium	small	-	0,77	-0,58	0,04	0,42
D	small	medium	very large	-	-0,60	0,19	0,56
E	medium	small	large	large	-	0,07	0,53
F	small	small	trivial	small	trivial	-	0,08
G	small	small	medium	large	large	trivial	-

- A Region

- B Size of enterprises

-C Outsourcing use in HRO

-D Reason for use of outsourcing

-E Reason for rest of outsourcing

-F Evaluation of economy efficiency of outsourcing use

-G Interest in using of outsourcing

Source: own study

The paper includes only partial results of the mentioned survey. It is mainly the area of outsourcing and the potential use of human resource outsourcing. Based on the conducted research, it was found that 53.5% of questioned enterprises do not use any form of outsourcing for managing the company processes. Outsourcing is therefore used mainly in SMEs (table 3). Outsourcing is used mainly in the fields of administration activities, care and maintenance of IS /IT and buildings (facility management), economy and low consulting, educational and training activities, marketing and transport services.

Table 3. Structure of SMEs in presented research paper

SMEs	Micro	Small	Medium-size
Using of any form of outsourcing services	22 (30.99%)	25 (35.21 %)	24 (33.80 %)
	yes 4 (18.18 %)	yes 11 (44.00%)	yes 15 (62.50%)
	no 18 (81.82%)	no 14 (56.00%)	no 9 (37.50%)

Source: own study

According to Amadeo (2016) human resources outsourcing is when businesses hire companies to manage personnel functions. That includes administration of health benefits plans, retirement plans, and workers' compensation insurance. It also includes hiring, training, and legal expertise. Smaller companies hire them to administer payroll, pay employment taxes, and manage risk. In fact, the average size of a company that uses HR outsourcing is 19 employees. According to the survey result HRO (Figure 4) is used only in medium-size enterprises and small enterprises. In micro enterprises, this form of outsourcing is unused. In summary, we can state that the use of HRO in small and medium enterprises of woodworking industry in Slovakia is at a very low level.

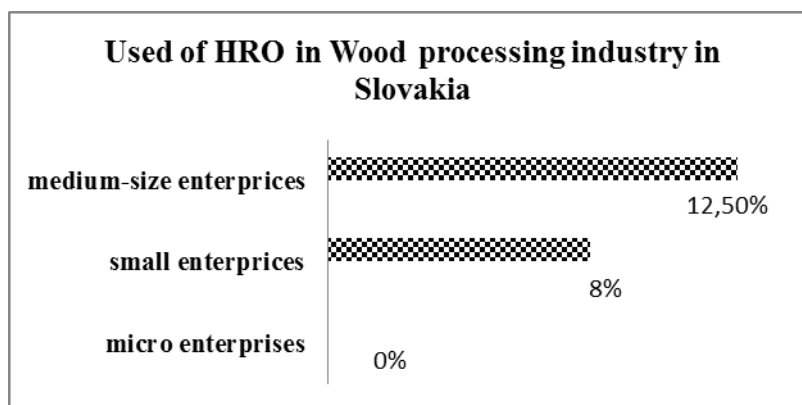


Figure 2 Used of human resource outsourcing in Wood processing industry in Slovakia

Source: own study

4. PROPOSAL OF THE GENERAL MODEL FOR THE IMPLEMENTATION OF HRO

The basic prerequisite for outsourcing is optimization of business costs for their administering and improving the quality of services delivered. To implement the human resource outsourcing in the organization it is necessary to prepare a high-quality project of its ensuring. The general model (design) of applications of outsourcing is very difficult to present because it is influenced by many factors, such as the specific features of the company (industry, size, region, organizational structure, experience of some form of outsourcing), the nature of the outsourced activities, the timetable for the implementation, financial budget and type of outsourcing relationship. In spite of it, there are attempts to define certain phases of outsourcing theoretically. The general application process of HRO can be defined in several phases:

- *Analysis of the areas identified for HRO, - Definition of requirements for the supplier,*
- *Selecting an outsourcing provider, -Terms and conditions for setting of outsourcing relationship,*
- *Management of the transition phase of outsourcing relationship.*

The overall implementation time of outsourcing greatly depends on many factors while the time horizon of implementation is estimated from a few months to one year.

4.1 Analysis of the areas identified for human resource outsourcing

The aim of this stage is to analyze the areas of organizations with potential to be outsourced with the calculation of potential benefits in the reduction or cost savings. Based on the analysis of the functional areas, a company must answer a few questions:

- Which areas related to the human resources would be appropriate to outsource?
- Outsourcing of which area will be of the highest benefit?
- What will be the potential cost savings resulting from the use of outsourcing services?
- It is appropriate to use the services of one supplier or more service suppliers?

The critical question of this phase, which greatly affects the decision-making of the enterprise, is to identify potential cost savings and other benefits arising from the use of outsourcing services. It cannot be presented in this contribution. The complex is presented in the *Potkány et al. (2016)*.

4.2 Definition of Requirements for the Supplier

Based on the results of the previous phase, it is necessary to define basic requirements for the supplier(s) of outsourcing services, whereby it is recommended not to focus on specific results but to identify the type of outsourcing relationship and definition of responsibilities for services rendered. Definition of requirements should include:

- detailed specification of the range and quality of delivered services,
- method of technology and information exchange in connection with outsourcings relationship (acknowledgment and acceptance of services),
- definition of liability (in the form of insurance guarantees determining the extent of coverage),
- qualification requirements and the size of the supplier with proof of ownership of resources to provide services: licenses (certificates, certificates serving as permit the implementation of the activity or as proof of their quality), references (list of organizations using the services provider who predicate of the ability to provide services).

4.3 Selecting an Outsourcing Provider

Selection of the contractor to ensure the assigned area (therefore outsourcing provider), is based on the assessment of criteria set out in the previous stage. However, the bid for outsourced activities designated by the supplier is taken particularly into account - its financial stability, number and expertise of employees, licenses, certificates, licenses, references and guarantees the contractor. Own choice of an outsourcing provider can take different forms and most often takes the form: public tender, tendering or direct addressing of recommended suppliers. When evaluating potential suppliers it is recommended to compile an Evaluation Commission (with internal staff of organization involved in the future cooperation but also with external evaluators) and use of multicriteria decision-making with more preference points or weighted point method with the assessment of the criteria scoring system based on defined criteria such as scale from 1 to 10.

4.4 Terms and Conditions for Setting the Outsourcing Relationship

In any relationship there must be conditions according to which this relationship is functional, therefore, negotiations about the outsourcing relationship is an inseparable part of the application process of outsourcing. Outsourcing contract is for a certain period and it is possible that, according to its content, the outsourcing relationship may continue for several years. The contract must be drawn up and written to describe the plan how the relationship will be managed.

In practice, there is no outsourcing contract type, because every relationship is different. When creating a contract, it can be inspired by a so-called checklist contract about outsourcing. Outsourcing contract of a specific type should contain at least the following points (Rydvalová, Rydval, 2007):

- Definition of the Parties: the definition of customer service and its supplier,
- Subject of the contract: the essence is the determination and specification of services being provided within the outsourcing process with the possibility of defining their level of quality and specific outcomes,
- The clause on transfer of responsibility: the transfer of responsibility for services performed for the contractor with the possibility of defining the fines and compensation for damages,
- Life of the contract: determining the time horizon of the contract (minimum time is recommended for two or for three years) and how to change the contents of the contract,
- Mode of termination of the contractual relationship: there are several options such as early termination of the contract, withdrawal, cancellation of the agreement (in each case, defining the reasons and notice period).

4.5 Management of the Transition Phase of Outsourcing Relationship

The project of human resource outsourcing is not finished with selecting the provider (s) and with the conclusion of an outsourcing relationship contract but it continues in a so-called transition phase. Based on the takeover documentation, the service provider takes over operation of HRO services and become the legitimate executor. The transition phase is actually a process of transformation when a selected area is replaced by an external service which often leads to restructuring of business processes and also to a change in the organizational structure of the enterprise. The incorporation of outsourced services to the restructured business processes should be closely monitored and evaluated. It is recommended to create a working position in the enterprise that would be responsible for relationship management, evaluation, and solving of any emerging problems and the preparation of business administration (the so-called outsourcing manager).

5. CONCLUSION

A lot of companies are constantly challenging the possibilities of potential savings on operation costs in the current turbulent times. Companies are considering the use of principles of outsourcing to find the savings. The globalization and increasingly complex forms of business environment led to increasing interest in the use of outsourcing services. It should be emphasized that outsourcing is the way to implement the strategy. Therefore a company with a wrong strategy may have problems in the future, despite the use of various forms of outsourcing.

The article deals with the use of human resources outsourcing in the conditions of SME'S companies at the woodworking industry in Slovakia. Its aim is to inform about the basic results of research on the use of outsourcing and to present a proposal for a general process of implementation of human resources outsourcing in practice of SME'S companies.

Acknowledgements

The paper is a partial result of the grant scientific project VEGA No.1/0320/17 Economic and Social Context of European 20/20/20 Targets from the Viewpoint of Economy Low-energy Houses

References

Kakabadse A., Kakabadse N. 2005. Outsourcing: Current and Future Trends. *Thunderbird International Business Review*. 47, pp. 183-204.

- Hirschheim R.A., Heinzl A., Dibbern J. 2006. *Information Systems Outsourcing: Enduring Themes. New Perspectives and Global Challenges*. Berlin: Springer.
- Corbett, M., F. 2004. *The Outsourcing Revolution: Why It Makes Sense and How to Do It Right*. Cicago: Dearborn Trade Publishing.
- Nayak, J., Sinha, K.G., & Guin, K.K. 2007. The determinants and impact of outsourcing on small and medium enterprises- an empirical study. *IIMB Management Review*, 19 (3), pp. 277-284.
- Jyoti, J., Arora, H., Kour, S. 2015. *Outsourcing and Organizational Performance: Role of Cost Leadership, Differentiation and Innovation Strategies. Sustainable Competitive Advantage: A Road to Success*. Excel India Publishers.
- Liu, Y. Tyagi, R. K. 2017. Outsourcing to convert fixed costs into variable costs: A competitive analysis. *International Journal of Research in Marketing*. 34 (2017), pp. 252–264.
- Potkány, M., Stasiak-Betlejewska, R., Kováč, R., Gejdoš, M. 2016. Outsourcing in contidions of SMEs – The potential for cost savings. *Polish Journal of Management Studies*.13 (1), pp. 145-156. ISSN 2081-7452.
- Hitka, M., Vetráková, M., Balážová, Ž., Danihelová, Z. 2016. *The impact of facility management on corporate culture*. Conference, BEM 2015, Zvolen 2015.
- Stachová, K., Stacho, Z. 2013. Employee allocation in Slovak companies. *Business: Theory and Practice*, 14 (4), pp. 332 – 336.
- Vlaseková, D., Mura, L. 2017. Effect of motivational tools on employee satisfaction in small and medium enterprises. *Oeconomia Copernicana*, 8 (1), pp. 111-130. ISSN 2083-1277.
- Spotts, H. E. 2006. *Revolution in Marketing: Marketing Driving Changes*. New York: Springer, 2011. 274 p. ISBN 978-3-319-11761-4.
- Simanová, Ľ., Gejdoš, P. 2015. *The use of statistical quality control tools to quality improving in the furniture business*. Procedia - Economics and Finance. Vol. 34 (2015), pp. 276-283. ISSN 2212-5671.
- Marcinek, K., Sujová, A. 2015. *The influence of the process control level on the enterprises' ROE*. In Procedia - economics and finance, vol. 34 (2015), pp. 290-295. ISSN 2212-5671.
- Arnold, U. 2000. New dimensions of outsourcing: A combination of transaction cost economics and the core competencies concept. *European Journal of Purchasing & Supply Management*, 6(1), pp. 23–29.
- Laarhoven, P.V., Berglund, M., & Peters, M. 2000. Third-party logistics in Europe—Five years later. *International Journal of Physical Distribution and Logistics Management*, 30 (5), pp. 425–442.
- Qu, Z., & Brocklehurst, M. 2004. What will it take for China to become a competitive force in offshore outsourcing? An analysis of the role of transaction costs in supplier selection. *Journal of Information Technology*, 18(1), pp. 53–67.
- Blumberg, D. F. 1998. Strategic assessment of outsourcing and downsizing in the service market. *Managing Service Quality*, 8 (1), pp. 5–18.
- Halvey, J. K., & Murph yMelby, B. 2007. *Business process outsourcing: Process, strategies, and contracts*. New Jersey: John Wiley&Sons.
- Žitkienė, R., Blusytė, U. 2015. The management model for human-resource outsourcing among service companies. *Intellectual Economics*, 9 (2015), pp. 80–89.
- Bakanauskienė, I., Brasaitė, D. 2011. *Personalo valdymo funkcijosiškeldinimo galimyb'es Lietuvoje*. pp. 21–31. Organizacijų vadyba: Sisteminiai tyrimai 57.
- Gilley, K. M., & Rasheed, A. 2000. Making more by doing less: an analysis of outsourcing and its effects on firm performance. *Journal of Management*, 26(4), pp. 763 – 790.
- Siew-Chen, S., Seow-Voon Y. 2016. *Exploring Human Resource Outsourcing Trends in Malaysia*. Procedia Social and Behavioral Sciences, 224 (2016), pp.491 – 498.
- Úradníček, V., Zimková, E. 2009. *Synchronisation of business Cycles-Cross Country Analyses*, AMSE (2009), pp. 439-446.
- Hajduchová, I., Sedliacikova, M., Halaj, D., Kristofik,P., Musa, H., Vízslai, I. 2016. The Slovakian Forest-Based Sector in the Context of Globalization. *Bioresources*. 12 (3), pp. 5155-5173
- Satanova, A, Krajcirova, L. 2012. Application of Accounting and Reporting in a Cost-Oriented Quality Management in Wood-Processing Companies. *Drvna Industrija*, 63 (4), pp: 283-289
- Lorincová, S., Hitka, M., Čambál, M., Szabó, P., Javorčíková, J. 2016. Motivational Factors Influencing Senior Managers in the Forestry and Wood-Processing Sector in Slovakia. *BioResources*, 11(4), 10339-10348. DOI: 10.15376/biores.11.4.10339-10348.
- Lorincová, S., Schmidtová, J., Javorčíková, J. 2016. Employee Job Satisfaction in Furniture Manufacturing Companies in the Slovak Republic. *Drvna Industrija*, 67(4), pp. 351-362. DOI: 10.5552/drind.2016.1614.
- Teplická, K., Culková, K., Manova, E. 2012. Using of operation analysis models in selected industrial firm. *Acta montanistica Slovaka*, 17 (3), pp: 151-157
- SAWP. 2017. *Sections of Associaton, Slovak Association of Wood Processors*. [online]. [Accessed September 12, 2017]. Available: <http://www.zsdsr.sk/>
- Sheer, L. 2007. *Biometria*. Zvolen: Technical University in Zvolen
- Rimarčík, M. 2007. *HRO: Effect on Economy*. [Online]. US Economy: [Accessed September 12, 2017]. Available: <https://www.thebalance.com/human-resources-outsourcing-effect-on-economy-3306256>
- Rydvalová, P., Rydval, J. 2007. *Outsourcing ve firmě*. Brno: Computer Press, 2007. ISBN 979-80-251-1870-8.

SELECTED ASPECTS OF CORPORATE SUSTAINABILITY FROM THE INVESTING AND REPORTING POINT OF VIEW

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ABSTRACT

Corporate sustainability concept has constantly represented a challenge for business community not only in terms of gaining competitive advantage but also in terms of potential cost reduction and improvement of the corporate environmental performance. However, enterprises perceive many barriers, but also benefits from its application in practice. From these aspects, the attitude of companies in relation to investments in the environmental and social area can also be observed. The aim of the paper is to evaluate the extent to which enterprises in the Slovak Republic deal with the influences in the particular areas of the concept and what influence has the priority given to the corporate sustainability on the above mentioned facts. The objective is also to assess the issue of corporate investing from the point of view of motivation and barrier. We have determined hypotheses that have been subjected to analyse through selected statistical tests. In the end of the paper we bring our findings.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: Corporate sustainability; Investing; Reporting; Motive; Barrier.

1. INTRODUCTION

In general, the main purpose of entrepreneurship is to achieve a profit and its maximization. However, due to several factors, e.g. an excessive environmental pollution, corporate behavior towards communities have led that the company also focuses on the environmental and social consequences of its activities alongside to the main objective (Elkington, 1998 In Baumgartner, Ebner, 2008). This was mainly due to the current situation which is marked by environmental burden, high social tensions and increased pressures on stakeholder interests. For this reason, some authors (Závadský et al., 2011, p. 42; Sakál et al., 2013, p. 116) mention as the primary objective of the enterprise the survival and sustainable development. This concept is based on the sustainability of the balance of the natural system and society, and it is understood primarily as a focus on stable and long-term business performance. It means that corporate sustainability incorporates the objectives of sustainable development - economic efficiency, social equity and environmental performance into operational practices of the company (Labuschagne, Brent, van Erck, 2007), which we consider to be key in business issue. According to Eccles et al. (2017) firms that largely correspond to the traditional model of corporate profit maximization, these "low sustainability" firms predominantly regard to social and environmental issues as externalities. On contrary, the "high sustainability" firms are looking ahead. It means that these firms have a distinct mechanism to directly involve the sustainability issues and objectives, a place on more emphasis to the stakeholder engagement, nonfinancial measures including employees, external environmental and social standards, and so on.

Although the corporate sustainability concept presents a global trend, many enterprises have still perceived a several existing barriers. As can be seen from McKinsey's research, most enterprises struggle with the pressure to achieve a short-term profit before achieving a long term value creation. Other barriers include a lack of incentives to carry out to sustainability activities, a misuse of key sustainability indicators, insufficient support from the current organizational structure, a lack of data and information to implement sustainable initiatives. In some enterprises, another problem is too low priority to sustainability issues of the business management, or enterprise has a lack of proper capacities or skills (Bonini, 2012). Grayson et al. (2008) as the basic barrier to the implementation of the Tripple Bottom Line approach (economic, environmental, and social pillar) consider an

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unclearness of the concept in the sense of change to be better. Problem areas are also seen in leadership negligence, involvement of stakeholders, or integrating sustainability into corporate goals and strategies. From the macroeconomic point of view, the main barriers include a lack of information and low public awareness of sustainable development, unfavourable economic situation, low political support, a lack of support for sustainable development in the media, inadequate legislation. To overcome these barriers, it is necessary to provide relevant information, raise awareness, increase political will to its implementation, improve legislation (better laws, regulate, etc.) and increase the key role of competent authorities (Society for Sustainable Life, 2003).

Many, especially, foreign enterprises have adopted a sustainable business practices, but there are still some doubts about the benefits of concept implementation. From the view of business objectives, it is clear that the business sphere will adopt the corporate sustainability concept if it is aware mainly the economic benefits of a gentle approach to the environment and if the respect of the principles of social responsibility contributes to the economic prosperity of the enterprise (Hyršlová, 2009, p. 10). On the other hand, promoting sustainable-related activities also means the increasing costs. An example could be the procurement of environmentally friendly equipment, implementation of stricter quality controls, new health programs, safety and environmental programs and so on. Reporting also includes costs associated with data collection, communication, and auditing. In fact, the costs will in principle be spent immediately; the benefits will be reflected in a longer time horizon (Lourenço et al., 2011). However, the active involvement of top management in the sustainable development policy has many advantages. It is precisely the organizational unit that determines the overall priorities, vision of sustainable development and defines the profile for the employees and the whole enterprise (UNEP, 2004). Enterprises which not only identify the key values, but also clearly define economic, environmental and social priorities, integrate them into the corporate strategy and culture and also communicated with all employees can gain a competitive advantage by just proactively managing enterprise performance (Székely, Knirsch, 2005). Moreover another key aspect of the governance process inside companies in relation to sustainability issue is the measurement and disclosure of important metrics and information (Ioannou, Serafeim, 2017).

There are many researches dealing with the areas of corporate sustainability. For example, the United Kingdom government has a vision for this type of businesses – which consider the economic, social and environmental impacts of their activities and believes that better understanding of the potential benefits of sustainability for the competitiveness of companies can lead to enormous returns on investment. These authors came to the finding that firms should not look at investments to the sustainability as only a costs but the essential for their survival in still increasingly competitive business world (Samy, Odemillin, Bampton, 2010). Authors Unruh et al. (2016) claim that a growing number of investors are nowadays pay attention to environmental, social and governance performance, as evidence that sustainability-related activities are substantial to the financial success of a company over time. Hroncová and Hronec (2017) researched dependence between the number of environmentally oriented companies and spending on environmental protection (from the private and public sectors) in EU countries. This presents a direct impact of the environmental strategy of a company. Within the social area authors Lorincová, Hitka, Balážová (2016) research the perception of corporate culture which is the base of social part of corporate sustainability concept. Based on results, employees of the medium-sized enterprises as well as large enterprises in Slovakia would prefer clan culture, in which organisation puts emphasis on long-term contribution of human resource development, ethics and coherence.

2. MATERIAL AND METHODS

In this paper we focused on evaluation the extent to which enterprises with a vision of sustainable development deal with the influence of the particular areas of the concept, and what impact has attributed priority of the sustainability concept to the measurement and reporting. The objective was also to assess the investing of enterprise to the sustainability areas from the point of view of motivation and barrier of implementation in practice.

2.1 Used Material and Research Methods

Within the processing the paper we used secondary and also primary data sources. These sources represent domestic and foreign research reports, surveys, and data from the Statistical Office of the Slovak Republic.

We examined the issue of corporate sustainability in relation to determination, measurement, reporting and investment through a survey conducted in 2015. In the survey we focused primarily on enterprises of industrial sphere. We will focus primarily on enterprises from those industries that affect human health and the environment to a greater extent with exception of the food, tobacco, and textile industry.

We obtained the basic database of enterprises from the Statistical Office of the Slovak Republic. After selection on the basis of the selected criteria, we acquired the database of enterprises in the number of 2 793. Some of them we were unable to obtain. Thus, 2 125 enterprises were addressed. Overall, we have gained them and we were able to analyse 455 completed questionnaires.

The population was made up of small, medium-sized and large enterprises operating in selected industries. We took into account the experience of some authors (Bussard, et al. 2005), and we have decided to exclude micro-enterprises from the survey because the micro-enterprises appeared too weak (financially, organizationally) to devote themselves to the concept. We proceeded without limitation in the ownership structure of the enterprises.

The questionnaire was primarily focused on analysing the influences of environmental and social areas, and we investigated the determination, measurement and reporting in these areas. We have also focused on the relationship between these influences and the attributed priority of the concept, as well as on the relationship between the most convincing motive (barrier) of the application in practice and the investment rate.

2.2 Research Hypothesis

After the goal setting phase, we came up with the setting some hypotheses. We have formulated the following hypotheses which are illustrated in Table 1.

Table 1 Description of formulated hypothesis

Hypothesis	Description
First hypothesis:	Enterprises with a vision of sustainable development deal with the influence of individual areas of sustainable development (more measured and reported).
Second hypothesis:	Priority attributed to the corporate sustainability concept has an impact on identifying and reporting the influences of environmental and social area.
Third hypothesis:	Companies with the motive of operational efficiency improvement invest more percentage of profit to the environmental activities.
Fourth hypothesis:	Companies with a barrier of lack of motivator to sustainability actions invest less percentage of profit to the social activities.

Source: Own

At the beginning of data processing we cleaned and filtered data set as needed. We excluded from dataset the cases with missing response or the responses "I do not know". By this way we reduced the sample size of 455 in the single statistical analyses.

At first we studied our sample data by the means of descriptive statistic. The sets of data we summarised into two-way tables. We described the sample data by the observed frequencies. Case profiles we illustrated using common graphic ways of presenting data.

From the reason of categorical character of our data then we used the nonparametric means of inductive statistics. Nonparametric tests of hypotheses are concerned with nominal or ordinal levels of measurement and they are free of assumptions regarding the distribution of the population. The chi-square goodness-of-fit test is one of the most commonly used nonparametric tests. The purpose of hypothesis-testing procedure is to determine how well an observed set of data fits an expected set.

In our study we used The chi-square test in contingency table analysis to test whether or not two traits are related. H0 states that there is no relationship (no contingency) between the two traits. H1 determines that there is a relationship between the two traits. We use the .05 level of significance to test the null hypotheses. Contingency coefficient and Cramer's V are used to estimate the extent of the relationship between two variables.

3. RESULTS AND DISCUSSION

3.1 Results of descriptive statistics of corporate sustainability in relation to company vision and influences in environmental and social area

In order to corporate sustainability concept be applied in practice, it is necessary to believe in what it offers to business and to define it a certain priority. A high priority to the concept is attributed from 133 respondents (30.03%). The most enterprises (201 respondents; 45.37%) indicate a medium priority. On the other hand, 109 respondents (24.60%) attributed a lower priority and 12 respondents did not comment a priority issue.

As we mentioned above, it is important to link the company's vision and sustainability. The linking of those aspects has been declared by 175 respondents (39.15%), 26 respondents answered negatively (5.71%). Partial link was identified by 204 respondents (44.84%). Only 45 respondents did not able to answer to the question and 5 respondents expressed their attitude: the vision is processed by the foreign owner, the vision is processed within the global group.

In addition, enterprise should be aware of the social and environmental influences which could affect its business, and vice versa. Not all enterprises perform this type of analysis. Within the framework of corporate sustainability, these influences are important not only to determine, but also to measure them or to report them. Taking into account that enterprises naturally focus primarily on the economic area, we have devoted to analyse environmental and social area. In these areas the company could only monitor the influences or regularly measure or report. Only 27 respondents (5.93%) did not answer to the question. The results are shown in Table 2.

Table 2 Analyse of particular influences within areas of corporate sustainability concept (relative frequency; absolute frequency)

What does the company do with particular influences?	Not realize	Not consider	Determine	Measure	Report
Environmental area	29.4%; 126	10.0%; 43	21.0%; 90	14.7%; 63	24.9%; 107
Social area	32.7%; 140	7.9%; 34	26.9%; 115	11.9%; 51	20.6%; 88

Source: Own

From the data in Table 2 it is evident that a large number of enterprises do not still pay sufficient attention to the influences in individual areas of the concept. Moreover researched enterprises deal with the influences in environmental area more than in social area.

3.2 Results of analyses in relation to formulated hypothesis

We believe that in order to company deal of the influences in sustainability areas it is important to promote the vision of sustainable development itself as well as its priority attributed to this concept. The first hypothesis mentioned in Table 1, we decide split into the environmental area and social area. On the base of p-value (.220) the decision is to accept the null hypothesis at the .05 level. Our research does not support the theory of relation between company vision of sustainable development and focusing on influences of environmental area.

In the case of influences of social area we also accept the null hypothesis at the .05 level. There is no statistically significant relation ($p=.516$) between company vision of sustainable development and focusing on influences of social area. Figure 1 shows two-way classification of the sample data, where we present the sample results using interaction line plot of observed relative frequencies.

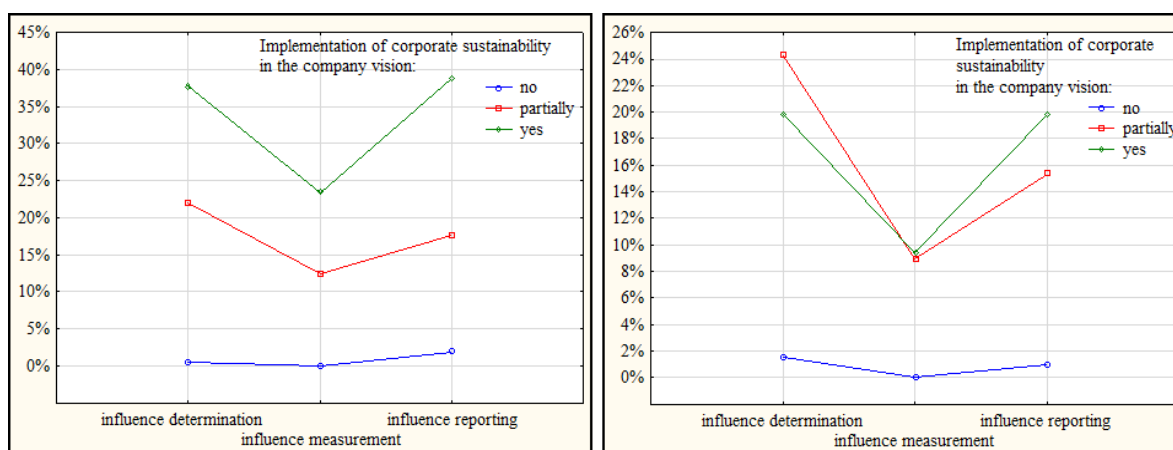


Figure 1 Interaction line plot of observed frequencies in environmental area (left) and social area (right)

Source: Software STATISTICA 12

Based on the results, we can describe only our sample set. An increasing tendency of including corporate sustainability concept to the vision, enterprises in our sample are more concerned with the determination, measurement and reporting of environmental impacts. Enterprises which have partially implemented concept in the vision, these sample companies mainly prioritize determination of environmental influences (without further measurement and reporting). In the case of social influences is situation similar with small deviations. Enterprises with a vision of sustainable development are concerned about determination and reporting of influences in social area at the same extent. Companies with a partial vision of sustainable development focus more on determining of influences than on their reporting. From these results cannot be concluded no generalisations.

Another aspect which we paid attention is issue of priority given to the corporate sustainability concept. We assume that priority attributed to the corporate sustainability concept has an impact on identifying and reporting the influences of environmental and social area. This hypothesis we again split into the two parts. The priority position we grade into three levels (high, medium, low). The data cross-classified into a contingency table are presented in Table 3. Except the observed frequencies we also list the expected (italics) and residual frequencies (italics in the brackets).

Table 3 Contingency table – environmental influences

Priority position	Not realized	Determine	Measure	Report	Not consider	Total
High priority	19 <i>28.57 (-9.57)</i>	24 <i>24.58 (-0.58)</i>	19 <i>15.67 (3.33)</i>	36 <i>26.42 (9.58)</i>	8 <i>10.75 (-2.75)</i>	106
Medium priority	37 <i>42.32 (-5.32)</i>	46 <i>36.41 (9.59)</i>	22 <i>23.21 (-1.21)</i>	39 <i>39.14 (-0.14)</i>	13 <i>15.93 (-2.93)</i>	157
Low priority	37 <i>22.10 (14.90)</i>	10 <i>19.10 (-9.01)</i>	10 <i>12.12 (-2.12)</i>	11 <i>20.44 (-9.44)</i>	14 <i>8.32 (5.68)</i>	82
Total	93	80	51	86	35	345

Source: Own

Results of contingency table analysis related to second hypothesis (the environmental influences) are presented in Table 3. There is sufficient sample evidence ($p=.000$) to reject H_0 . This hypothesis test indicates that the priority position of corporate sustainability concept and focusing on influences of environmental area within the concept are dependent traits. Contingency coefficient (.30) or Cramer's V (.22) inform about weak relationship (Table 4). The biggest residual frequencies (Table 3 bold italics in the brackets) indicate that companies with high priority attributed to the corporate sustainability concept are focused mainly to reporting environmental influences. We consider this fact as adequate because we understand reporting as the highest last phase of the evaluation of the individual influence of the concept. Conversely, companies with low priority do not make any assessment of these impacts.

Table 4 Results of the contingency table analysis

Statistics	Chi-square	df	p-level
Pearson Chi-square test	34.82	8	P=.000
Contingency coefficient	.30		
Cramér V	.22		

Source: Own

From the perspective of social area of corporate sustainability concept, the counts for next analysis are given in the following Table 5.

Table 5 Contingency table – social influences

Priority position	Not realized	Determine	Measure	Report	Not consider	Total
High priority	27 33.78 (-6.78)	31 28.27 (2.73)	13 12.29 (0.71)	30 23.04 (6.96)	5 8.60 (-3.60)	106
Medium priority	44 50.06 (-6.06)	48 41.87 (6.13)	21 18.20 (2.80)	34 34.13 (-0.13)	10 12.74 (-2.74)	157
Low priority	39 26.14 (12.86)	13 21.87 (-8.87)	6 9.51 (-3.51)	11 17.83 (-6.83)	13 6.66 (6.34)	82
Total	110	92	40	75	28	345

Source: Own

On the basis of p-value (.000) for Chi-square test (Table 6) our decision is to reject H_0 . The priority position of corporate sustainability concept is contingent on focusing on influences of social area. Contingency coefficient (.27) or Cramer's V (.20) indicate weak extent of the relationship between these two variables. The biggest residual frequencies (Table 5 bold italics in the brackets) indicate that companies with high priority attributed to the corporate sustainability concept are focused mainly to reporting influences of social area. We again consider this fact as adequate as in the previous case. Conversely, companies with low priority do not make any assessment of these impacts.

Table 6 Results of the contingency table analysis

Statistics	Chi-square	df	p-level
Pearson Chi-square test	27.80	8	p=.000
Contingency coefficient	.27		
Cramér V	.20		

Source: Own

Determination of impacts of environmental and social area are influence each other. We confirmed the following dependence ($\chi^2=119.08$; $p=.000$; Cramer's $V=.572$). In the case that enterprises determine the influences of environmental area, they also determine them in the social area. Similarly, this also applies at the level of measurement and reporting of impacts.

3.3 Results of analyses of corporate investing from the point of view of motivation and barrier

As we mentioned in the introduction, investing to sustainability activities is coming to the centre of attention. In our case, we examined the relationship between investing and improving operational efficiency which was the most important motive that leading to the concept implementation marked by the respondents. The sample results are presented in the Table 7. All three types of frequencies – observed, expected and residual are listed as in previous cases.

Table 8 informs about the results of the Pearson Chi-square test. We reject the null hypothesis ($p=.004$) and accept the contingency between motive of operational efficiency improvement and investing more percentage of profit to the environmental activities. The extent of contingency is estimated by Contingency coefficient (.23) or Cramer's V (.17) as weak relationship. The biggest residual frequencies indicate that enterprises that consider the most important motive - improving operational efficiency - also invest a larger percentage of profits to environmental activities. It means that this motive has a significant impact on investing to sustainability activities.

Table 7 Contingency table – investing and the motive of implementation of concept

Improving of operational efficiency	Investing to 2% of profit	Investing 2-5% of profit	Investing more than 5% of profit	Total
The highest priority	111 121.72 (-10.72)	49 48.35 (0.65)	26 15.93 (10.07)	186
High priority	66 62.17 (-3.83)	27 24.69 (2.30)	2 8.13 (-6.13)	95
Low priority	22 17.02 (-4.98)	4 6.76 (-2.76)	0 2.23 (-2.23)	26
The lowest priority	15 13.09 (1.91)	5 5.20 (-0.20)	0 1.71 (-1.71)	20
Total	214	85	28	327

Source: Own

Table 8 Results of the contingency table analysis

Statistics	Chi-square	df	p-level
Pearson Chi-square test	19.21	6	p=.004
Contingency coefficient	.23		
Cramér V	.17		

Source: Own

In relation to the forth hypothesis which are focused on investing and the most important barrier to implementation of the concept, dependence was not confirmed in our research. It means that the barrier – lack of incentives leading to sustainability activities does not have a statistically significant impact on the level of the firm's investment.

4. CONCLUSION

Corporate sustainability concept can bring a several benefits, especially in the field of manufacturing enterprises. However, enterprises convey this concept to their vision or strategy at different level. It can be caused by the perception of many barriers to the implementation of the concept and also that enterprises do not have sufficient evidences of its benefits. From these aspects, the attitude of companies in relation to investments to the environmental and social area can also be observed. The aim of paper was to evaluate the extent to which enterprises with a vision of sustainable development deal with the influence of the particular areas of corporate sustainability, and what impact has attributed priority of concept to the measurement and reporting. The objective was also to assess the investing of enterprise to the sustainability areas from the point of view of motivation and barrier of implementation in practice. We have analysed the issue through formulated hypotheses, which were subsequently verified by selected statistical tests.

Based on the results is evident that a many of enterprises do not still pay sufficient attention to the influences in individual areas of the concept. Statistically significant relation we did not confirm in the case of company vision of sustainable development and focusing on influences of both area. On the contrary, the priority position of corporate sustainability concept and focusing on influences of environmental and also social area are dependent traits. In addition, the determination of impacts of environmental and social area are influence each other.

The hypothesis test indicated that the motive of operational efficiency improvement had a significant impact on investing to sustainability activities. From the barrier point of view we did not confirm a statistically significant impact on the level of the firm's investment.

We believe that if the enterprise is interested in the impact of own activities on the environment and also has an interest to integrate them into the corporate strategy and priorities, company would increase determination, measurement, analysis and subsequent efforts to reduce negative impacts and improve corporate development. Under conditions of Slovak industrial enterprises, up to 30% of them do not carry out any measurement or assessment of environmental and social influences. For this reason, it is important to educate the new generation of potential entrepreneurs for the future. A few thoughts to think about this issue represents of statement of one respondent: "in today's world when the state is liquidating small businesses, it is difficult to find space and capacity for any approach, not just ecological," there is a clear need to change this situation.

References

- Baumgartner, R. J., Ebner, D. 2008. The relationship between corporate social responsibility and sustainable development. [online]. CRRRC 2008: Queen's University Belfast. Retrieved September 05, 2016, from <http://www.crrconference.org/downloads/2006ebnerbaumgartner.pdf>.
- Závadský, J., MačKayová, V., Závadská, Z. 2011. Manažment. Teoretické aspekty vybraných manažerských procesov. Bratislava : Slovenský komitét pre vedecké riadenie ZSVTS, 2011, 142 p. ISBN 978-80-970684-0-0.
- Sakál, P. a kol. 2013. Udržateľné spoločensky zodpovedné podnikanie. [CD - ROM]. Trnava : Materiálovotechnická fakulta STU. ISBN 978-80-8096-186-2.
- Labuschagne, C., Brent, A. C., van Erck, R. P. G. 2007. Assessing the sustainability performance of industries. DOI: 10.1016/j.jclepro.2003.10.007.
- Eccles, R. G., Ioannou, I., Serafeim, G. The Impact of Corporate Sustainability on Organizational Processes and Performance. *Management Science*, 60(11): 2835–2857.
- Bonini, S. 2012. The business of sustainability. [online]. McKinsey and company. Retrieved October 20, 2016, from https://www.mckinsey.com/~media/mckinsey/dotcom/client_service/Sustainability/PDFs/McK%20on%20SRP/SRP_11_Biz%20sustainability.ashx.
- Grayson, D., Lemon, M., Slaughter, S., Rodriguez, M. A., Jin, Z., Tay, S. 2008. A new mindset for corporate sustainability. [online]. Retrieved May 12, 2017 from http://www.cisco.com/cisco/web/UK/pdfs/A_mind_set_for_corporate_sustainability.pdf.
- Society for sustainable life. 2003. [online]. Višegrádsky region 20 rokov po Riu. Dotazníkový prieskum. Retrieved May 20, 2016, from <http://www.seps.sk/zp/stuz/knihy/2003/8.htm>.
- Hyršlová, J. 2009. [online]. Účetnictví trvalo udržitelného rozvoje podniku. Praha : Vysoká škola ekonomie a managementu, 174 p. Retrieved March 20, 2015, from http://www.enviweb.cz/download/ea/ucetnictvi_udrzitelneho_rozvoje.pdf.
- Lourenço, I. C., Branco, M. C., Curto, J. D., Eugénio, T. 2011. How does the market value corporate sustainability performance? [online]. Retrieved September 16, 2016, from http://www.fep.up.pt/conferencias/10seminariogrudis/Louren%C3%A7o,%20Isabel%20et%20al%20%20How%20does%20the%20market%20value%20corporate%20sustainability%20performance%20%20Paper_DJSI_Grudis2011.pdf.
- Integrated Assessment and Planning for Sustainable Development. 2004. [online]. United Nations Environmental Programme. Retrieved May 20, 2015, from <http://www.unep.ch/.../IAPGuidelinesPilotProjectsEN.pdf>.
- Székely, F., Knirsch, M. 2005. Leadership and Corporate Responsibility. Metrics for Sustainable Corporate Performance. [online]. Berlin : European School of Management and Technology. Retrieved June 15, 2016, from http://www.esmt.org/.../Working%20Paper_Metrics.pdf.
- Ioannou, I. Serafeim, G. 2017. The Consequences of Mandatory Corporate Sustainability Reporting. [online]. Harvard Business School Research, Working Paper No. 11-100. Retrieved September 16, 2017, from <http://dx.doi.org/10.2139/ssrn.1799589>.
- Samy, M., Odemilín, G., Bampton, R. 2010. Corporate social responsibility: a strategy for sustainable business success. An analysis of 20 selected British companies. [online]. *Corporate Governance: The international journal of business in society*, 10(2): 203-217. Retrieved September 16, 2017, <https://doi.org/10.1108/14720701011035710>.
- Unruh, G., Kiron, D., Kruschwitz, N., Reeves, M., Rubel, H., zum Felde, A. M. 2016. Investing for a sustainable future. [online]. MIT Sloan Management Review. Retrieved September 10, 2017, from <http://sloanreview.mit.edu/projects/investing-for-a-sustainable-future/>.
- Hroncová-Vicianová, J., Hronec, Š. 2017. Environmental Impact of Application on the Concept of Corporate Social Responsibility in Selected EU Countries. In *Problemy ekorozvoju – problems of sustainable development*, 2017, 12(2): 79-88.
- Lorincová, S., Hitka, M., Balážová, Z. 2016. Corporate culture in slovak enterprises as a factor of hrm quality - case study. [online]. *International Journal for Quality Research* 10(4):719-732. Retrieved September 09, 2017, from <http://www.ijqr.net/journal/v10-n4/4.pdf>. ISSN 1800-6450.
- Bussard, A., Marček, E., Markuš, M., Bunčák, M. 2005. Spoločensky zodpovedné podnikanie. Prehľad základných princípov a príkladov. [online]. Bratislava : Nadácia Integra. 112 p. Retrieved May 20, 2015, from http://www.panet.sk/download/text_zodpovedne_podnikanie.pdf.

UTILIZATION OF SELECTED SMART DEVICES IN MANUFACTURING PROCESSES

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ABSTRACT

The paper presents the results of empirical research. The main goal of the research was to identify how selected smart devices are used in production processes. As the main smart devices were chosen smart glasses, smart watches, tablets and smart phones. Utilisation of these technologies is rapidly increasing. This business environment resulted from extremely digitalization and automation of all business processes. Currently, this digitalization and creating the smart enterprises is linked to the Industry 4.0 concept. In the scientific paper we conducted empirical research on a set of Slovak industrial enterprises. The aim of the research was to find out what the current state of smart devices utilisation is and what production managers expect in the future. We defined the future as 2025. Managers should have expressed how smart devices will be implemented into production processes. In research, we focused mainly on manufacturing processes.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: Industry 4.0. Smart devices. Smart factory. Cyber Physical Systems.

1. INTRODUCTION

In today's competitive business environment, companies are facing challenges in dealing with big data issues of rapid decision-making for improved productivity. Many manufacturing systems are not ready to manage big data due to the lack of smart analytic tools. As more software and embedded intelligence are integrated in industrial products and systems, predictive technologies can further intertwine intelligent algorithms with electronics and tether-free intelligence. These technologies will then be used to predict product performance degradation, and autonomously manage and optimize product service needs (Tuček, Hájková, Tučková, 2013; Lee, Kao, Yang, 2014). Within the factory of the future, also considered as a smart factory, smart devices and cyber physical systems will enable the communication between humans, machines and products alike. As they are able to acquisition and process data, they can self-control certain tasks and interact with humans via interfaces (Brettel, Friederichsen, Keller, Rosenberg, 2014; Almada-Lobo, 2015).

The last industrial revolution was enabled through the use of electronics and computer technology for manufacturing and manufacturing automation in recent decades (Moller, 2016). Only with effective management of processes, enterprises can effectively manage, modify, improve efficiency, increase performance, identify and resist market risks (Tuček, Hájková, Tučková, 2013). The introduction of information and communication systems into industrial network also leads to a steep rise in the degree of automation (Wan, Cai, Zhou, 2015). Nowadays, smart factories focus mostly on control-centric optimization and intelligence. The discovery of new technologies has escorted industry development from the early adoption of mechanical systems, to support production processes, to today's highly automated assembly lines, in order to be responsive and adaptive to current dynamic market requirements and demands (Lee, Kao, Yang, 2014).

Under the Industry 4.0 concept, astounding growth in the advancement and adoption of information technology and social media networks has increasingly influenced consumers' perception on product innovation, quality, variety and speed of delivery. This requires establishing the factory with capabilities of selfawareness, self-prediction, self-comparison, self-reconfiguration, and self-maintenance (Lee, Kao, Yang, 2014). Digitally developed smart devices, warehousing systems and production facilities enable end-to-end information and communication systems-based integration

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across the supply chain from inbound logistics to production, marketing, outbound logistics and service (Kagermann et al., 2013). Industry 4.0 is the fourth industrial revolution applying the principles of cyber-physical systems (CPS), internet and future-oriented technologies and smart systems with enhanced human-machine interaction paradigms. This enables identity and communication for every entity in the value stream and leads to IT-enabled mass customisation in manufacturing (Lasi et al., 2014; Posada et al., 2015; Valdez, Brauner, Schaar, Holzinger, Ziefle, 2015).

There is a basic postulate (Qin, Liu, Grosvenor, 2016) that the industrial revisions require a long-time period of development and cover the four aspects (smart factory, business, product, customers), considered as the future manufacturing visions. One positive aspect of Industry 4.0 is the value creation effects from gains in efficiency and new business models, but technological change may have both a positive and a negative impact on employment. The challenge will be the restructuring of jobs because some of the less-demanding occupations will quickly disappear (Kane, Palmer, Phillips, Kiron, 2015). The productivity gains achieved by the use of smart technologies may help to secure jobs and boost consumer demand with additional income (compensation effect), but the use of new production technologies and processes may also destroy jobs (redundancy effects). There are concerns that the redundancy effect from Industry 4.0 will predominate in the long run, leading to what is known as technological unemployment (Posada et al., 2015).

Examples for Industry 4.0 could be machines which can predict failures and trigger maintenance processes autonomously or self-organized logistics which react to unexpected changes in production. Cyber-Physical Systems (CPS) are integrations of computation and physical processes (Lee, J., Kao, H., Yang, 2014; Wan, Cai, Zhou, 2015). The basic principle of Industry 4.0 is that by connecting machines, work pieces and systems, businesses are creating intelligent networks along the entire value chain that can control each other autonomously. It helps to reduce product development time and ad-hoc networking within cyber-physical systems. This is the reason why we also call the Industry 4.0 in terms like “factory 4.0” or “smart factory” (Wang et al., 2016).

2. MATERIAL AND METHODS

New business models will be based on a combination of data analytics and software as well as the linking of intelligent machines with physical and digital services, so-called Smart Devices. The above mentioned fact is inevitable in today's world of high competitiveness and therefore the need for improvement of competitive abilities of an enterprise and its products grows steadily (Hajdu, Andrejkovič, Mura, 2014). Between the most popular smart devices nowadays we can consider smart glasses, smart gloves and smart watches.

2.1 Selected smart devices involved to the research

Cloud manufacturing is a service-oriented, customer-centric and demand-driven process with well-established industrial automation. Even though, it does not necessarily mean the absence of human beings. Enhanced human-machine interaction is one of the core areas for the success of the next generation of manufacturing. However, the current research only focuses on the automation and flexibility features of cloud manufacturing, the interaction between human and machine and the value co-creation among operators is missing. Therefore, a new method is needed for operators to support their work, with the objective of reducing the time and cost of machine control and maintenance (Hao, Helo, 2017). Common feature of cyber managed systems is the role of human in the Industrie 4.0 vision as still considered and irreplaceable. With the advances in augmented and virtual reality data visualization and novel interaction techniques like mid-air gestures, these approaches seem to be suitable for integration into the industry environment (Maly, Sedlacek & Leitao, 2017).

Humans are an essential part of the manufacturing domain. In factory environments the support to humans can offer benefits. Such benefits can for example be monetary as processes are accelerated, time can be saved. Benefits can also be ergonomic improvements offering hands-free operations during daily tasks. Hands-free operations are of special interest in case both hands are needed during a task. Lifting heavy parts is a typical scenario during commissioning processes that can impede necessary scanning processes. The disadvantage of such scanners is that during the usage, the worker is left with only one free hand (Scheuermann, Strobel, Bruegge & Verclas, 2017).

With the demographic change and a generally increasing product complexity, there is a growing demand for assistance technology to cognitively support workers during industrial production processes. Many approaches including head-mounted displays, smart gloves, or in-situ projections have been suggested to provide cognitive support for the workers. Recently, research focused on improving the cognitive feedback by using activity recognition to make it context-aware. Thereby an assistance technology is able to detect work steps and provide additional feedback in case the worker makes mistakes. However, when designing feedback for a rather monotonous task, such as product assembly, it should be designed in a way it does neither overchallenge nor under-challenge the worker (Funk, Schmidt, Dingler & Cooper, 2015).

The rising number of variants and more individualized products increase the physical and mental load for assembly workers. Assistance systems ease the stress in these situations especially when they offer assembly instructions for products. There are different requirements such systems must fulfill in order to be used efficiently. They must be adaptable to the special needs of the using employee, they need to be location-independent as well as capable to react in real-time to process changes. Assistance systems must offer significant flexibility to cope with shortening product life-cycles as the need for individualized products increases. Paper-based work instructions cannot meet these requirements. Instead new technologies like mobile devices (e.g. smart watch, tablet) are established on the market. Nevertheless it must be ensured that these devices are accepted and properly used by the employees in order to tap their full potential for increasing the productivity in assembly lines (Vernim, Reinhart, 2016).

The Lean Production paradigm has become the major approach to create highly efficient processes in industry since the early 1990s. After the sudden end of the Computer Integrated Manufacturing (CIM) era, which finally was doomed to fail due to its unrulable complexity of the required automation technology, the Lean approach was successful because of its high effectiveness by reducing complexity and avoiding non-value-creating process steps. Today, the term Industry 4.0 describes a vision of future production. Many people are at least skeptical or even hostile towards this new approach (Kolberg, Zühlke, 2015).

2.2 Manufacturing processes involved to the research

Our empirical research was done within a few phases and the most important of them are: determination of a set of 26 manufacturing and logistics processes in four groups and 4 smart devices as well, as creation of a research matrix, determination of basic and selected set of industrial enterprises, matrix distribution, data collection from research matrixes filled in by quality managers, statistic processing of data related actual situation of intelligent technologies application, quality managers' expectations and identification of growth potential of intelligent technologies increase. Empirical research basic method was a sociological enquiry in a form of the questionnaire, in our case in a form of research matrix shown in Table 1. Research matrixes were sent to quality and production managers. Data collection was carried out from November 2016 to March 2017.

Table 1 Percentage of smart devices utilization in manufacturing processes [%]

Manufacturing processes	Smart Glasses	Smart Gloves	Smart Watches	Smart Phones/ Tablets
Forecasting	0	0	0	80
Product development	7	0	5	80
Prototype production and evaluation	7	0	0	80
Commercial prototype production planning	7	0	0	80
Commercial prototype production and evaluation	7	0	0	80
Demand management	0	0	11	80
Tool management	9	0	0	80
Material management	9	0	11	80
Scheduling	0	0	0	80
Manufacturing planning and control	7	0	18	80

Manufacturing	20	9	18	80
Manufacturing processes	Smart Glasses	Smart Gloves	Smart Watches	Smart Phones/ Tablets
Converting manufacturing processes	0	0	0	77
Nonconformity management	27	2	50	98
Continuous improvement	0	0	0	80
Reporting	2	0	39	80
Maintenance	9	0	7	80
Quality Control	23	2	57	98
Visual management	20	0	30	98
Waste management	0	0	0	80
Change management	23	2	59	80
Purchasing	11	0	23	98
Warehousing	27	2	25	98
Dispatching	36	16	16	98
Transportation	7	0	14	98
Manipulation	25	2	7	98
Delivering	11	0	39	98

Source: Elaborated by the author on the base of the own research.

3. RESULTS AND DISCUSSION

Statistical set was made up of all big enterprises employing more than 249 employees. According to SK NACE classification the total number of registered big enterprises was 907 in December 2016. The basic set of 251 enterprises based on selection criteria resulted from the statistical set. All of them meet the criteria related to the number of employees which is higher than 249, all are located in the Slovak republic, have manufacturing or logistic processes and their products are specified as specific and clearly identifiable ones. Industries which are shown in Table 2 were classified into the basic set of enterprises. The biggest group in the basic set is represented by the enterprises doing business in automobile industry, their number is 52. The second biggest group is represented by the enterprises from the area of transport and warehousing. This fact is not too surprising since the automobile industry plays an essential role in the development of Slovak economy. Selected set consisted of 44 enterprises.

Table 2 Industrial enterprises

Industrial enterprises	No.	%
CA Manufacture of food, beverages and tobacco products	23	9.16
CE Manufacture of chemicals and chemical products	5	1.99
CF Manufacture of pharmaceuticals, medicinal chemical and botanical products	3	1.20
CG Manufacture of rubber and plastics products, and other non-metallic mineral products	40	15.94
CH Manufacture of basic metals and fabricated metal products, except machinery and equipment	29	11.55
CI Manufacture of computer, electronic and optical products	11	4.38
CJ Manufacture of electrical equipment	29	11.55
CL Manufacture of transport equipment	52	20.72
F Construction	11	4.38
H Transportation and storage	48	19.12
Total	251	100.00

Source: Elaborated by the author on the base of the own research.

Tablets and smart phone are most represented in the smart devices group. In none of the defined set of production and logistic processes the percentage of their utilization is lower than 77%. The second mostly utilized smart devices are smart watches, which belong among wearable intelligent technologies. Intelligent watches biggest representation is in processes like nonconformity management, their actual value is at 50% and also in reporting, quality control and change management. The least utilized intelligent device in the selected set of enterprises are smart gloves. They are mentioned only in six processes. The gloves are most intelligent in dispatching, where they achieve the level up to 16%. Smart glasses are mostly used in manufacturing, nonconformity management, quality control, visual management, change management, purchasing, warehousing, dispatching, transportation, manipulation and delivering. The highest level of the above mentioned processes is achieved by dispatching with the value equal to 27%.

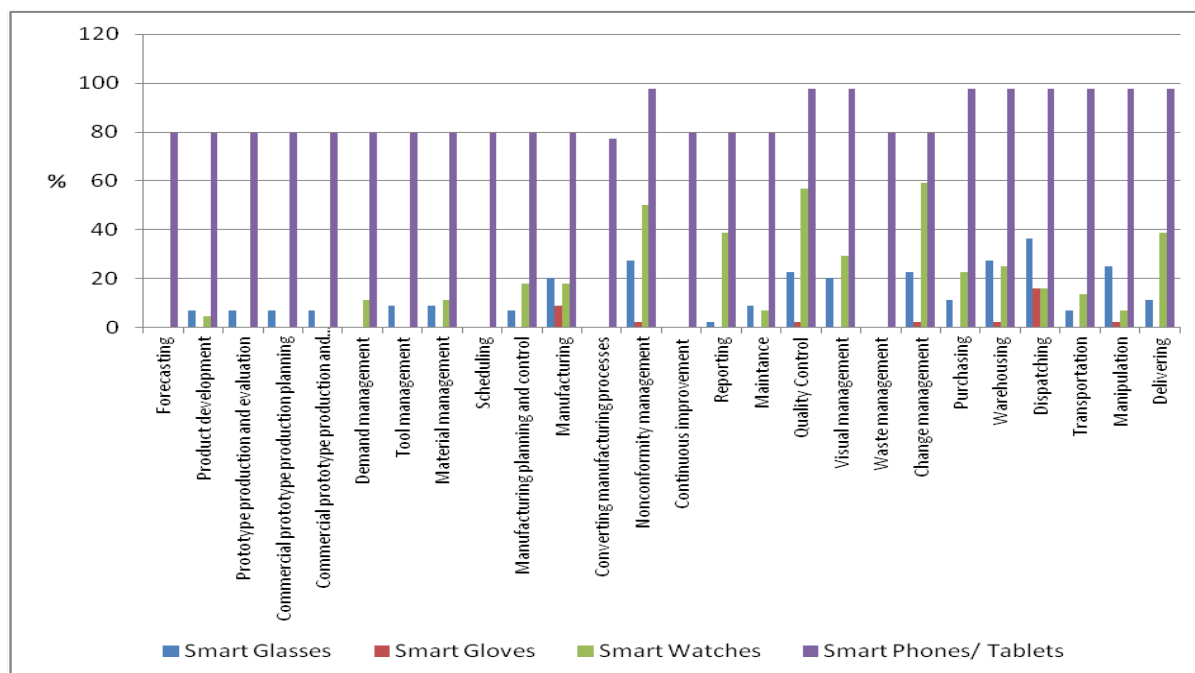


Figure 1 Current utilisation of smart devices in manufacturing processes [%]

Source: Elaborated by the author on the base of the own research.

4. CONCLUSION

Under the Industry 4.0 concept, astounding growth in the advancement and adoption of information technology and social media networks has increasingly influenced consumers' perception on product innovation, quality, variety and speed of delivery. This requires establishing the factory with capabilities of selfawareness, self-prediction, self-comparison, self-reconfiguration, and self-maintenance. Accompanied with this new technology, two types of innovative development are receiving more attention by academia and industries: service innovation and industrial big data (Lee, Kao, Yang, 2014).

In this paper, we analyzed the utilization of the smart devices. Another view on the main elements of the networked production can be defined for example by digital workpieces. The dimensions, quality requirements and the order of technological processing is given for the digital workpieces. Intelligent machines communicate simultaneously with the production control system and the workpiece under processing, so that the machine coordinates, control and optimize itself. The product to be manufactured senses the production environment with internal sensors and controls and monitors its own production process in order to meet the production standards, since it is able to communicate with the equipments as well as the components already incorporated and to be incorporated (Husi, 2016, Hao, Hello, 2017).

Considering the technology enablers for Industry 4.0. include Mobile, Cloud, Big Data analytics, Machine to Machine (M2M), 3D Printing, Robotics and so on there are many companies

with particular expertise (Almada-Lobo, 2015). Recently, benefitting from the Internet of things (IOT) and Cyber-Physical System (CPS), the industry-relevant items, for example, material, sensors, machines, products, supply chain, and customers, are able to be connected, which means these necessary objects are going to exchange information and control actions with each other independently and autonomously. The next generation software technologies are expected to strongly improve the efficiency of software system development processes and with it the quality of software systems and systems of systems. Key impacts include for example increased collaboration and awareness of engineering teams, increased efficiency and effectiveness of engineering processes, better maintainability through improved visibility and traceability, long-term sustainability and increase reusability of engineering artefacts, improved systems of systems quality has a range of downstream benefits for industry, commerce, society and the scientific community. German engineers realise that manufacturing has been developed into a new paradigm shift, so-called 'Industry 4.0', where products tend to control their own manufacturing processing (Qin, Liu, Grosvenor, 2016).

References

- Almada-Lobo, F. 2015. The Industry 4.0 revolution and the future of Manufacturing Execution Systems, In *Journal of Innovation Management*, 3(4), 16-21. Retrieved from <http://www.open-jim.org/article/view/249>.
- Brettel, M., Friederichsen, N., Keller, M., Rosenberg, M. (2014). How Virtualization, Decentralization and Network Building Change the Manufacturing Landscape: An Industry 4.0 Perspective. *International Journal of Mechanical, Aerospace, Industrial, Mechatronic and Manufacturing Engineering*, 8(1), 37-44. Retrieved from: <http://www.waset.org/publications/9997144>.
- Funk M., Schmidt A., Dingler T. and Cooper J., "Stop helping me - I'm bored! why assembly assistance needs to be adaptive.," UbiComp and ISWC 2015 - Proceedings of the 2015 ACM International Joint Conference on Pervasive and Ubiquitous Computing and the Proceedings of the 2015 ACM International Symposium on Wearable Computers., pp. 1269-1278, 2015.
- Hajdu, Z., Andrejkovič, M., Mura, L. 2014. Utilizing experiments designed results during error identification and improvement of business processes. In *Acta Polytechnica Hungaria*, Vol 11, No. 2, ISSN 1785-8860, pp. 149-166.
- Hao, Y., & Helo, P. 2017. The role of wearable devices in meeting the needs of cloud manufacturing: A case study. *Robotics and Computer-Integrated Manufacturing*, 45, 168-179. doi: 10.1016/j.rcim.2015.10.001.
- Husi, G. 2016. Industry 4.0. educational material (in Hungarian). University of Debrecen, <http://www.eng.unideb.hu/userdir/vmt2/images/tantargyak/robottechnika/Ipár%204.0%20jegyzet.pdf>, downloaded: 15 Sep. 2016, pp. 37.
- Kagermann, H. 2013. Recommendations for implementing the strategic initiative INDUSTRIE 4.0. Final Report of the Industrie 4.0. Frankfurt: Working Group Heilmeyer und Sernau.
- Kane, G. C., Palmer, D., Phillips, A. N., & Kiron, D. 2015. Is your business ready for a digital future? MIT Sloan Management Review, 56, 37. Retrieved from: <http://sloanreview.mit.edu/article/is-your-business-ready-for-a-digital-future/>.
- Kolberg, D., & Zühlke D. 2015. Lean automation enabled by industry 4.0 technologies. *IFAC-PapersOnLine*, 28(3), 1870-1875. doi: 10.1016/j.ifacol.2015.06.359.
- Lasi, H., Fettke, P., Kemper, H. G., Feld, T., & Hoffmann, M. 2014. Industry 4.0. In: *Business & Information Systems Engineering*, 6(4), 239-242. doi: 10.1007/s11576-014-0424-4.
- Lee, J., Kao, H., Yang, S. 2014 Service innovation and smart analytics for Industry 4.0 and big data environment, In *Product Services Systems and Value Creation Proceedings of the 6th CIRP Conference on Industrial Product-Services*.
- Maly, I., Sedlacek, D., & Leitao, P. 2017. Augmented reality experiments with industrial robot in industry 4.0 environment. Paper presented at the IEEE International Conference on Industrial Informatics (INDIN), France, pp. 176-181.
- Moller, D. P. F., 2016. Digital Manufacturing/Industry 4.0 In *Guide to Computing Fundamentals in Cyber-Physical Systems*, 2016.
- Posada, J., Toro, C., Barandiaran, I., Oyarzun, D., Stricker, D., & De Amicis, R. 2015. Visual computing as a key enabling technology for industrie 4.0 and industrial internet. *Computer Graphics and Applications*, IEEE, 35(2), 26-40. doi: 10.1109/MCG.2015.45.
- Qin, J., Liu, Y., & Grosvenor, R. 2016. A Categorical Framework of Manufacturing for Industry 4.0 and Beyond. *Procedia CIRP* (52). Paper presented at the Changeable, Agile, Reconfigurable & Virtual Production Conference.
- Scheuermann C., Strobel M., Bruegge B. and Verclas S., "Increasing the support to humans in factory environments using a smart glove: An evaluation.," In Proceedings - 13th IEEE International Conference on Ubiquitous Intelligence and Computing, 13th IEEE International Conference on Advanced and Trusted Computing, 16th IEEE International Conference on Scalable Computing and Communications, IEEE International, 2017.

- Tuček, D., Hájková, M. & Tučková, Z. 2013. Utilization level of Business Process Management in Czech enterprises – Objectives and factors. In *E & M: Ekonomie a Management*, Vol. 16, No.3, ISSN 2336-5604, pp. 81-98.
- Valdez, A. C., Brauner, P., Schaar, A. K., Holzinger, A., & Zieflea, M. 2015. Reducing Complexity with simplicity-Usability Methods for Industry 4.0. Paper presented at the 19th Triennial Congress of the IEA, Melbourne, 9-14.
- Vernim, S., & Reinhart, G. 2016. Usage frequency and user-friendliness of mobile devices in assembly. *Procedia CIRP*, 57, 510-515. doi: 10.1016/j.procir.2016.11.088.
- Wan, J., Cai, H., & Zhou, K. 2015. Industrie 4.0: Enabling technologies. In *International Conference on Intelligent Computing and Internet of Things (ICIT)*. IEEE, Harbin, China, 135-140.
- Wang, H., Liu, L., Fei, Y., & Liu, T. 2016. A collaborative manufacturing execution system oriented to discrete manufacturing enterprises. In *Concurrent Engineering Research and Applications*, 24(4), 330-343. doi: 10.1177/1063293X16640591

PREDICTIVE ANALYTICS IN MANUFACTURING

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ABSTRACT

Manufacturing Companies are faced with more and more data. These are collected by their own or externally available data sets, time series and information. Most of these data are unstructured and have different types and formats. Last years IT-experts are talking about „Big Data“ as a big issue to handle these data and take an advantage out of them. Predictive Analytics is the most exiting part of „Big Data“. By using the unmanageable sum of historic and new data, stochastic algorithms are able to recognize patterns and transform them into future probabilities and forecasts about events and outcomes. The value of forecasts is very differently and regarding to the business model of the companies and the relevant time horizon for reactions. A lot of companies over all branches have the opportunity to enrich their value chain with completely new products and services based on a deeper knowledge of their customer and their markets by using Predictive Analytics. The defiance for all companies will be to find out what will be a value for their customers, what kind of data do they have and how to transform an idea into an autonomous acting system. With our publication we want to show the need and the opportunities to use Predictive Analytics in companies and make Manufacturing Companies sensitive about it to generate new revenues and new services. Predictive Analytics is part of economic research and needs an overall understanding of business.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: Predictive Analytics, Business intelligence, Big Data, forecasting, business development, software.

1. INTRODUCTION

Aim of our paper is to work out corporate situations and criteria in which Predictive Analytics may generate a value for manufacturers. We worked in different projects for different companies and here will define suitable criteria for a successful use of Predictive Analytics. We will show how a project may be planned and realized. We will talk about the value of forecasts in an uncertain world and the role predictive analytics can play in manufacturing companies and how to develop new ideas in the context of Predictive Analytics. As a matter of fact most companies don't like uncertainties. An uncertainty can be, to don't know what a customer wants to buy on a webshop, or which price he can or wants to pay for a product? What will be the price of a share tomorrow? How many insured claims will occur next month? How many electricity will be produced by wind engines in the next hour? How many people will buy fresh sushi in a supermarket tomorrow? There are a lot of questions like this. The biggest challenge for companies will be to find out how Predictive Analytics can help to provide new service or products. In our opinion these ideas will not be generated in the IT-departments of the companies, they have to be generated in the Business Development or at a high level of management. The technologies behind Predictive Analytics like stochastics and Artificial Intelligence might be complex, but they are to handle. More important is the understanding of the entire business chain.

These Business or even Supply chain models are evolving. The predictive analytics of the past are becoming more apt and intellectual, powering a new age in manufacturing. Furthermore, the "Industrial Internet of Things" will climb to more than 25 billion devices by 2025. The increase in the use of IIOT represents a 500 percent increase from the number of devices in 2015. Additionally, major manufacturers are working to prioritize predictive analytics and use them to improve production.

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We will have a detailed look at the increase in utilization and implementation of predictive analytics in manufacturing companies and what it means for these group of manufacturers.

2. PREDICTIVE ANALYTICS IN MANUFACTURING

As a fact, every single day in 2014, more than 2.5 quintillion bytes of data are created by companies and private, with 90 percent of the world's data created only in the past two years alone. Videos, pictures, feeds, blogs, messages, machine data (sensor information) and other types of structured and unstructured data appear every day. The global production of this data will be 44 times greater in 2020 than in 2009 (Sashihara, 2012). The volume of business data worldwide is expected to double every 1.2 years. Why do companies collect them? Why not delete? Is there a worth in historical data?

The retailer Wal-Mart processes one million customer transactions per hour, which are stored in databases estimated to contain more than 2.5 petabytes. There are questions regarding to these enormous set of data: What is the value of them? What can Wal-Mart do to understand customers better and make an advantage? Are there important patterns like the „pregnancy-case“ in which a u.s. based supermarket found out what pregnant women buy in the first days and than proposes medicine and products for them? Target noticed that women on the baby registry were buying larger quantities of unscented lotion around the beginning of their second trimester (Hill, 2012).

While computing resources have evolved, advancing to better handle data size and complexity, more and more companies harvest many more benefits from Big Data and Predictive Analytics. It's no wonder that big data is a topic in corporate boardrooms and IT departments, with many leading firms doing more than talking. According to recent studies, more than 45 percent of u.s. companies have implemented a business-intelligence or Big Data initiative in the past two years. Further studies estimate more than 90 percent of Fortune 500 companies will have at least one big data initiative underway within a year (Scharlach, 2013). The effective use of this technology can deliver substantial innovations in service and products. Building capabilities in this area will not only improve performance in traditional segments and functions, but also create opportunities to expand product and service offerings.

Big Data is a collection of data sets that are so large and complex that they become awkward to work with using traditional database management tools. The volume, variety and velocity of big data have introduced challenges across the board for capture, storage, search, sharing, analysis, and visualization. Examples of big data sources include web logs, RFID, sensor data, social networks, internet search indexing, call detail records, military surveillance, and complex data in astronomic, biogeochemical, genomics, and atmospheric sciences. Big Data is the core of most Predictive Analytic services offered by IT organizations. Thanks to technological advances in computer hardware and new databases such as Hadoop, MapReduce, and in-database and text analytics for processing big data questions. It is now feasible to collect, analyze, and mine massive amounts of structured and unstructured data for new insights (White, 2009).

The central element of Predictive Analytics is the predictor, a mathematical variable that can be measured for an individual or other entity to predict future behavior at a high level of granuarity. For example, an insurance company is likely to take into account potential driving safety predictors such as age, gender, and driving record when issuing car insurance policies. Multiple predictors are combined into a predictive model, which, when subjected to analysis, can be used to forecast future probabilities with an acceptable level of reliability. In predictive modeling, data is collected, a statistical model is formulated, predictions are made and the model is validated (or revised) as additional data becomes available. Modern software systems are using the potential of advanced artificial intelligence like „neural networks“, „support vector machines“ or „Bayes Networks“. Most advanced systems like MRI META-AI (www.mri.lu) integrates more than one artificial intelligence and make them work automatically to generate forecasting models in every field of business or science imaginable. In many cases the technologies of the predictor are based on these artificial intelligence to handle the enormous numbers of data. Predictive Analytics encompasses a variety of statistical techniques from predictive modeling, machine learning, and data mining that analyze current and historical facts to make predictions about future, or otherwise unknown, events.

2.1 Cases in Manufacturing

Not many years ago, supply chain visibility tended to be an internally-focused process, one that allowed manufacturers to know when exactly they could expect to receive inbound goods and materials from their suppliers so they could plan and adjust their production schedules. While that's still an important capability for companies to have, the Age of the Consumer has shifted the focus of visibility initiatives in the direction of the customers.

Manufacturers still need a complete view of their supply chain as it exists now, of course, but just as crucial is being able to know where their supply chain needs to be. And that's where predictive analytics come into play.

In business, predictive models exploit patterns found in historical and transactional data to identify risks and opportunities. Models capture relationships among many factors to allow assessment of risk or potential associated with a particular set of conditions, guiding decision making for candidate transactions. Decision Making is the last step after data mining, finding pattern and predict. It's a set of algorithms including all relevant and potential business decision information to take fast directly an advantage out of the predictions without "asking" human deciders.

The step without "Decision Making" is called "Decision Support". The current forecasts are used by human decider to make their own decision and actions. Regarding to the business, the number of transactions, the single worth of every transaction and the relevant time horizon of an action, the management has to find out, that human decisions are necessary or not. Even in the phase of finding a business case for Predictive Analytics, the business developer have to know about the options what to do with the forecasts (Andrews, 2015).

The defining functional effect of the technical approaches is that Predictive Analytics provides a predictive score (probability) for each individual in order to determine, inform, or influence organizational processes that pertain across large numbers of individuals, such as in marketing, credit risk assessment, fraud detection, manufacturing, healthcare, and government operations including law enforcement. Predictive Analytics is more than "forecasting". It's an integrated work around the companies value chain including supplier and customer needs and data. To implement it in the process of business development the company should understand it as a technology to handle future needs and generate revenues from "data-driven" ideas.

In industry there are a lot of ideas focusing on maintenance and automation. Some call it "Industry 4.0" and they are looking for business cases integrating production, demand site and supplier on a more individual level. We are here focusing on simpler cases, "closed loops". One of the most important use cases is Predictive Maintenance. Maintenance planners are faced the challenge of ensuring maximum machine availability at the same time as keeping the amount of materials consumed by maintenance and repairs to a minimum. Predictive Maintenance opens up new possibilities for all industry companies: Data from sensors monitoring machine condition is automatically reviewed to pick up any patterns that indicate probabilities of a possible fault.

This allows maintenance planners the onset of a stoppage to be recognized early and corrective measures to be planned and introduced in the most effective way. It also means unplanned downtimes can be avoided and both staff and resources can be employed more effectively. Predictive Analytics here even uses information on past problems to predict future events (Mobley, 2002).

2.2 PREDICTIVE MAINTENANCE IMPORTANCE

Currently, Europe trails the civilized world with placing predictive analytics in manufacturing in the fourth position of importance in the use and implementation of advanced technologies in manufacturing. Unfortunately, leaving predictive analytics at any place other than first, asserts "Forbes Magazine" (Columbus, 2015), can only lead to the existence of inefficiencies and missed opportunities in the supply chain. In fact, according to "Industry Week" magazine (Blanchard, 2015), CEO of MHI George Prest said, "The speed at which supply chain innovation is being adopted—coupled with rising consumer expectations for anytime, anywhere service—is stressing traditional supply chains to near-breaking points." In other words, the traditional supply chain must evolve to meet the demands of modern society. Customer demands for lower delivered costs and pricing are seen as the top challenge facing supply chains today, the report indicates. However, by applying advanced statistical analysis of structured and unstructured data sources (i.e., Big Data) to identify

patterns and predict future events, manufacturers using predictive analytics gain the ability to make better decisions that anticipate what their customers are asking for now, and will be asking for in the future, according to a new industry report compiled.

"Predictive analytics are changing consumer buying behavior," notes Bill Abernathy, head of North America product supply logistics excellence, Bayer CropScience, "and supply chain professionals need to be able to satisfy the increasing demands of consumers who expect products delivered exactly when promised."

3. RESULTS AND DISCUSSION

Shorter product lifecycles in competitive environment mean a shorter window of business opportunity. Organizations need to get quicker at understanding customers, analyzing customer data and responding to customer needs. Business Development has to adopt on techniques to find and project new ideas based on data and forecasting. As seen, these ideas are founded on a deep understanding of what Predictive Analytics can do and the own value chain. With the four indicators for potential business ideas and the written six steps to a operating system, we hope to provide a fundamental technique to think deeper and make Predictive Analytics part of a value orientated Business Development.

4. CONCLUSION

Predictive Analytics is an area of data mining and "Big Data" that deals with extracting information from data and using it to predict trends and behavior patterns. Often it should predict an unknown event or probabilities of interest in the future. But Predictive Analytics can be applied to any type of unknown events or probabilities whether it be in the past, present or future. In the research area of economics it is mostly used to predict future events or probability. For example, identifying suspects after a crime has been committed, or credit card fraud as it occurs. The core of predictive analytics relies on capturing relationships between explanatory variables and the predicted variables from past occurrences, and exploiting them to predict the unknown outcome or its probabilities. It is important to note, however, that the accuracy and usability of results will depend greatly on the level of data analysis and the quality of assumptions and the data base itself. Data can and should be acquired internally and externally to make more business cases possible and the quality of forecast higher. If you are working on a business case and you have the decision between Man or Machine acting, there are four indicators to look for: Various Decisions, Time-critical, Various Data and level of automatisisation. As a further step you have to look for the potential reaction time (decision maker) and the quality of forecasting in these given time horizon. The quality and therefore the value of a Predictive Analytics use case is always a question of the time and best forecasting horizon. Predictive Analytics is often defined as predicting at a more detailed level of granularity, i.e., generating predictive scores (probabilities) for each individual organizational element. This distinguishes it from a simple forecasting model. Predictive Analytics always includes what to do with the forecast, how to improve the quality of forecast and decision. For example, Predictive Analytics technology that learns from experience (data) to predict the future behavior of individuals in order to drive better decisions. In our opinion the most important question for using Predictive Analytics is the time horizon of reaction compared with the horizon of the highest forecasting quality.

References

- Blackburn, Robert, et al. (2015) "A predictive analytics approach for demand forecasting in the process industry." *International Transactions in Operational Research* 22.3: 407-428
- Danese, Pamela, and Matteo Kalchschmidt. (2011) "The role of the forecasting process in improving forecast accuracy and operational performance." *International Journal of Production Economics* 131.1: 204-214
- Fildes, Robert, et al. (2009) "Effective forecasting and judgmental adjustments: an empirical evaluation and strategies for improvement in supply-chain planning." *International Journal of Forecasting* 25.1: 3-23
- Mobley, R.K. (2002) *An Introduction to Predictive Maintenance*, 2nd Edition, Butterworth-Heinemann, Amsterdam
- White, T. (2009) *Hadoop – The definite Guide*, O'Reilly Media, Boston

- Andrews, M. (2015), "How to use Predictive Analytics for better decision Making", *Forbes*. [Online], [Retrieved May 28, 2015], <http://www.forbes.com/sites/ibm/2015/05/28/how-to-use-predictive-analytics-for-better-decision-making/#776670b378af>
- Blanchard, D. (2015), „Predictive Analytics Let Manufacturers See More Clearly into their Supply Chains“[Retrieved March 17, 2015] <http://www.industryweek.com/supply-chain/predictive-analytics-let-manufacturers-see-more-clearly-their-supply-chains>
- Hill, K., (2012), "How Target Figured Out A Teen Girl Was Pregnant Before Her Father Did,' *Forbes*. [Online], [Retrieved Februar 16, 2012], <http://www.forbes.com/sites/kashmirhill/2012/02/16/how-target-figured-out-a-teen-girl-was-pregnant-before-her-father-did/#58770e0434c6>
- Ouchi, F., (2004) "A Literature Review on the Use of Expert Opinion in Probabilistic Risk Analysis", World Bank Policy Research Working Paper 3201, February 2004, [Online], [Retrieved February 2004],http://www.wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2004/04/15/00009486_20040415130301/additional/115515322_20041117173031.pdf
- Reichheld, F.; Schefter, P., (2014) Harvard Business School, "The Economics of E-Loyalty", <http://hbswk.hbs.edu/archive/1590.html>
- Ringsdorf, B. (2014), Kalkuliertes Risiko "Quant 2.0", Alternative Investments [Online], [Retrieved February 1, 2014], http://www.hedgework.de/dl.php?file=alternative-news/archive/altii_Februar_2014.pdf
- Sashihara, S. (2012), The European Financial Review "From Big Data to big Optimization: What every Executive needs to know" [Online], [Retrieved April 12, 2012], <http://www.europeanfinancialreview.com/?p=1940>
- Scharlach, A., Goffre, J., for A.T. Kearney Inc. (2013), "Big Data and the creative Destruction of todays business models", https://www.atkearney.de/analytics/ideasinsights/article/-/asset_publisher/hZFiG2E3WrIP/content/big-data-and-the-creative-destruction-of-todays-business-models/

ONLINE PR OF SMALL AND MEDIUM WINE COMPANIES IN SLOVAK REPUBLIC, CZECH REPUBLIC AND GERMANY

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ABSTRACT

One of the main tasks of marketing communication is not only to inform the consumer about the product by characterizing its features and benefits of buying a product, but also building a brand and creating awareness of the company. The use of digital communication channels is one of the key attributes in implementing the marketing strategy of small and medium-sized wine companies in the Slovak Republic, Czech Republic and Germany. Small and medium-sized wine companies, also through online PR activities as one of the essential components of the communications mix, are trying to meet the goals of the marketing strategy and to integrate all marketing processes in businesses so that customers are at the center of their interest. In our article, we are trying to investigate on-line PR communication activities in wine companies on the basis of a questionnaire survey in the Slovak Republic, Czech Republic and Germany.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: online public relations, digital marketing communication, digital communication mix.

1. INTRODUCTION

As the primary role of implementing marketing sales promotion and advertising is to inform the customer about the product by characterizing its features and the benefits of buying a product, online public relations help wineries to build a digital world brand and to create public consciousness of the company. The European agro-food industry is dominated by small and medium enterprises (SMEs) that often lack resources and qualified personnel to invest in research and innovation (Dries, 2014). The wine industry is facing several global challenges that are shaping the competitive environment (Contó et al., 2015).

The wine industry is facing several global challenges that are shaping the competitive environment (Contó et al., 2015). One of the challenges will be the case of tourism and movement of persons deploying SMART (Golej, Panik & Adamuscin, 2016) technology and innovation in the field of data (Bawa, et al., 2016). Research on marketing innovation is extremely wide and explores different aspects of the issue by adopting various approaches and perspectives (Contó et al., 2015). The aim of the innovation of the marketing and economic processes (Janáková & Zatrochová 2015) in the wine industry is improvement of manufacturing plant performance (Grell & Hyránek 2012) (Tekulová, Králik & Chodasová 2015).

The use of online public relations techniques and tools in small and medium-sized wineries through digital communication channels ensures that the goals of a digital marketing strategy are met, aimed at promoting the company, creating a positive image of the business, or increasing the reputation and popularity of each product.

In the digital world, for the needs of online PR, it is important to use all technology communication channels such as the acquisition of an audience called Millennials or generation Z. The so-called Millennials is a generation that has been using computers and cell phones all of their lives (Nowak et al., 2008) and also generation Z (Kuprina et al., 2016). Study of Nowak examined the attitudes of Millennial wine consumers and tried to determine if positive evaluations of the winery's web site lead to increased trust in the winery and perceptions of product quality, higher levels of brand equity, and increased purchase intentions.

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Small and medium-sized wine companies in the Slovak Republic, the Czech Republic and Germany, are trying through the online public relations activities as one of the essential components of the communication mix, like companies from other sectors of the economy, to build the image of the company in a way that would positively influence the introduction of new products in their sales growth. Wine companies can thus influence public consciousness for a fraction of the costs that would be necessary to spend on advertising, building, maintaining and enhancing mutually beneficial relationships of the organization with all stakeholders, customer vendors and distribution partners other than through online PR activities.

In our article, we are trying to investigate on-line PR communication activities of wine companies in the Slovak Republic, Czech Republic and Germany.

2. MATERIAL AND METHODS

Marketing communication strategies of wine companies are being empirically investigated in this article. We were interested in geographically similar European countries. The investigation was realized in Slovak Republic, Czech Republic and Federal Republic of Germany. A questionnaire was used. Marketing strategies are focused on the identification of new occasions at the market. These reflect the changing needs and purchasing conventions of new and existing customers. Based on the quality of identification, the companies create a marketing plan to achieve as efficiently as possible a profit in a dynamically changing environment. Marketing communication is a tool to create a relationship between a producer and a customer. With its effective combination a wine company can save advertising costs and maximize the profit.

Methodology of this paper is based on collecting information from a sample of wine companies from three European countries. The questionnaire was filled out by 49 companies. The sample consists of 13 respondents from Czech Republic (27 %), 22 respondents from Slovak Republic (45%) and 14 respondents from Federal Republic of Germany (29%).

The majority of the respondents were wine companies with the number of employees between 0 and 24. This group consists of 10 wine companies from Czech Republic, 17 from Slovak Republic and 10 from Federal Republic of Germany. Altogether 37 respondents (76%) from the total number of 49 wine companies.

Altogether 12 respondents were wine companies with 25-499 employees (approximately 24% from 49 companies). This group consists of 3 companies from Czech Republic, 5 companies from Slovak Republic and 4 companies from Federal Republic of Germany.

Wine companies must correctly identify and define their target audiences in the digital world. Examining online PR communication activity as a process that is designed to provide the wineries with both the creation of their fans' community and the trust through digital content distributed to digital channels. In defining the objectives of the online PR, it is necessary to consider four key aspects in the development of the digital strategy: key performance indicators, their compliance with the main business objectives, the tactics of implementing the digital strategy and targeting activities in the digital world.

In the next, we will deal with the use of online PR for active communication with the public and for building a good name within a portfolio of four activities (Social Media, Blog, Online video, Events) that we have designed as key activities for wine companies in the digital world.

These four major online PR activities are as follows:

- Social Media,
- Blog
- Online video
- Events

All four major online PRs are shown in FIG. 1 online PR. In specific wine-producing companies, the intensity of use of individual online PR activities and the above-mentioned particularities will be specifically depending on several factors.

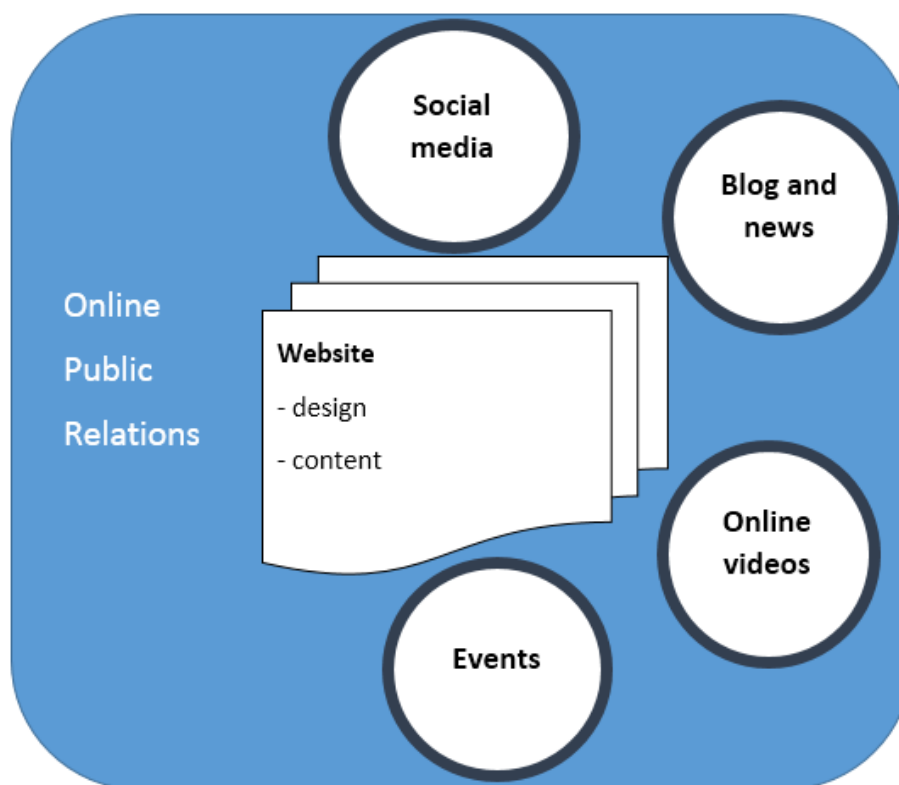


Figure 1 Four major online PR activities

Source: Own processing

In our survey, we evaluated how wine companies use online PRs to actively communicate with the public and build a good reputation. The subject of our investigation are four online activities (Social Media, Blog Online videos and Events).

For each of the four selected activities for the participating wineries, we evaluated the values with Yes (if the enterprise uses the relevant activity) or No (if the enterprise does not use the relevant activity). These values were then calculated as the sum for each participating country for each item. On the basis of the data we have created a separate table for each of the four selected activities - tables 1, 3, 5, and 7. In the following tables, we have applied the Chi-Square Good Match for the selected activity. We tested whether the distribution of values for each of the attributes was governed by an even distribution. SPSS software was used for calculation. For individual PR activities we have investigated in individual countries, if their wine companies are using them in the same amount. Or, if they are statistically significantly different.

3. RESULTS AND DISCUSSION

3.1 Social media

Social media is a very important part of online PR. Social media is a set of Internet sites and applications that allow registered users to create, modify, share, or collaborate on content, which can be both text and multimedia, individually or in collaboration. These features make it possible to build relationships, distribute user-generated content, rating and tagging content as well as entertainment. The statistical data obtained can be found in the table. 1 The results show that most wineries do not underestimate the importance of using Social Media, Google+, Facebook, Snapchat, Twitter, LinkedIn and others in their portfolio of PR activities in the digital world. More than 63.6% of Slovakian 76.9% of Czech and up to 78.6% of German wine companies use Social Media as channels to engage new audiences.

Table 1 Social media

			Variabl.			
			1 Germany	2 Czech	3 Slovak	Total
Statis_File	1 Yes	Count	11	10	14	35
		% within Statis_File	31,4%	28,6%	40,0%	100,0%
		% within Variabl.	78,6%	76,9%	63,6%	71,4%
Statis_File	2 No	Count	3	3	8	14
		% within Statis_File	21,4%	21,4%	57,1%	100,0%
		% within Variabl.	21,4%	23,1%	36,4%	28,6%
Total		Count	14	13	22	49
		% within Statis_File	28,6%	26,5%	44,9%	100,0%
		% within Variabl.	100,0%	100,0%	100,0%	100,0%

Source: Own processing

From the point of view of the effectiveness of campaign spending, this is well founded. Social media, in fact, allow the spread of the effect of building a good reputation very quickly. And it's a medium where users are primarily looking for products from businesses where there are conversations about the brand or product in question. Taking control of these conversations promises a significant enhanced image and reputation for winemaking businesses. Social media can also be used for Social Media SEO, another product of the activities of wineries is so significant strengthening the off-page factors of their web presentation and so on.

Table 2 Social media - Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Value
Pearson Chi-Square	1,197 ^a	2	0,550	0,562		
Likelihood Ratio	1,196	2	0,550	0,562		
Fisher's Exact Test	1,119			0,562		
Linear-by-Linear Association	,849 ^b	1	0,357	0,450	0,234	0,101
N of Valid Cases	49					

*a. 2 cells (33,3%) have expected count less than 5. The minimum expected count is 3,71.

*b. The standardized statistic is ,921.

Source: Own processing

3.2 Blog / News

Articles created for a corporate blog have many common features with articles from the print media, but they also differ significantly. Texts on the web have their own specific rules, which it primarily determines the Czech public through its different reading habits for web / blog content compared to, for example, print magazines. When creating PR articles, it is also important to keep their SEO (Search Engine Optimization) on the right keywords. Just as in other channels, it is important for the effectiveness of PR articles on the corporate blog and the placement of backlinks to articles in suitable online media such as social media pay articles on news portals, and more.

Table 3 News

			Variabl.			
			1 Germany	2 Czech	3 Slovak	Total
Statis_File	1 Yes	Count	14	11	14	39
		% within Statis_File	35,9%	28,2%	35,9%	100,0%
		% within Variabl.	100,0%	84,6%	63,6%	79,6%
Statis_File	2 No	Count	0	2	8	10
		% within Statis_File	0,0%	20,0%	80,0%	100,0%
		% within Variabl.	0,0%	15,4%	36,4%	20,4%
Total		Count	14	13	22	49
		% within Statis_File	28,6%	26,5%	44,9%	100,0%
		% within Variabl.	100,0%	100,0%	100,0%	100,0%

Source: Own processing

In the second area, which is the use of a blog in the PR activities, results show that only 63.6% of Slovak wineries have an integrated blog as part of their corporate website. Much more intensely, the Czech (84.6%) and German (100%) wineries are using the blog to build public relations and the reputation of their brand.

Table 4 News - Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Value
Pearson Chi-Square	7,240 ^a	2	0,027	0,027		
Likelihood Ratio	9,585	2	0,008	0,014		
Fisher's Exact Test	7,151			0,018		
Linear-by-Linear Association	3,135 ^b	1	0,077	0,090	0,057	0,037
N of Valid Cases	49					

^aa. 3 cells (50,0%) have expected count less than 5. The minimum expected count is 2,65.

^bb. The standardized statistic is 1,770.

Source: Own processing

3.3 Online videos

The most common approach to online PR activities is generally to create Online videos with viral entertainment content to ensure positive ratings and more massive expansion to target audiences. But Online Video should primarily answer customer inquiries. This may be the way the product or service works. Wineries should mainly inspire the audience to new ways to look at the added value of their products and services.

Table 5 Online videos

			Variabl.			
			1 Germany	2 Czech	3 Slovak	Total
Statis_File	1 Yes	Count	10	11	14	35
		% within Statis_File	28,6%	31,4%	40,0%	100,0%
		% within Variabl.	76,9%	78,6%	63,6%	71,4%
Statis_File	2 No	Count	3	3	8	14
		% within Statis_File	21,4%	21,4%	57,1%	100,0%
		% within Variabl.	23,1%	21,4%	36,4%	28,6%
Total		Count	13	14	22	49
		% within Statis_File	26,5%	28,6%	44,9%	100,0%
		% within Variabl.	100,0%	100,0%	100,0%	100,0%

Source: Own processing

Therefore, it is a disappointing fact that winemaking businesses make the most of the benefits and opportunities of Online Videos in their online PR activities. As can be seen from the statistics given in Table 5, only 12.2% of all wineries use this modern digital communication channel to convincingly present their story to their audience and build a positive image of their products or services.

Table 6 Online videos - Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Value
Pearson Chi-Square	1,197 *a	2	0,550	0,562		
Likelihood Ratio	1,196	2	0,550	0,562		
Fisher's Exact Test	1,119			0,562		
Linear-by-Linear Association	,849 *b	1	0,357	0,450	0,234	0,101
N of Valid Cases	49					

*a. 2 cells (33,3%) have expected count less than 5. The minimum expected count is 3,71.

*b. The standardized statistic is ,921.

Source: Own processing

3.4 Events

Linking events running on the Internet with real-world events is one of the online PR combination in the digital communications campaign of the winemaking company in the digital world, it is possible to see exactly how the results of different versions of one communication campaign are. Events in the digital world will ensure the acquisition of a new audience on social media for the PR needs of the winery. Events in online PR are also beneficial to ensure publicity on popular news portals.

Table 7 Events

			Variabl.			
			1 Germany	2 Czech	3 Slovak	Total
Statis_File	1 Yes	Count	10	11	14	35
		% within Statis_File	28,6%	31,4%	40,0%	100,0%
		% within Variabl.	76,9%	78,6%	63,6%	71,4%
Statis_File	2 No	Count	3	3	8	14
		% within Statis_File	21,4%	21,4%	57,1%	100,0%
		% within Variabl.	23,1%	21,4%	36,4%	28,6%
Total		Count	13	14	22	49
		% within Statis_File	26,5%	28,6%	44,9%	100,0%
		% within Variabl.	100,0%	100,0%	100,0%	100,0%

Source: Own processing

As can be seen from the statistics given in Table 7, the online PR activities of Slovak wine companies in the Events area are poorly utilized. Only 27.3% of Slovak wine companies are actively putting Events in a digital communication campaign. Even so, Events in Online PR can help winery businesses, in addition to gaining new audiences and securing publicity, to build mutually beneficial personal relationships with potential customers. Thanks to such online PR activities, a winery can create a positive image in the eyes of the target audience.

Table 8 Events - Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Value
Pearson Chi-Square	1,197 ^a	2	0,550	0,562		
Likelihood Ratio	1,196	2	0,550	0,562		
Fisher's Exact Test	1,119			0,562		
Linear-by-Linear Association	,849 ^b	1	0,357	0,450	0,234	0,101
N of Valid Cases	49					

*a. 2 cells (33,3%) have expected count less than 5. The minimum expected count is 3,71.

*b. The standardized statistic is ,921.

Source: Own processing

4. CONCLUSION

Online PR activities offer for wine companies a wide range of opportunities to reach out to their target audience and to build a positive image of the company in a way that is beneficial in increasing sales of new and existing products. Small and medium-sized wine companies in the Slovak Republic, the Czech Republic and Germany can try to inform potential customers about new perspectives, perceptions of their products or services through online public relations. Such a change of perspective will help to inspire their target audience to change the perception of wine companies from a common seller to a popular brand that not only sells but also informs and educates or rewards. Wine companies can influence through online PR public consciousness for a fraction of the cost. Therefore, it is disappointing that wine companies, for example, use the benefits and opportunities of online videos to a minimum. In online PR activities, wine companies can even use online videos as part of on-line Reputation Management as a method of influencing the brand's online reputation or its products. This approach offers wine companies the ability to make video content enhance the status and relevance of the search engine result page (SERP to the selected keywords) relative to the brand or

product offered. Using online videos can also limit, or totally eliminate, the presence of problematic pages in search results.

References

- Bawa, M., Cagáňová, D., Szilva, I., & Špírková, D. 2016. Importance of internet of things and big data in building smart city and what would be its challenges. In Smart City 360° : First EAI International Summit, Smart City 360°, Bratislava, Slovakia and Toronto, Canada, October 13-16, 2015. Revised Selected Papers. p. 605-616.
- Contó, F., Fiore, M., Vrontis, D., & Silvestri, R. (2015). Innovative marketing behaviour determinants in wine SMEs: the case of an Italian wine region. *International Journal of Globalisation and Small Business*, 7(2), 107-124.
- Dries, L., Pascucci, S., Török, A., & Tóth, J. (2014). Keeping your secrets public? Open versus closed innovation processes in the Hungarian wine sector. *International Food and Agribusiness Management Review*, 17(1), 147-162.
- Grell, M., Hyránek, E.. (2012). Matrix models for production systems efficiency's measure-ment. *E+M Ekonomie a Management*, 15(5), pp. 73 - 88..
- Golej, J., Panik, M., & Adamuscin, A. 2016. Smart Infrastructure in Bratislava. In Internet of Things. IoT Infrastructures: Second International Summit, IoT 360° 2015, Rome, Italy, October 27-29, 2015, Revised Selected Papers, Part II (pp. 142-149). Springer International Publishing.
- Janáková, H., Zatrochová, M., 2016. The numerical methods used in the simulation of economic processec. In Aplimat-15th Conference on Applied Mathematics 2016 Proceedings, pp. 583- 590.
- Kuprina, T. V., Kultan, J., Kozík, T., & Minasyan, S. M.. (2016). Meaningfulness of academic migrants' education, its assessment and modeling on IT-based technologies. *Economy of Region*, 12(2). 485-498.
- Nowak, L. I., & Newton, S. (2008). Using winery web sites to launch relationships with Millennials. *International Journal of Wine Business Research*, 20(1), 53-67.
- Tekulová, Z., Králik, M., & Chodasová, Z., 2016. Take advantage of benchmarking methods in measuring performance. In: *Ekonomické spektrum* . vol. 11, iss. 1 p. 27-34

NEW TRENDS IN QUALITY MANAGEMENT

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Abstract

The content of the paper will analyse the development of quality management within the business environment and refer to new procedures in the field of quality economics. In article I would like to deal in more details with the last mentioned methodology, since it is quite known and available in the practice and it does not require any revolutionary experimenting. New trends in the area of quality each time point more urgently at the necessity of focusing on economic aspects.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: measurement of efficiency, analysis of efficiency, indicators of profitability, quality returns, indicator of quality returns.

1. INTRODUCTION

An important starting point for such focusing is the fact that each important activity which is performed in the company (including introduction of the quality management which undoubtedly belongs to such activity) should lead to provable economic effects. Researches show that out of 60% of companies actually measure the economic impacts of initiatives relating to the quality enhancement of company processes with using the methods which are more or less known, consisting of the set of selected indicators. Methods the most often used in the quality management are e.g.:

- Cost analysis known from the literature as PAF, which classifies the quality costs as the costs on prevention, the costs on inspection and external and internal losses from non-qualitative production,
- Benchmarking,
- Six Sigma system (see more in Sujová et al, 2016)
- Balanced Scorecard (BSC) – this is the methodology, which is by many authors considered as a new, revolutionary system of measuring the efficiency (Marcinek et al, 2015). It should be a balanced approach trying to reach the balance in many areas of business, between existing global company aims of efficiency oriented towards an owner, shareholder and customer and internal aims of efficiency connected with critical processes in the enterprise, innovations and with the ability to educate oneself and to grow professionally.

2. MATERIALS AND METHODS

An inseparable part of the analysis of efficiency is the set of selected indicators. Although the computation of indicators is relatively a simple matter, there are series of factors that may distort a complex view at efficiency or the company management. Therefore an important principle is that the indicators forming a portfolio of the efficiency analysis should be selected properly and their declarative ability should lead to real results. (Sujová et al. 2017) In order to construe the results acquired from the calculation of selected indicators reliably, we must know their structure. In practice the most often two approaches are applied. In the first structure we speak about the indicators of productiveness or efficiency (output/input) and in the second structure we speak about the indicators of demandness (input/output). Although both types of indicators reflect the level of transformation process, a principal difference is in their interpretation.

While the indicators of productiveness must be maximalized, the indicators of demandness must be minimalized.

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The dynamics of inputs seems to be very different in the practice. Therefore it is recommended to perform, in this connection, the following types of analyses:

- a) **Analysis of the Development of Analytical Indicators of Efficiency** – with its help we compare individual indicators for certain consecutive time periods. By that we acquire a more complex view at general development of concrete indicators of efficiency during the time sequence defined in advance. It is suitable to record the growing tendencies in efficiency indicators and vice versa the dropping tendencies in demandness indicators. The examples of monitored indicators are: indicator of labour productivity, efficiency of tangible investment property, but also the efficiency of a concrete process, etc.
- b) **Analysis of the Change of Input Caused by 1 % Output Growth** - we come from the precondition that only qualitative inputs represent the guarantee of qualitative outputs. We may then evaluate the acquired results according to the following optimum criteria:
 - if the growth of output by 1 % does not require the growth of input, then this will be the intensive development. A sole factor of output growth is the change of qualitative factor.
 - If the growth of output by 1 % requires the growth of input in the interval from 0.01 to 0.49 % this will predominantly be the intensive development. A main factor, but not the sole one, is the change of qualitative factor represented by analytical indicators of efficiency.
 - If the growth of output by 1 % requires the growth of input in the interval from 0.5 % to 0.99 %, this will be predominantly the extensive development. A decisive factor of the change of output is the quantitative factor.
 - If the growth of output by 1 % requires the growth of input by 1 % or more, this will be the extensive development. A sole factor of output growth is the quantitative factor here.
- c) **Analysis of the Proportion of Quantitative and Qualitative Factor on the Output Change**
 - this analysis is also based on expressing the influence of quantitative and qualitative factor on the change of company output and this change may be expressed relatively in % or absolutely in crowns or other currency. For this type of analysis the most often a logarithmic method is used.
- d) **Calculation of Relative Saving or Absolute Exceeding of Inputs** – development of efficiency using the calculation of relative saving or absolute exceeding again reflects the relation of inputs per output unit. While in the relative saving we speak about the specific saving of inputs per output unit, in the absolute exceeding we, on the contrary, speak about the growth of inputs per output unit.

As we have already mentioned, individual types of efficiency analyses may not be performed without adequately selected indicators. The most often analyzed synthetic indicators of efficiency are **profitability indicators**. The declarative ability of these indicators is almost principal, since they react to the changes in consumption and the link-up of production indicators very sensitively. However, qualitative factors have influence on their level and development in quite a big extent. To monitor these indicators is necessary mostly in view of their development for a certain time period. The most well known indicators of profitability are the following: ROE, ROA, ROI, but also the profitability indicators which are less known and used in the practice, such as: ROC (Return on Customer) – customer profitability and ROQ – quality profitability.

In article I will deal in more details with the structure and declarative ability of the last mentioned indicator.

In the area of quality economy the practice concentrates on the methods recommended by ISO standards and these methods are, as already mentioned, monitoring the expenses relating to quality (PAF) or benchmarking, etc. Monitoring the expenses according to PAF model is quite an old method, existing for 60 years and although it is commonly used in the industrial practice, the deficiency of this model is that it does not take into account the changes that have been performed in the area of quality management in the last decades. Other deficiency is the fact that such monitored expenses on the quality leading to the structure of different proportion indicators, only analyse the structure of these indicators and do not enable to judge whether an offered product is really profitable or the loss one. Therefore in the practice there is more and more demanding need to introduce the access which expresses the influence of quality on reached economic results of the company. In literature this approach is marked as expressing the benefits from the quality and in the British literature the term

“returns on quality“ is used, what indicates that it is the indicator, which is very close just to profitability indicators.

ROQ Model is based on the precondition that it is not only purposeful, but also possible to measure the influence of quality on reached profit. At the same time it is stressed that the main influence of quality on reaching a higher profit is not decreasing the costs on quality, but the efforts aimed at better satisfaction of present customers of the company, maintaining them, but also at acquiring new customers. In this connection two types of marketing are mentioned: ”defensive“ marketing, which is aimed at maintaining present customers and ”offensive marketing“ aimed at acquiring new customers. ROQ model has the character of defensive strategy. Although the importance of acquiring new customers is indisputable, the calculation of profitability of the costs on this strategy is very complicated and inaccurate and the costs on maintaining present customers are identifiable in a more simple way.

The chain of effects and the sequence of steps aimed at maintaining the customers and the influence of these steps on reached profit may be expressed in a following way:

- Expending the means on quality
- Improving the level of production
- Improving the customers satisfaction
- Maintaining the present customers
- Maintaining the position in the market
- Reaching the sales.

The ROQ model consists of the following blocks. The model has two inputs. The first input includes the data of the satisfaction of customer and the data of maintaining the customers. This input continues then in the expression of relation between the satisfaction of customers and maintenance of customers. The second input includes the information about the share on the market leading to mathematical interpretation of the market dynamics. Both these inputs to the model are at the same time basic information for the top management enabling to judge the extent of company opportunities. The next step is an interactive analysis allowing the management to judge the level of individual effects, aiming at the problems of satisfaction of customers and expected effect from expended means. Managerial inputs for this block are:

Extent and dynamics of the market, time horizons, potential limitations and discount rates. The next step is ROQ analysis itself, having two outputs: the output aimed at expressing numerically the present net value for different levels of expending means and time horizons and the second output is the estimation of the market trajectory for given time horizons and different levels of expended efforts.

3. RESULTS AND DISCUSSION

The costs on implementation of such model are not very high, since they relate to problems which are monitored in enterprises (e.g. data about customers), but they are not used in this sense in the ROQ model. At present there are two basic indicators which are suitable to use in this sense – the first one is an indicator of “net present value“ what is one of methods for the evaluation of investment effectiveness (in the British literature an acronym NPV is used). Although this model has a high declarative ability in comparison with presently used approaches, it also has a disadvantage since the indicator of net present value in our conditions include the costs for acquiring the investment for a new product but it does not include that part of the costs which generally influences the quality of products – the costs on research and development, although it is known from the literature that it is particularly research and development where the quality of products in 80% is created. There is also the problem that other indicators of returns are not based on the net present value indicator, but on indicators of profitability, in relative statement they use profit as a factor which must be monitored. This relates to known indicators, such as ROI, ROE, ROA, etc.

The second more advanced indicator is an indicator of “economic value added” designated in the British literature as EVA. In comparison with the net present value indicator this indicator is preferable because it does not include the cost on own capital which are not commonly shown in accounting as if the capital owner would put it into business for free. On the other hand this indicator has also a disadvantage since it is not monitored in many countries and the accounting does not

provide the sources for its monitoring. Therefore specific methods are used for monitoring this indicator exceeding the limits of this lecture.

In order to express the influence of quality on created profit, firstly the approach used in other profitability indicators must be used (already mentioned ROI and others). But we must realize that if we use these indicators to express the profitability in the form of the ratio of profit to certain costs, then the total of these gains is always higher than the company profit. Independently from this, the indicator of quality returns has the following form:

$$ROQ = \frac{P}{CRD} \quad (1)$$

Where: P is calculated profit and
CRD are costs on research and development of a certain product.

There is not any problem to calculate this indicator formally; it should be used mainly in a pre-production stage. The disadvantage of this procedure is the fact that in a pre-production stage the indicator usually does not express the reality since the amount of reached price for product and finally the amount of reached profit are only estimated. On the other hand we may calculate the value of indicator which expresses the ratio of actually reached profit (in a certain time period) to financial costs on research and development of this product. This indicator has a higher declarative ability and expresses the profitability of research and development works in a new products of higher quality. The disadvantage of this indicator is the fact that the profit is a synthetic indicator and therefore it can be used only in the companies producing only one product. If the company produces more products, a numerator of this indicator would contain calculated profit what again leads to inaccuracies because the total of calculated profits not always equals to real profit. The indicator of quality returns would then have the following form:

$$ROQi = \frac{Pi}{CRDi} \quad (2)$$

Where: Pi is the profit from a certain product
CRDi are costs on research and development of a certain product.

In the companies which produce more products an indicator could be used expressing the ratio of reached profit for the whole production programme to the total of costs on research and development of produced products. The indicator of quality returns has the following form:

$$ROQ = \frac{\sum P_i}{\sum CRD_i} \quad (3)$$

where the meaning of symbols is known from the previous interpretation. For this case, mainly if the company monitors the costs on quality according to the PAF model, it is possible to express the indicator of quality returns in the following way:

$$ROQ = \frac{\sum P_i}{\sum CQ_i} \quad (4)$$

Where: Pi is the total of profits and
CQi are the costs on quality according to the PAF model.

But I must say that a considerable part of so-called the costs on quality are not the costs on quality (losses from the non-qualitative production, claims), but they are losses that directly decrease

the company economic result. Mentioned indicators may also be used to monitor the development in the time sequence using the indicator expressing the ratio of reached profit in “j” period to the total of costs on research and development in a certain period to the same indicator in “i” period. This indicator has then the following form:

$$ROQ_{ij} = \frac{\frac{P_j}{CRD_j}}{\frac{P_i}{CRD_i}} \quad (5)$$

where the meaning of symbols is known from the previous interpretation.

In the next interpretation of indicators of quality returns we will come back to already mentioned indicators of net present value (NPV) and to the indicator of economic value added (EVA). But both cases are based on the precondition that the quality is basically influenced by the costs on research and development. Moreover, these costs are not single, but they have the character of operative investments, therefore they may be included to these considerations as investments. If we use the first method, then the present net value equals to:

$$NPV = \sum_{t=1}^n \frac{CF_t}{(1+k)^t} - (CRD + CR_i) \quad (6)$$

Where: CF is a cumulated cash flow value
CRD are costs on research and development of a certain product
CR_i are investment costs caused by the research of a certain product
k is the company discount tariff
t means year 1 up to “n” years

If the indicator of economic value added is used, then

$$EVA = NOPAT - (WACC.C1t + WACC.C2t) \quad (7)$$

Where: EVA is an economic value added
NOPAT is an operative profit after taxation
WACC is a weighted average of costs on foreign and own capital
C2t is own and foreign capital invested for a long term for research and development
C1t is own and foreign capital invested for a long term for other areas.

It shall apply to both procedures that if the indicator value is positive, the development is favourable and if the indicator value is negative, the development is unfavourable, non-profitable. Of course, the interpretation of these indicators is a little different with respect to mentioned differences between NPV and EVA. Both these indicators may be used to express quality returns and they are modern indicators and by their character they are similar to other indicators of profitability.

At present there are next two possibilities how to express the influence of quality on reached economic results. It is either the use of “present net value” indicator or “economic value added” indicator. In both cases it is suggested that if the influence of quality on reached economic results is to be used, the source for expressing such influence are not so-called the costs on quality /e.g. according to PAF model), which in fact does not express the quality at all, but the costs on research and development because mainly in this area the quality is created.

Advantage of the indicator of economic value added (EVA) is the fact that this indicator takes into account also the costs on own capital which are not expressed in ordinary accounting and it looks as if the owners invest their own capital to business for free, while the use of own capital in general

means for the owner the costs in the form of non-reached profit, if such capital would be used in other area than in own company. The disadvantage of this indicator is the fact that its calculation is more complicated and moreover the legislation of accounting (financial reporting) in many countries does not take into account such indicator. In both cases it is also suggested that the costs on research and development are not single costs, but they have the character of operative investments and they should be deducted in such a manner than other investments.

If the first method is used, the influence of quality on the present net value may be expressed as follows:

$$ROQ = \frac{NPV}{CRD} \quad (8)$$

Where: NPV is net present value and
CRD are costs on research and development of products

and when the economic value added is used:

$$ROQ = \frac{EVA}{WACC.C2_t} \quad (9)$$

Where: EMA is the economic value added and
WACC.C2t are costs on own and foreign capital on research and development.

Similarly these indicators may be used also to express the return of costs on quality.
In the first case the return period is as follows:

$$RP = \frac{CRD}{CF} \quad (10)$$

Where: RP is the return period of capital spent on research and development in years.
CF is an average annual cash flow.

In the second case the return period is as follows:

$$RP = \frac{WACC.C2_t}{EVA} \quad (11)$$

The return period is a number of years during which the cash flow brings the value equalling to the costs on research and development of a certain product.

This lecture analyzes some new approaches to the issues of quality economy. These approaches are based on ROQ model, which shows that the costs on keeping clients and their monitoring, as well as the costs on acquiring new clients are more important than a traditional approach for monitoring the quality costs. Therefore author has proposed such system of indicators which is able to express this influence. Of course, the proposed indicators are not exhaustible, but in spite of it they represent the extension of approaches to the quality economy. Such extension may lead to the expression of a “completion ROQ indicator”, which would represent the sequence of the following items:

- costs on research and development
- losses from the non-qualitative production
- costs on defensive market strategy
- costs on offensive market strategy.

Completion quality returns would be then equal to the ratio of profit (or present net value or economic value added)

$$KROQ = \frac{P}{CRD + LQ + CD + CO} \quad (12)$$

Where: KROQ is a completion quality return
RDE are costs on research and development
LQ are losses from the non-qualitative production
CD are costs on defensive strategy
CO are costs on offensive strategy
P is a reached profit for a certain period.

4. CONCLUSION

The value of the KROQ indicator expresses a completion quality return. It is obvious that even this indicator does not express all influences. In any case it has much more higher declarative ability, mainly if it is supplemented by other indicators. The costs on implementation of such model are not very high, since they relate to problems which are monitored in enterprises (e.g. data about customers), but they are not used in this sense in the ROQ model. The author of lecture referred to the fact that even the ROQ model is not complete, since it does not include the methods of evaluation of quality returns as far as the costs on research and development concern, which in fact create the quality.

Acknowledgements

The information provided in this article are part of the author's research work and her research team.

References

- Linczényi, A. 2006. Indicators of Quality Returns, In: *Quality for Life*, Ostrava.
- Nováková, R., 2006. Indicators of Profitability in Quality Management and their Influence on Competitiveness of the Company, In: *Quality for Life*, Ostrava.
- Rust, R., Zahorik, A., Keiningham, T. 1996. Return on Quality. Chicago, Irwin Professional Publishing,
- Marcineková, K., Sujová, A. 2015. Modern Methods of Process Management Used in Slovak Enterprises. *Procedia-Economics and Finance*. 23: 889 - 893
- Sujová, A., Šimanová, L., Marcineková, K. 2016. Sustainable Process Performance by Application of Six Sigma Concepts: The Research Study of Two Industrial Cases. *Sustainability* 8(3): 260.
- Sujová, A., Marcineková, K., Hittmár, Š. 2017. Sustainable Optimization of Manufacturing Process Effectiveness in Furniture Production. *Sustainability* 9(6): 923.
- Synek, M. et al: Managerial Economy, Grada Publishing Prague, 1996

CRISIS COMMUNICATION CONTROLLING

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ABSTRACT

The article deals with the issue of efficiency of crisis communication of industrial enterprises. The aim is to support the efficiency of the crisis communication of an industrial enterprise through controlling. In order to achieve this goal, the knowledge and information base on crisis management, crisis communication and crisis controlling is processed. The model of crisis control is designed on the basis of analysed crisis communication models. The proposed methodology consists of three phases that correspond to the life cycle stages of the business crisis. Attention is paid to the evaluation of the course and results of each phase of crisis communication through performance indicators. The evaluation is carried out according to the importance of different interest groups involved in crisis communication. The aim of this methodology is to support the effectiveness of crisis communication.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: crisis, crisis communication, controlling, performance indicator.

1. INTRODUCTION

The system of information flow in the enterprise is very important, allowing the development of the enterprise, cooperation, is an advantage in competition, but also represents the level of corporate culture. Positive or negative communication depends on the business environment, the code of ethics and the behaviors of owners, managers, and employees themselves Vidová, Jahnátek, Mihok (2007).

Mikulaščík (2003) considers business communication as a means that people are interconnected in an enterprise to achieve a common business goal.

Communication in a business has a two-fold position:

- **Internal mission** - facilitates the implementation of individual management functions and their mutual integration,

- **External mission** - enables business to interact with the outside environment, making the enterprise an open system. In this case, customers' needs, suppliers' options, shareholders' requirements, government restrictions, and so on. The external communication mission is important for business leadership.

Crisis communication Csikósová et al. (2014) is a specific form of social communication in a crisis situation. It represents "the exchange of information that arises between the responsible authorities, businesses, the media, individuals, and groups prior to an extraordinary event, at the time of termination." An essential part of the crisis communication is risk communication Vymětal (2009). It is a tool of crisis management and its mission is to deliver complete, correct, trusted and convincing information at the right place at the right time.

Crisis communication can be broken down into:

- **Internal communication** that takes place inside the enterprise, e.g. between the crisis management components or between the management and the employees of the company,

- **External communication** concerning the company's external relations (for example, with the media through media);

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- **Communicating members of the interference with individuals and groups** affected by an extraordinary event, communication with firefighters, health rescuers with injured and their families, communication of policemen with peers and media representatives.

2. CRISIS COMMUNICATION

Crisis communication is a highly specific area of business as it represents the penetration of crisis management and business communication. From the point of view of crisis communication tasks, which are focused on solving business problems, it is essential to assign its tasks in terms of strategic and operational management (Figure 1).

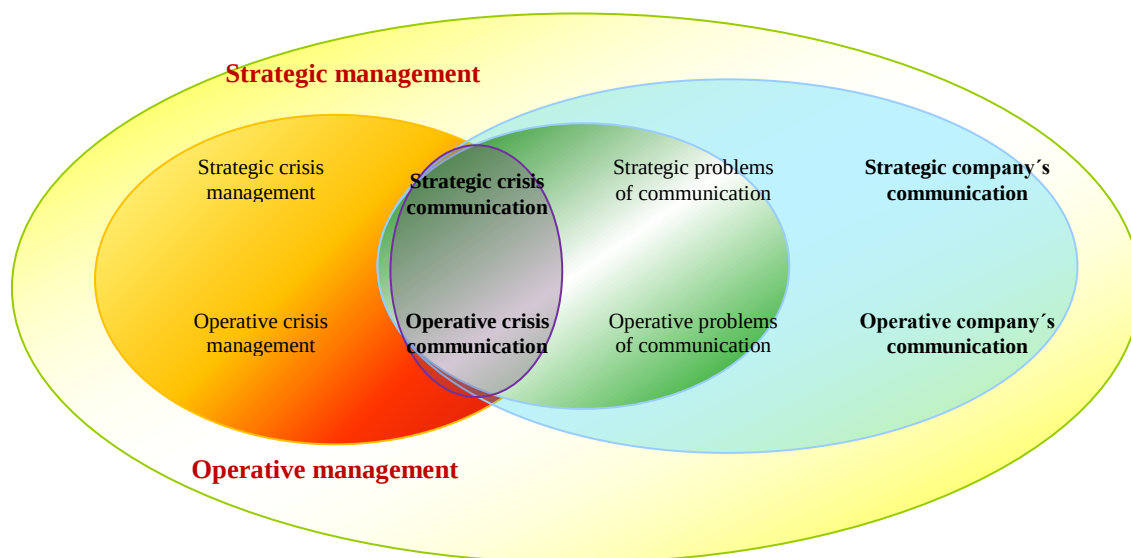


Figure 1 Integrating crisis communication into business management

Source: Kádárová et al. (2015)

Crisis communication should be a superstructure of classical business communication. It is now essential for industrial companies that crisis communication develops in all its forms, such as Proactive, Reactive and Corrective Crisis Communication Rajnoha (2010).

Crisis communication in an enterprise should be based on the concept of corporate social responsibility, which seeks to encourage companies to voluntarily improve their behavior in relation to people and the environment, focusing not only on economic gain but also on the environmental and social aspects of the company's business. It follows that the main areas of socially responsible business are the economic, social and environmental spheres. The social area also includes support for communication with all business interest groups.

The quality of business communication in standard periods is the basis for the quality of communication in the crisis. A redesigned system of internal and external business communication is conditional on preparing a business for the crisis before it becomes apparent. Effective management in crisis situations requires clear targeting, communication, motivation, enthusiasm and emotional intelligence.

Crisis communication management concerns the planning, organization and evaluation of all communication activities related to crisis events in enterprises. These are symbolic acts by which the business and its leaders try to tell others or try to understand the appropriate forms of expression.

Business communication is the culmination of every dream of mutual understanding and understanding. It represents all communication processes for external and internal stock coordination and clarification of interests between the enterprise and its stakeholders, including building the reputation of the business. Of course, business communication consists of external and internal communication. Communication controlling is a link between enterprise management as a whole and communication management (Figure 2).

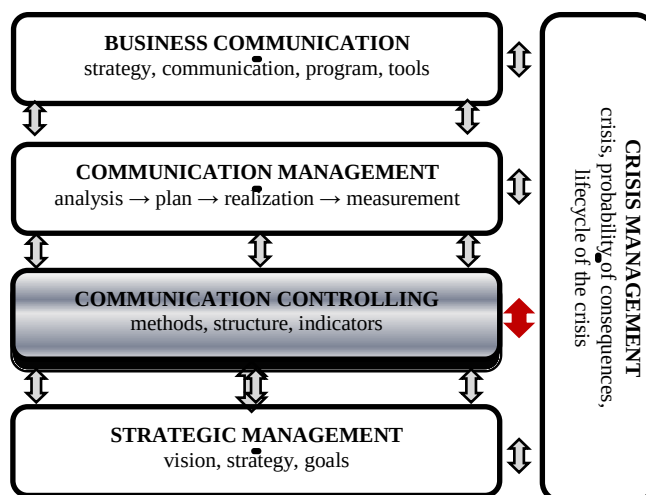


Figure 2 Linking communication and business management

Source: Jahnátek, Vidová, Mihok (2007)

Its role is to carry out control activities in the broadest sense, focusing on the evaluation of the achievement of the company's strategy, the suitability of the organizational structure, which allows relevant communication, organization and distribution of work in the company, which should contribute to the creation of a lasting competitive advantage. Communication controlling supports the adoption of the right decisions to ensure the best possible use of expertise and creativity in terms of crisis management and crisis communication measures.

Crisis communication management Mihok, Kádárová (2012), Csikosová et al. (2012) is the role of top management and corporate communications. In doing so, staff coordination and experience are supported, and external consultants or researchers are supported.

According Zerfaß (2007) Communication controlling is a support and control mechanism that creates transparency in terms of strategy, processes, results and finances of individual business management communication processes, and provides appropriate methods, structures and indicators for planning, implementing and monitoring corporate communications.

Communication controlling provides appropriate methods for investigating added value generated by communication and evaluating the effectiveness of crisis communication during communication control.

3. MODEL OF CRISIS COMMUNICATION CONTROLLING

Communication controlling Sujová, Rajnoha (2012) makes it possible to harmonize interests on all sides of communication and incorporate them into the planning and implementation of communication measures, since professional communication is not only high-cost but also high-risk.

The following controlling tools are used in communication controlling models:

- Assumptions and proposals for a framework of control tools and performance standards that simplify the preparedness and evaluation of crisis communication.

- Indicators by which the effectiveness of crisis communication can be measured.

- Crisis communication card.

- Strategic crisis map.

3.1 Assumptions and proposals

The model of crisis communication controlling is based on several principles and concepts that are important for the functioning of the whole methodology:

I. Assumption - As crisis communication should be a continuous process throughout, before, during and after the crisis, the proposed model of communication controlling should be used at all

stages of the corporate crisis and should be part of the whole process of crisis communication. The individual tasks of crisis communication controlling are divided into these three stages.

II. Precondition - Another principle that formed the basis of the model is the orientation towards individual groups of participants in the crisis. The goal of communication is to achieve an interaction between the business and its environment. This is a link feature. The environment is socially created through a communication process in which people follow the behavior of others and create attributes for meaningful situations. People give meaning to events through their activity and communication with others. However, during the crisis, there is experience of a high level of uncertainty that prevents them from believing in meaningful structures. Businesses need to summarize and interpret information on how the crisis is evolving. These activities, in addition to being meaningful, enable interaction with the participants in the crisis and adjust the direction of the events. Different organizations operating in the field of crisis management affect the environment in a more or less coordinated way. Most crises require the exchange of information as part of the comprehensive network response of public and private organizations.

III. Assumption - The model is based on the Balanced Scorecard concept, the authors of which are Norton and Kaplan. The Balanced Scorecard is a measurement and refinement system designed to deliver a strategy to your business. The BSC can be implemented in an enterprise or specific business unit, and the strategy is tailored to the needs of the business. The Scorecard approach is integrative as it combines the tasks of communication with crisis management and provides good criteria for crisis communication.

3.2 Indicators and crisis communication card

Performance cards have so far been developed for specific areas of crisis management, city management and disaster management, or have been created for different areas of activity, in human resources, marketing, information technology and communications. Vidová, Vida (2006) developed a performance card for natural disaster management projects, in which performance indicators are sorted by matrix disaster management, while the corporate scorecard along with the four BSC perspectives is maintained. Power cards for crisis communication are not yet known.

The purpose of the proposed crisis communication effectiveness card is to (a)• an estimate of the quality of implementation of individual crisis communication tasks according to the crisis communication phases, (b) simplifying decision making; (c) analysis of the strategic options of the company in crisis for the use of crisis communication, (d) continuous learning of the enterprise based on performance evaluation of previous business crises

The Crisis Communication Card is inspired by the Business Performance Cards of the BSC concept and uses efficiency-based methods based on strategic maps, but retains a different structure.

The proposed crisis communication effectiveness card has the shape of a table that has its horizontal and vertical structure (Figure 3):

- The main element defining the vertical structure of the crisis communication efficiency card is the crisis communication phase. The crisis communication tasks were assigned to the individual phases of crisis communication based on the study of crisis communication literature and their own practical experience with crisis management. Altogether, 31 tasks have been proposed, which are measured on the basis of indicators of the effectiveness of crisis communication. The use of individual indicators of the effectiveness of crisis communication depends on the stage at which the measurement and evaluation is carried out. Not every indicator can be evaluated at each stage of crisis communication, but the crisis communication effectiveness card is still usable throughout the crisis communication process.

- The main elements defining the horizontal structure of the instrument are the individual groups of crisis communication participants. Individual groups of crisis communication participants were defined in the chapter, where the significance of individual groups of participants for the enterprise was also defined. This approach is also transferred to the crisis communication effectiveness card.

Phases of crisis communication	Tasks of crisis communication	Groups of participants in crisis communication					
		A					
		Shareholders	Managers	Employees	Suppliers	Customers	B C
Preparatory phase	1.1 Identification of individual groups of participants in crisis communication						
	1.2 Identifying the risks of a business crisis						
	1.3 Monitoring risk perceptions by CC participants						
	1.4 Understanding the risk of groups of CC participants						
	1.5 Elaboration of the crisis communication plan						
	1.6 Creating a crisis manual						
	1.7 Budgeting CC						
	1.8 Determination of business cooperation with media and editors for crisis situations						
	1.9 Evaluation of the company's preparedness at CC						
	1.10 Improvement of resources and human resources capabilities						
	1.11 Improving exchange information towards individual groups of CC participants						
	1.12 Training programs and simulation of crisis communication in the company						
Implementation phase	2.1 The company's first reaction to the outbreak of the corporate crisis						
	2.2 Focus and spread warning messages						
	2.3 Media awareness						
	2.4 Monitoring the reactions of individual groups of CC participants						
	2.5 Exchange of information and coordination of CC with individual groups of CC participants						
	2.6 Instructions to prevent further damage						
	2.7 Clarify the situation and help groups of CC participants to cope with the situation						
	2.8 Continuous monitoring of needs and requirements of individual groups of KK participants						
	2.9 Direct crisis communication						
	2.10 Determination of the crisis apparatus for reporting to groups of KK participants						
	2.11 Assessing the effectiveness of crisis communication						
Restoration phase	3.1 Instructions for recovery efforts						
	3.2 Creating a correct understanding of recovery by groups of KK participants and continuing risks						
	3.3 Continuing monitoring of needs and expectations of individual groups of CC participants						
	3.4 Continuing media relations						
	3.5 Promoting collaboration and coordination in the company and in relation to groups of participants in the CC						
	3.6 Support reflection						
	3.7 Assessing the strengths and weaknesses of crisis communication						
	3.8 Supporting crisis assessment and business learning						

Figure 3 Integrating crisis communication into business management

Source: Vidová, Vida (2006)

The Crisis Communication Card is not just a short list of existing and often irrelevant indicators, but a tool based on research-based critical factors, leading to improved crisis communication effectiveness.

3.3 Strategic crisis map

The Strategic Crisis Communication Map is designed as an instrument presenting the objectives of the crisis communication business. The strategic map in Figure 4 is an example of how crisis communication targets should be linked to crisis management Vos et al. (2011), Kádárová (2010).

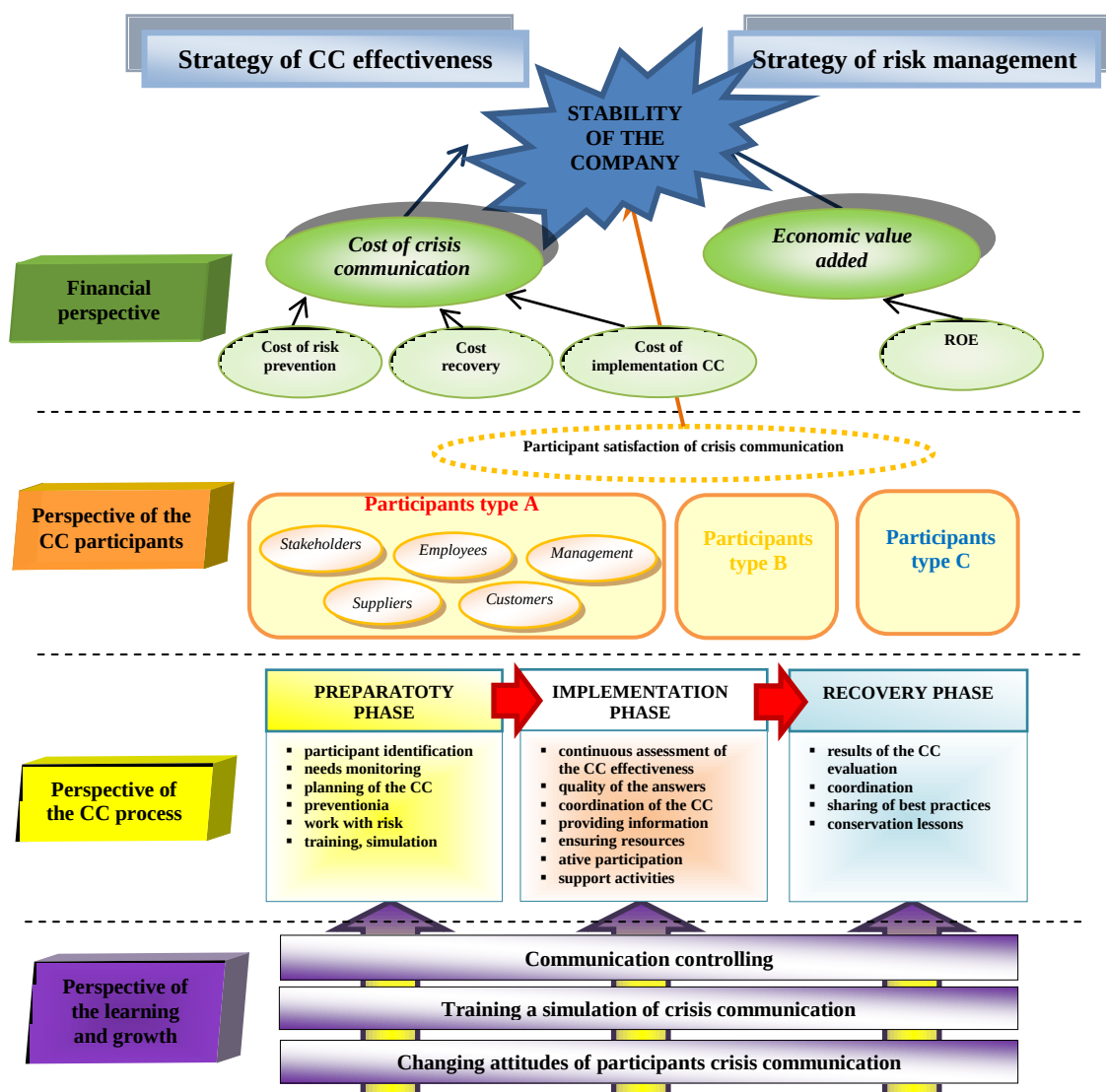


Figure 4 Strategic crisis map

Source: Kádárová, Mihalčová, Kádár, Vida (2015)

The basis for building a strategic crisis map was the general strategic map that Kaplan and Norton put together for businesses. While the goal of an enterprise is to increase its market value, the ultimate goal of an enterprise in crisis is to achieve its stability. Four perspectives are used in the proposed strategic map, but the perspective of the client is replaced by the perspective of the participants of the crisis communication Coombs (2004). Crisis communication targets aimed at participants in the crisis have replaced original customer targets and individual groups of participants become "end users" of crisis communication. Other perspectives remained.

Communication contributes to the realization of corporate crisis management goals. Understanding the risks of the corporate crisis is enhanced by providing information and participating individual groups of crisis communication participants on simulation activities. Crisis management can then be understood as coordination between individual groups of participants, which requires not only activities but also answers to questions of individual groups of crisis communication participants.

4. CONCLUSION

The research was focused on crisis communication of industrial enterprises, focusing on the creation of a model to support the efficiency of crisis communication of an industrial enterprise and the introduction of communication controlling of crisis communication in an industrial enterprise.

Crisis communication is linked to the whole life cycle of the corporate crisis, with emphasis being placed on strengthening the role of crisis communication in order to increase its effectiveness. The Crisis Communication Card is a new, specialized instrument of crisis communication with individual groups of crisis communication participants in managing business crises Kádárová (2010). The tool is designed for industrial companies to improve the preparedness of their crisis managers to communicate in crisis situations. The Strategic Map highlights the objectives of crisis communication, which makes it possible to increase the effectiveness of understanding and cooperation of individual groups of actors in crisis communication, to respond efficiently in the framework of prevention or in the process of reducing the damage to the business as a result of crisis communication. The orientation towards the individual groups of crisis communication participants, the process model of crisis communication and the power card literature, form the theoretical basis of the proposed card for effectiveness of crisis communication.

Acknowledgements

This article was created by implementation of the grant Project VEGA 1/0741/16 Controlling innovation of the industrial companies for the sustaining and improving their competitiveness.

References

- Coombs, W. T., 2004. Impact of Past Crisis on Current Crisis Communication – Insights from Situational Crisis Communication Theory, In: *Journal of Business Communication*, Vol. 3(2004), p. 265–289.
- Csikósová, A., Antošová, M., Čulková, K., 2014. Strategy in Direct and Interactive Marketing and Integrated Marketing Communications, In: *Procedia - Social and Behavioral Sciences*, Vol. 116, p. 1615-1619.
- Csikosova, A., Teplicka, K., Seňova, A., 2012. Communication and Humanization of University Education Through E-Learning, In: *Procedia - Social and Behavioral Sciences*, Vol. 46, p. 2978-2982.
- Jahnátek, Ľ., Vidová, J., Mihok, J., 2007. Crisis Communications and Communication in Crisis, In: *Acta Avionica*, Košice, Vol. IX, No. 13, p. 73-78.
- Kádárová, J., Paška, P., Ružinský, M., 2012. Crisis communication and risk management, In: *Acta Moraviae Scientific journal for economics, management and informatics of European polytechnic institute, Ltd. in Kunovice*, Vol. IV., No. 8, p. 103-110.
- Kádárová, J., 2010. Business crisis. In: *Globalization and Crises in Modern Economy*, Litva, p. 66-91.
- Kádárová, J., 2010. Contemporary Business Crisis. In: *Annals of Faculty Engineering Hunedoara – International journal of engineering*, Fascicule 3, Tome VIII/2010, p. 65-67.
- Kádárová, J., Mihalčová, B., Kádár, G., Vida, M., 2015. Strategy map for the crisis communication, In: *Procedia Economics and Finance: Business, Economics, Management and Tourism*. Vol. 23 (2015), p. 1119-1124.
- Mihok, J. - Kádárová, J., 2012. *Managerial aspects of the company crisis management*, Sjf TU, Košice. ISBN 978-80-553-1255-2.
- Mihok, J., Vidová, J., 2006. *Company management in crisis*, Multiprint s.r.o., Košice.
- Mikulaščík, M., 2003. *Communication skills in practice*, Grada Publishing, Praha.
- Rajnoha, R., 2010. *Strategic management*, TU vo Zvolene, Zvolen, p.159.
- Sujova, A., Rajnoha, R., 2012. The Management Model of Strategic Change based on Process Principles, In: *Procedia - Social and Behavioral Sciences*, Volume 62, p. 1286-1291.
- Vidová, J., Jahnátek, Ľ., Mihok, J., 2007. Business Crisis in Contemporary Global World, In: *Acta Avionica*, Košice, roč. IX/2007 č. 13, p. 101-104.
- Vidová, J., Vida, M., 2006. Strategy maps of the companies, In: *Manažment priemyselných podnikov*, roč. III., č. 4/2006, Zvolen, p. 6-11.
- Vos, M. et al. 2011. *Developing a Communication Scorecard*. Jyväskylä Yliopisto, Jyväskylä.

- Vymětal, Š., 2009. *Crisis communication*. Grada Publishing, Praha.
- Zerfaß, A., 2007. Unternehmenskommunikation und Wertschöpfung: Grundlagen, Wertschöpfung, Integration, In: *Piwinger, Manfred/Zerfaß, Ansgar (Hrsg.): Handbuch Unternehmenskommunikation*, Wiesbaden: Gabler, p. 21-70.

ENERGY SITUATION IN NIGERIA AND ITS INFLUENCE ON SUSTAINABLE DEVELOPMENT DRIVE.

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ABSTRACT

The paper examines current Nigerian energy deficiency situation and the magnitude effects it has on sustainable development drive. Energy and economic growth in manufacturing and social well-being are mutually un-exclusive. A large population of over 160 million depends on less than 3000MW supply of electricity for industrial and socio-economic activities. And the power sector still faces high energy losses from generation to billing, management, insufficient cash collection and has pushed cost maintenance to government funding. As a result, only 10% of the rural households and less than 50% of the entire country's population have access to electricity. This management deficiency encourages the use of fossil fuel powered generators in all the homes and diesel generators for production, thereby causing serious environmental air pollutions, import of goods, and zero manufacturing innovation in the economy among others. This paper takes cognizance of the technical issues involved and suggests how sustainable development could reach its strategies if changes could occur soonest in the energy sector.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: Energy, economic manufacturing, sustainable development, Environmental pollution, and social well-being.

1. Introduction

A brief descriptive background of the energy sector in Nigeria.

The challenges of unstable energy productions and utilization in Nigeria are historical, dated back to 1896 when energy was first introduced into the Nigerian energy market in Lagos. We recalled that this happened fifteen years after it was done in England, (Claudius 2009). But the gap in terms of energy generation, economic growths and social well-being between these two environs are huge today. To achieve rapid growth in any economy means to improve growth and efficiency in the energy sector of such economy. Economic manufacturing is the engine room for poverty alleviation and the only means to attainable development. As energy mix is shifting towards cleaner lower carbon fuels driven by environmental needs and technological advancement, meeting these challenges becomes paramount for Nigeria as a developing nation.

As at then, about 60KW generators satisfactorily took care of the energy demands in Lagos which obviously will not do the same today with a population close to 20 million in the same city alone. By 1946, an undertaking that brought the establishment of Nigerian government electricity to take over the responsibility of energy supply was made under the jurisdiction of public works department. The trend continued as legislative council transferred electricity supply and development to Electricity Corporation of Nigeria, (ECN) and other bodies such as Native Authorities and Nigerian Electricity Supply Company (NESCO) and now unreliable or even defunct Power Holdings Company of Nigeria (PHCN) obtained licenses to produce electricity in other locations in Nigeria.

Presently, the Federal Government owns 100% of the transmission company, while its hold on the generating companies is 20 per cent (with 80 per cent of equity sold to private investors) and in the case of the distribution companies, in October, 2014, total number of nine (9) has been sold, and government only sold 60 per cent and is still holding 40 per cent. In other words, the transmission company of Nigeria (TCN) is 100 per cent owned, generating companies (GENCOs) 20 per cent owned by the government and 80 per cent private sector ownership, (Obatode, 2012 and Claudius 2011). The TCN is controlled by the government (nonetheless, the management of TCN is handled by

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the Canadian company, the Manitoba Hydro Company) whose contracts have not been renewed by this present government. On the 30th day of September 2013, the Federal Government handed over certificates of ownership to prospective owners. Since then the generation and distribution of electricity have been transferred to the private investors.

Despite all this, we are yet to see improvement. Nigerians continuously face an extreme energy supply shortage -- A critical condition that has brought all forms of economic kinetics and development to a standstill. This deficiency is predominately multi-faceted, linking its causes not only to structural, financial and sociopolitical actors but high-energy loss due to lack of maintenance of deteriorating transmissions and distributing facilities, poor metering system and illegal connections in the overall management system thereby causing huge loss to energy (Julia, Kola & Ikeme 2009). All these hinders human capital investment in economic manufacturing and will affect sustainable development drive. Many national policies around the world are working assiduously refocusing attention to better clean energy initiatives to support their economic manufacturing and measure up in competing with the global common future goal centered on industrial revolution to balance social, economic and environmental development as contained in the three pillars of the 2002 World Summit on Sustainable Development (WSSD) initiative.

The paper, therefore, examines these challenges in Nigerian energy sector as a factor affecting sustainable development in the long run. It also presents opportunities Nigeria has in renewable energy potentials where the government can find permanent solutions to power the nation's economy by improving energy efficiency and relying on less within the limits of fossil fuel. Exploring this strategy knowledge that recognizes the pervasiveness of energy use in manufacturing, its importance on living standards, and most significantly in processing, from raw materials to finished goods and services are of great value today due to the current paradigm shift from unhealthy fossil fuel. Efforts were made in this study to bridge the gap between the economic manufacturing, social well-being and environmental pollution resulting from fossil fuel, using life cycle assessment (LCA) impact analytical tool.

2. METHODS AND MATERIALS

The methodology approach used in the study is Life Cycle Assessment (LCA). A system analysis tool. It was used to assess the technical issues of the present energy (electricity) limitations in terms of production and longtime impact on sustainability. Designed to specifically provide analysis on the following:

- I) **Goals and scope:** To assess how the current energy sources has performed in benefiting social well-being, and economic growth. Propose the importance of alternatives (renewable) energy generation for sustainable development drive in Nigeria.
- II) **Materials used:** Materials were sourced from the World Bank site, energypedia PHCN sites, papers presentation and articles on energy crisis in Nigeria.
- III) **Inventory:** Data collected for the study analysis were from the above mentioned sources, renewable energy sources and the modeling was based on indicators that predict the future effects in meeting the present paradigm shift on energy trend in the world.
- IV) **Impact assessment:** Various impact categories were considered within the scope of economic manufacturing not from cradle to grave but from cradle to cradle in the productivity cycle and waste stream to reduce poverty in the large population. Environmental and human implications resulting to carbon pollutions were equally looked at.
- V) **Interpretation:** This recognizes the level of impact on stakeholders who are mostly affected in accessing energy for domestic activities especially in the rural areas where assess to clean, reliable, sustainable and affordable electricity supply of traditional energy system is yet to gain success.

2.1 Energy sources and technical challenges of generation.

To a large extent, Nigerian energy situation has not improved as expected over the years. Energy supply security has not been reliable and has raised an important concern demanding immediate emergency actions. Government involvement for a better economic manufacturing advancement and further justification of substantial percentage roles it plays in investment and

performance is a must for this drive. A critical look at Nigeria's production and export of oil for revenue generation as shown in Figures 1 & 2 is not encouraging for sustainable development.

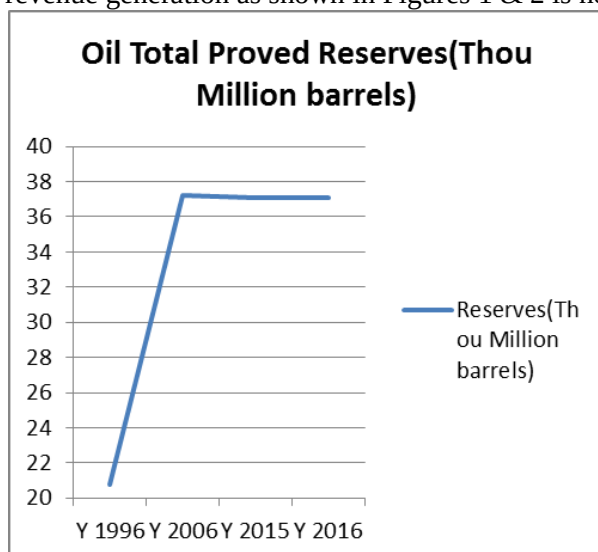


Figure 1 Nigerian oil reserve

Sources: NNPC, 2016.

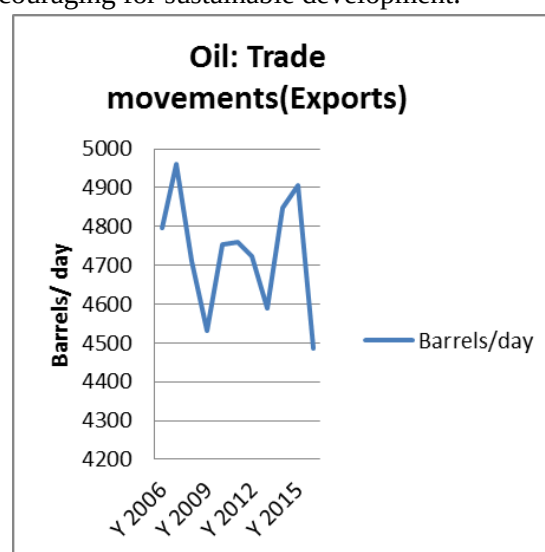


Figure 2 Oil Trade

Sources: energypedia.com decline

To generate electricity for its own population is a big challenge. Instead, the power sector has high energy losses from generation to billing, a low collection rate and low access to electricity by the population as described in Table 1.

Besides that, there is insufficient cash generation because of these inefficiencies. Large population depends on biomass sources of energy generation for cooking and heating. Planning for non-solid fuel has been focused on the fossil fuel exploration to meet the fundamental needs of energy input to human activity and development of the economy.

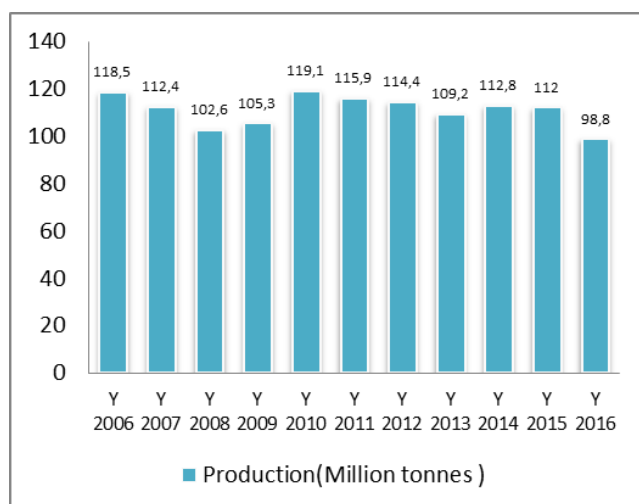


Figure 3 Oil production decline in million tons.

Sources: energypedia.com.

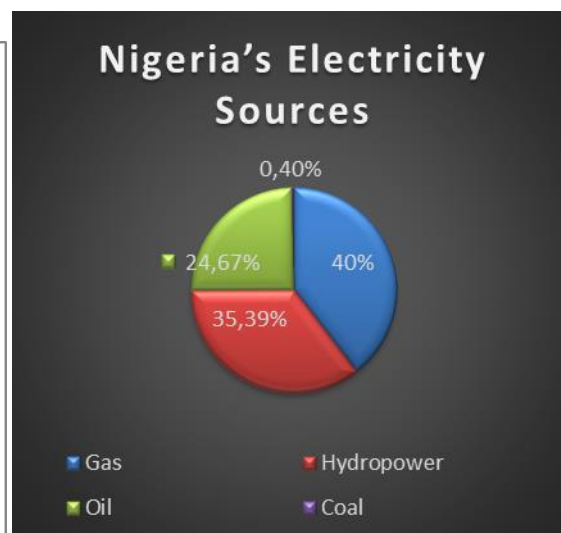


Figure 4 Major electricity sources

If we look through the total distribution of energy production/export, we can say that Nigeria is dependent on the global market due to consumption of petroleum products.

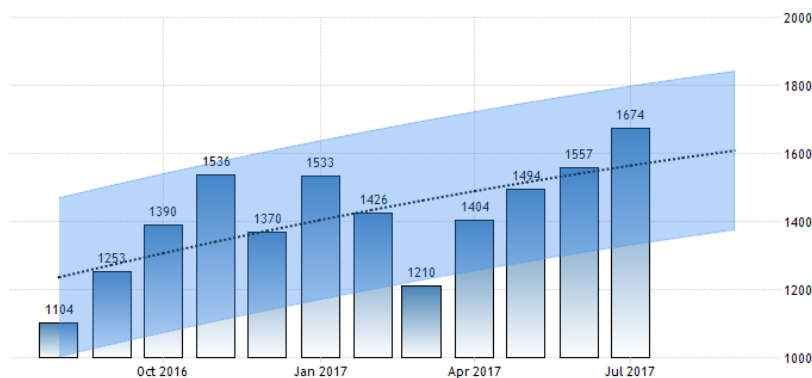
Table 1 Nigeria's fuel and energy balance for 2010, Mtoe.

Indicator	Production (output)	Import	Export	Change for inventory account (including bunker)	Consumption
Coal	-	-	-	-	-
Oil	136,0	-	-131,7	0,7	4,9
Petroleum products	-	7,1	-0,9	-0,6	5,6
Gas	27,0	-	-19,8	-	7,2
Atomic Energy	-	-	-	-	-
Hydropower	0,5	-	-	-	0,5
RES (not including hydropower)	94,8	-	-	-	94,8
International electricity trade	-	-	-	-	-
Energy - total	258,4	7,1	-152,5	0,1	113,1

(Source: tradingeconomics.com)

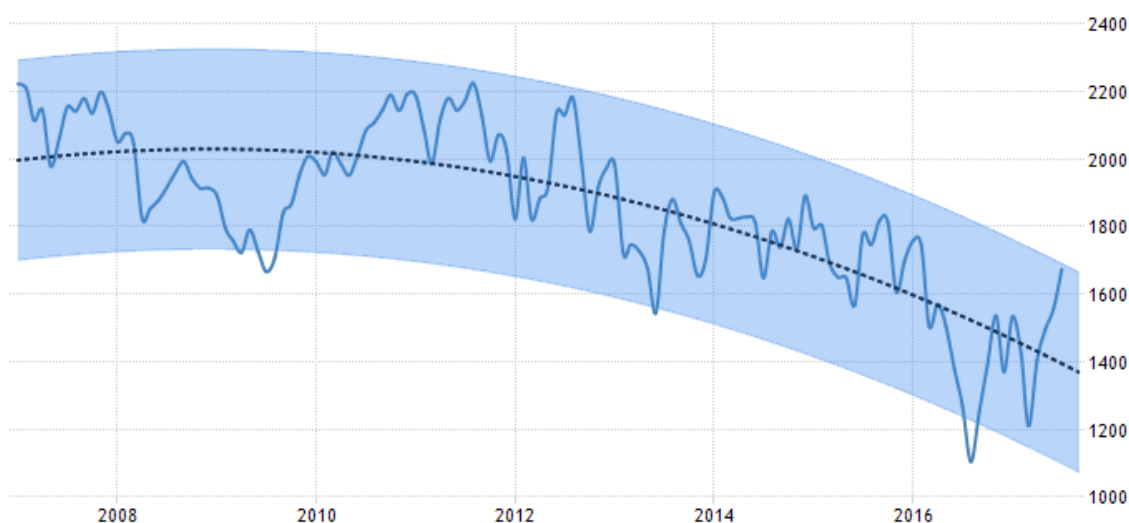
The figures as shown describe production and main sources of energy generation and their deficiencies to meet up energy requirements in Nigerian society.

As we can see from Figure 5, the oil production in the last 2 years tends to increase,

**Figure 5: Nigeria - Crude oil production - forecast**

(Source: tradingeconomics.com)

But if we study the longer period of time, the situation is not very good.

**Figure 6: Nigeria - Crude oil production – forecast.**

(Source: tradingeconomics.com)

Nigeria, Africa's largest economy, is one of the world's largest oil producers. The problem is that only four oil refineries operate on the territory of the country, whose production volumes are insufficient to cover the needs of the economy.

As a result, the country imports most of the fuel. The government for many years subsidized the price of gas stations: that is, the wholesale fuel sellers in the country sold it at a price below the market price, and in return received compensation from the government.



Figure 7: Nigeria - Gasoline Prices.
(Source tradingeconomics.com)

This indicates that Nigeria has a prospect future for gas exploration for energy and exports for revenue however, technical issues might still be a problem.

Table 2 Showing energy sources & technical challenges.

Sources	Hydropower	Thermal	Transmission	Distribution
Maintenance	General Poor maintenance culture.	i) Poor maintenance of gas pipelines ii) Lack modern security against Vandalization.	i) old equipment, ii) Lack of new Innovations. iii) Vulnerability of grid structure to sabotage.	i) Under or over billing payment ii) Smart practices of distributing staff.
Infrastructure	i) Lack of new technology ii) Technical know-how.	Lack of constant supply due to technological know-how.	i) Unstable grid structure. ii) Poor management by government.	Illegal connection of Industrial electricity to national grid.
Output	i) Less river flow & less water, less energy output. ii) Below projected capacity	Low gas pressure	i) Power Evacuation problems. ii) Huge transmission losses 30-35%	i) Overloaded transformer (low voltages) ii) Illegal Manipulation of meters
Potentials	i) Depends on Oscillatory. ii) Seasonal drought.	i) Socio-political issues. ii) Insufficient for household & domestic use.	i) Lack storage facilities. ii) No modern technology	i) Network problems during raining seasons ii) illegal electricity connections
Average performance	Very poor reservoirs	Poor	Very poor. Energy loss	Inconsistent distribution
Carbon emission	High greenhouse emissions.	Heavy emissions from gas flaring.(particulates)	Emissions from fossil fuel.	Presence of emissions.
Economic Manufacturing	Not enough to generate constant electricity.	No reasonable amount for production capacity.	Irregular power generation. ii) poor management	i) Irregular power supply to industrial areas. ii) Poor planning

(Source: Obadote & author 2017).

Table 2 & 3 described technical problems facing energy production and abundant alternatives sources from renewable materials respectively in the Nigerian environment.

Table 3 Renewable energy potential in Nigeria

Energy Resources	Estimated Reserve
Large Hydropower	11,250 MW
Small Hydropower (<30 MW)	3500 MW
Fuel Wood	11 million hectares of forest and woodland
Municipal Waste	30 million tonnes/year
Animal Wastes	245 million assorted animals in 2001
Energy Crops and Agricultural Residue	72 million hectares of agricultural land
Solar Radiation	3.5-7.0 kW h/m ² /day
Wind	2-4 m/s at 10 m height Wind speeds in Nigeria range from a low 1.4 to 3.0m/s in the Southern areas, except for coastal line and 4.0 to 5.1m/s in the North. The Plateau area particularly interesting.

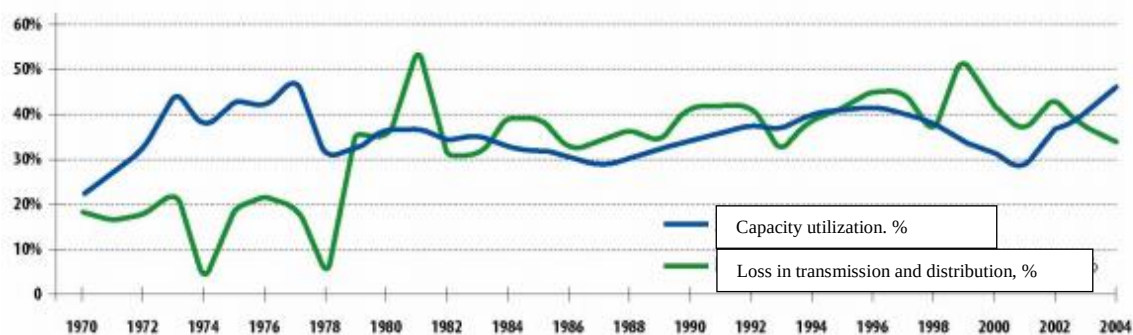
Source: energypedia.com.

3. RESULTS

The life cycle assessment of energy production: Major challenges.

3.1. Generating companies: Using an illustrative case study as reported from advisory power team office of vice president of Nigeria in Vanguard newspapers (18th and 24th of July, 2017 respectively), Nigerian energy sector lost a whopping amount of 7.73 billion NGN within one week due to gas and water constraints. Power supply leaped to 3, 221 megawatts per hour (MWh/h). An average power sent out was merely 3,221MWh/h. From gas constraints we had 852MW, line constraints were 76.5 MW, water constraints was 0MW and Management constraints due to loss of Disco feeders was slated at 2110.5MW. This gas and water constraints are significant technical issues emanating from the generating companies like ASCO, Rivers IPP, and Gbarain NIPP which produced nothing (zero MW) during this time. Meanwhile, on September 7, 2017, average power sent was 3236 to 481 MWh/hour, the Gas constraint was 600MW and the frequency management constraint due to loss of Disco feeder was 2185 MW, Nigerian Electricity Supply Industry statistics (NESI, 2017). An overall assessment of life- wire of this magnitude is a mismanagement of a total loss of investment and unsustainable economy.

3.2. Transmission Company of Nigeria: The Transmission Company of Nigeria (TCN) is still battling with a daily generation of power average of 3000MW to 3500 MW for more than 160 million population with output losses of 2,105MW as reported in NESI 2017 statistics. There is a clear evidence that power sector is plagued with structural problems in all critical areas such as generation, gas supply, transmission, distribution and management to name but a few. An indication that shows the operational capacity of the country's power plant performing less than a third of the installed capacity. The Nigerian Guardian newspaper reported on 20 March 2017, a statistical estimate of the Nigerian Electricity Supply Industry (NESI) a loss of (3million USD) due to gas constraints. Figure 8 showed capacity utilization and loss in transition percentage from 1970 to 2004.

**Figure 8 Indicators of the energy crisis in Nigeria from 1970 to 2004.**

Source Санди Оляинка Ойедепо, университет "Ковенант" (Covenant University), Нигерия

3.3. Under-investment maintenance: In Table 2, observation emerged that under-funding, infrastructure innovation, and poor maintenance culture has limited power transmission to the grid. Also aggressive attacks on oil and gas pipelines vandalism by hoodlums and communities who feel marginalized in the system cripple more efforts -- a situation creating gas shortages at the power plants. It was also noticed that high collection and commercial losses are seriously impacting on the financial viability of the privatized distribution companies and unreliable supply to the distributing companies.

3.4. The Energy Commission of Nigeria (ECN): The strategic development plan mandated by this body to produce energy blueprint and coordinate national policies in the field of energy should be taken seriously. With the aim to serve as a center for resolving technical issues in energy, the ECN has to employed many computer-based tools for energy planning and analyses over the years. In its determination to further promote sustainable energy development in Nigeria, the ECN must collaborate with the Department of Energy and Climate Change (DECC) to ensure better ideas and produced a modeling tool that will concurrently reveal the various energy demand and supply pathways over long-term periods and their consequent emissions in the air for Nigerians to be aware of impending dangers of global warming.

4. DISCUSSIONS

Impact Assessments based on sustainable growth challenges:

4.1. Technology manufacturing gap: - Achieving SDGs requires unique strategy execution which involves closing the infrastructural deficit and technological gap. Nigeria depends so much on the importation of goods and all kinds of products which can be produced locally. And it is due to these lapses in technology that is adequately missing just as energy coupled with system collapse (Victor et al 2017). To succeed in a meaningful project, from the social well-being, infrastructure development, economic emancipation even to improve in agro-based production which government is considering for economic diversification, energy is first on the list. Hence, economic manufacturing is a big challenge in the system. The current energy situation has not met or resolved this and cannot be done with what we have as energy now. As a result, it hinders science of manufacturing, service provision and technology innovation. So, attaining SDGs with what is on the ground is not possible. This might just be another white paper policy that enjoys lip-services in the political atmosphere or a model principle guideline that depicts reality implementation.

4.2. Reliance on oil and gas: - According to EIA, quoting IEO 2016 reference case, in global perspective, natural gas consumption for electricity grows by 2.7% from 2012 to 2040. The natural gas has share increase of 28% by 2040, as referenced in the IEO 2016 reference case. Nigeria has to work hard on sustainable economic growth and management (Sambo & Odiah 2011). This is achievable with the natural gas and renewable energies at her disposal. But to depend on oil to drive the future economy is unrealistic with the present global energy paradigm shift for low carbon. Petroleum and other liquids usage for electricity generation are declining as referenced in IEO 2016 case. A record of 5% falls of liquid fuel in 2012 to 2% in 2040, an average decline of 2.2% per year shows a frightening future of fuel disappearance in the oil market. More so, man-made disasters associated with oil and pollution, agitations and land tenure systems are constraints in Nigerian case. Oil has caused more harm than good to the Nigerian society. Meaning that over dependency on oil has encouraged lazy hangers-on, nobody want to work. State and local government that supposed to be autonomous entities generating internal revenues depends on Federation account (oil proceeds). As a result, Nigeria federal government units have totally neglected other sectors of the economy and oil will soon dry up. This is not good for the economy. Only the elite seems to enjoy the proceeds while the masses aimlessly watch. Nigeria is yet to pursue her implementation policies that can translate into the main goals of renewable sources of the energy system.

4.3. Human implication: Human capital utilization is required to drive abundant natural resources of the Nigerian economy, and bring technology to a limelight. The human resources are not lacking but it needs a broadened management like Chinese international policy to salvage the situation. Energy deficiencies have consequences on human psychology of Nigeria population. Apart from killing individual ideas and innovative goals, it encourages all manners of social unrest, migrations and lack of confidence in government. A situation where only 10% of rural households and less than 45% of

the country's total population have access to electricity is the unappealing situation. Almost every home in the town and some villages have embraced alternative source of unclean energy to power electronics, refrigerators, and other home appliances. These sources are well endowed with heavy environmental hazards of carbon emissions from fossil fuels generating powers of fairly used generator engines. This position is a misplacement of priority for an attainment of SGDs in the long run. Alternative energy self-sufficiency is the main stay.

4.4. Environmental implication and Renewable energies: Human activities are the main sources of greenhouse gas emission characteristics and they are issues challenging the global climate change. Natural gas is least carbon-intensive fossil fuel in the category of all fossil fuels. Its generation technology is known to be more efficient; therefore, natural gas meets the global mitigation of CO₂ emissions for countries like Nigeria where gas is in abundance with enough renewable energy sources.

However, a revision of the renewable energy policies from time to time is also imperative due to Climate change. The impending changes in climate due to human activities have the potential to impact on the already assessed viable renewable energy sources of Nigeria. This leads to uncertainties as to whether the renewable energy potential of the country is likely to be negatively affected. However, these challenges posed by climate change on renewable energy sources according to Moriarty et al (2016) should rather propel or add urgency to a shift to the adaptation and integration of renewable energy systems. The longer the adoption is delayed the lower the technical potential of the country will be in terms of matching up with the challenges posed by climate change. Droughts and flooding are becoming more severe in recent times and can also lead to the closure of some power stations for safety reasons. This has negative implications for manufacturers that rely on one source of energy for their production.

The uncertainties and risks pertaining to climate change and the delay in integrating renewable energy technology in Nigeria calls for manufacturers or industries based in Nigeria to be expedient in the efficient use of energy. Most industries in many countries use about one-third of the energy for their manufacturing activities (transforming raw materials into finished products). Their energy usage rises further when they have to transport their products, leaving behind more CO₂ footprints. The National Association of Manufacturers (USA) suggests the use of good business practices, investment in innovative technologies to achieve energy efficiency and environmental sustainability in this period of increasing cost of energy. It is thus imperative for manufacturers in Nigeria to adopt measures to efficiently use energy and reduce their energy use. This will free up some energy (in the case of electricity) for some rural areas.

5. CONCLUSION AND SUGGESTIONS

5.1 Review of the current need for Renewable Energy in Nigeria for Sustainable Development.

In conclusion, we believe that renewable energy sources are still the best options because they are limitless and have the character of transiting the economy from technology development to productivity with huge potentials. With the rising societal concern over energy, alternative energy sources are at present the only panacea that will get Nigeria out of the energy deficiency as other neighboring countries like Ethiopia, South Africa, and Kenya is already leading in this area. The viability of renewable energy and technologies suitable for successful adaptation has gained much attention especially as the energy situation persists and keeps deteriorating.

1).Review and implement renewable energy policy: Persistent energy problems in Nigeria despite its endowment on renewable forms of energy supply are as a result of poor implementation of renewable energy policies on the ground. Ozoegwu (2017) and others argued that despite the several energy policies especially on solar integration none has been implemented. Its potential to supplement the current energy demand by households and industry in Nigeria, should be prioritized. This will no doubt attract foreign direct investment to the energy sector.

2) Renewable energy job creation: As the Nigerian youths endure massive unemployment, renewable energy is positioned for relief, it has the potentials for massive job creation which can be gained by setting up solar panel manufacturing plants just as being implemented by The National Agency for Science and Engineering Infrastructure (NASENI), and other skill-based training programs to equip and empower the youth to explore the immense opportunities available in the field of Solar

Energy. This will also enable them to contribute in the manufacturing of accessories for solar energy projects. The private sector is also very vital in the attainment of these goals to adopt and contribute to the integration of the solar.

3) **Attaining some SDGs by 2030:** A recent progress report by the UN on the attainment of goal seven (7), highlight the fact that about 1.06 billion people (mostly rural dwellers) do not still have access to electricity, half of which live in sub-Saharan Africa. The integration of solar energy in the Nigerian energy sector will be a big step toward the attainment of the Sustainable Development Goals (SDGs), number 7, which emphasizes the use of clean, affordable and sustainable energy for all. An extensive cost and stakeholder analysis will be required to achieve a successful implementation. The focus for initial implementation should be in rural Nigeria (10% of rural households have access to electricity).

4) **Improving social well-being:** Nigeria being the most populous country in sub-Sahara Africa has a major role to play in the adaptation of renewable energy technologies geared toward the improvement of lives and living standards in rural Nigeria. These technologies if successfully implemented can be shared within the sub-region. This can go a long way to reduce the continual reliance on fossil energy by rural dwellers which leads to deforestation (cutting of timber for charcoal), and the release of combustible gases such as carbon monoxide that are harmful to the environment.

5) **Adaptation of renewable options:** To support Garba (2017) extensive view, suitable renewable energy technologies that can be adapted for use in rural Nigeria should only be considered. The following renewable energy technologies were identified, Biomass (animal waste and plant material) energy technology, solar energy, and wind energy. A detailed assessment of these viable renewable energy technologies in rural Nigeria reveals that solar energy technology (Photovoltaic system) is the only renewable energy technology that has the manufacturing capability in Nigeria for the generation of electricity. Biomass energy technology was also identified to be suitable for sustainable rural electrification and have a massive potential to poverty alleviation. The Biomass technology has the capability of converting organic feed to fertilizer which can be applied on farms to improve the yields of farmers which eventually translates to more income. Wind energy remains a gray area which is yet to be exploited in this sector.

Acknowledgements

I acknowledge with thanks the many sources from which the materials have been put together. I appreciate the contributions made by the co-authors Anna Kurbatova, and Kapralova Daria's input and efforts. I take responsible for deficiencies contained in this work, however, regardless of defects, this article will be beneficial to government of Nigeria, institutions, energy organization, investors and research students.

References

- Claudius A. Awosope, (2009) Nigeria electricity industry: issues, challenges and solutions. Electrical and Electronics Engineering, School of Applied Engineering College of Engineering, Covenant University, Ota.
- Ebewele J.O. (2014) Electricity Sector Reform and the Challenges of Covenant University Public Lecture Series. Vol. 3, No. 2, October, 36 Power Generation in Nigeria, Paper presented at the Summit on Energy And Sustainable Economic Growth, Energy Commission of Nigeria Organized workshop at Ladi Kwali.
- Ebiojuomore O. Elias; (2006) Electric power sector and sustenance, environment, Nigerian Society of Engineers Conference and Annual General Meeting. GATEWAY.
- Garba. A. (2017) Renewable energy technologies assessment in providing sustainable electricity to Nigerian rural areas.
- Julia Kennedy-Darling et al (2008) "The Energy Crisis of Nigeria: An Overview and Implications for the Future", University of Chicago,
- Kola Subair and David Mautin Oke, (2008) "Privatization and Trends of Aggregate Consumption of Electricity in Nigeria: An Empirical Analysis" African Journal of Accounting, Economics, Finance and Banking Research. Vol. 3, No. 3. Pg.20- 21.
- Moriarty, Patrick, and Damon Honnery. (2016)"Can renewable energy power the future?." Energy Policy 93: 3-7.
- Nadel S. (1992). Utility demand-side management experience and potential—a critical review. Annual Review of Energy and the Environment 17, 507–535. This work provides an overview of the demandside management experience.

- Obadote D.J. 'The Energy Crisis of Nigeria: (2008) An Overview and Implications for the Future', University of Chicago, Principal Manager (Performance Management) Jebba Hydro Power Business Unit.
- Odiah R.I; (2011) Challenges surrounding power investment in Nigeria: Insights and perspectives from owners and developers, Paper presented at the Summit on Energy and Sustainable Economic Growth, Energy Commission of Nigeria Organized workshop at Ladi Kwali. Overview and Implications for the Future". University of Chicago. Nigerian Energy Support Programme.
- Ozoegwu. C. G., Mgbemene. C. A., & Ozor. P. A. (2017) . the status of solar energy integration and policy in Nigeria. *Renewable and Sustainable Energy Reviews*, 70, 457-471.
- Sambo A.S, (2011) Energy Options for Sustainable Economic Growth in Nigeria: Status, Issues and the Way Forward, Key note Address at the Summit on Energy and Sustainable Economic Growth, Energy Commission of Nigeria Organized workshop th at Ladi Kwali.
- Victor Ahiuma –Young, Sebastine Obasi & Ediri Ejoh,(2017) Projections for power supply; Nigerians resign to fate as system collapses 22 times in 12 months.
- Watkins G. C. (1992). The economic analysis of energy demand: perspectives of a practitioner. In *Energy Demand: Evidence and Expectations*, pp. 30–92, Guildford: Surrey University Press. This work surveys the major developments of energy demand forecasting techniques.
- Wene C. O. (1996). Energy-economy analysis: linking the macroeconomic and systems engineering approaches. *Energy* 20, 806–821. This work explains the broadening application of optimization techniques to the energy system and its interaction with the economy

Consulted sites-references.

- ENERGYEDIA.COM https://energypedia.info/wiki/Nigeria_Energy_Situation#cite_note-Energy_Commission_of_Nigeria_.28ECN.29.2C_.E2.80.9CDraft_National_Energy_Master_Plan_.5.Consulting_firm.5/09/2017
- ESI – AFRICA <https://www.esi-africa.com/news/nigeria-secures-funding-transmission-projects/September4/09/2017>
- National Association of Manufacturers 2014 -<https://energy.gov/sites/prod/files/2014/05/f15/energy-nam.pdf> 9/09/2017
- Nigeria Electricity Supply Industry Statistics. Read more on <http://www.nesistats.org/index.html>
- Nigeriaenergy.com <http://www.nigeriaelectricityhub.com/2017/07/28/power-sector-lost-n7-73bn-in-one-week/>
- Nigerian Energy Sector - an Overview with a Special Emphasis on Renewable Energy, Energy Efficiency and Rural Electrification Energy Commission of Nigeria (ECN), "Draft National Energy Master Plan 2014. 06/09/2017
- Nigerian National Petroleum Corporation Oil and Gas Statistics 2/9/207 <http://nnpcgroup.com/PublicRelations/OilandGasStatistics.aspx>
- OPEC Annual Statistics Bulletin. http://www.opec.org/opec_web/static_files_project/media/downloads/publications/ASB2017_13062017.pdf 4/09/2017
- Sustainable Development Goal 7. Progress of Goal 7 in 2017.<https://sustainabledevelopment.un.org/sdg7>
- US Energy Information Administration Key findings in the *IEO2016 Reference case* EIA. International Energy Outlook 2016 and EIA. Analysis of the Impacts of the Clean Power Plan International Energy Outlook | www.eia.gov/ieo May 11, 2016. 9/09/2017
- World Bank Group and Nigerian Government Discuss Financial Sustainability of the Power Sector <http://www.worldbank.org/en/news/press-release/2016/12/09/world-bank-group-and-nigerian-government-discuss-financial-sustainability-of-the-power-sector>
- Нигерия. Экономические показатели. <https://ru.tradingeconomics.com/nigeria/indicators>
- ТЭК Нигерии. Российское Энергетическое Агентство. №31, 08. 2012 10/09/2017http://esco.co.ua/journal/2012_12/art116_40.pdf
- В Нигерии отмечается острый дефицит горючего 25 05. 2015 10/09/2017http://www.bbc.com/russian/business/2015/05/150525_nigeria_energy_crisis
- <https://ru.tradingeconomics.com/nigeria/crude-oil-production/forecast>.
- Санди Оляинка Ойедепо, университет "Ковенант" (Covenant University), Нигерия 8/09/2017

ANALYSIS OF BUSINESS PROCESSES AND PROCESS MAPS

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ABSTRACT

This article deals with a complex streamlining of the implementation of processes at the city office, which was addressed mainly by optimizing processes and defining unambiguous procedures for solving partial tasks. Consequently, the aim is to optimize the workload of the individual workers, the substitutability of the professionals and the development of the knowledge of the workers. This part of the study should lead to the strengthening of the company's strategic management in terms of human resources management. The analysis defines the processes that are necessary for the enterprise to meet its objectives and planned outputs. First, we define carrier processes, their contents, inputs and outputs. The supporting processes are described next. The next part of the analysis defines the boundaries and process resources, costs and added value are assigned to the processes. [3] It can be said that the study on which this article is based has led to an improvement in the functioning of the office, the optimization of the workload and the increase of customer satisfaction, all through the transparent setting of the implemented processes. A side effect should be to increase the efficiency of the office's management, as it should be managed strategically and systematically by key processes.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: process, process analysis, process maps, organizational structure.

1. INTRODUCTION

In practice, the process audit can be focused on the entire organization or on selected processes only, using the process analysis application, which is the starting point for subsequent optimization. It is used to identify deficiencies, cost reductions, reengineering, or a survey of service occupations. This analysis helps identify sub-processes, describe them, visualize them, and then merge them into contexts. The output of the analysis is process models or a global process map. Like any analysis, this is associated with risks. There may be risks in poorly chosen methodology or process analysis tools. [1], [2]

The goal of analyzing and reengineering the process is to maximize customization of business processes to customer requirements, to eliminate all of the business processes from being unnecessary and to maximize added value in business processes. [3]

Process analysis is used to prepare a business for change from a functional to a process organization, and typically involves two types of processes:

- Production processes in which material flows predominate
- Administrative and decision-making processes where information flows dominate [3]

Process analyzes are especially relevant in the following cases:

- The company has problems with its performance - it needs to relieve, slim down processes
- The company has a cumbersome organizational structure, it does not meet deadlines and is inflexible
- The company has existential problems and needs radical restructuring
- The company changes its strategy and needs to adapt its processes to it

The process of analyzing and reengineering processes must be the responsibility of top management executives and must be in line with corporate strategy. [3]

2. MATERIAL AND METHODS

For a case study of the process audit, the municipal authority was selected, which was the subject of a procedural audit.

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In order to be able to perform the process analysis itself, it was necessary to set up a solving team from the members of the contracting party and the investigator, who started to analyze and identify the key processes that will be subsequently processed. Selection must be done in terms of performance and the significance of the partial processes. The analysis was carried out on the existing municipal authority processes. The output is to find out how processes are running now, what the gaps in processes are, or where, on the other hand, process detail could be reduced.

First of all, general problems have been revealed regarding the ambiguous defining of processes and the associated attribution of responsibilities. These problems have been detected across the office and we can sort among them:

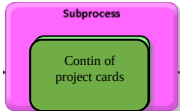
- Imperfect flow of information
 - o Finding information at a time of need
 - o The registry office's insufficient information about the office's activities
- Unclear competencies
 - o Absence of competencies in some departments (not provided eg public transport administration, administration of events, management of leases and others)
- Presentation of the city
 - o Communication with the public
 - o Representing the city.

2.1 Processes map

As stated above, this study was carried out within the framework of a university project in cooperation with the city council. Within the framework of the existing processes carried out at the city office, key processes were identified, which were subsequently mapped and analyzed in detail. Selected key processes were consulted with the office representatives in the team. Part of the process mapping is also an analysis of the responsibilities of individual departments, on the basis of which the responsibilities of departments and workers for individual activities were defined. Then a detailed analysis and mapping of specific, already selected, processes was carried out. For these, a subsequent optimization was carried out, with the timing of individual activities in fulfilling key tasks.

All key processes involved in the process audit needed to be mapped to the process maps based on a detailed analysis. These maps must strictly follow the process mapping principles, the main principle of which is to use the uniform symbols that are described below in the table on all maps as well (see Table 1).

Table 1 Process Mapping - Used Symbols.

SYMBOL	MEANING	ILLUSTRATION PREVIEW
Event (blue box)	Status or resp. event	
Activity (green box)	Activity	
Sub-process (pink box)	Sub process (link to a self-processed process)	
Document (yellow)	New document created (output of the activity)	

Document (orange)	Required document (input necessary for the performance of the activity)	
Message flow	Transfer of information (messages)	
Gateway	Exclusive decision-making gate "either or" (there may be only one option)	
	Inclusive decision-making gateway (the flow of the process can go through more than one path, after the gate passes all the paths are merged into one)	
	Parallel decision-making gateway "and also" (Process flow flows through multiple paths at once)	

Reference: Own elaboration.

After plotting processes into process maps, it was necessary to validate the accuracy of the map by the responsible person or correct them. From the point of view of the utilization of key personnel, it was necessary to draw up detailed descriptions of the job descriptions and, on the basis of them, to create knowledge matrices corresponding to the particular worker. By combining process analysis and analysis of workloads, it was possible to define crisis job positions, those positions for which substitutability is not resolved.

2.2 The process of mapping key processes

One of the key processes was the process of elaborating the city's action plan. This process outlines process mapping and other related activities. The process of developing a city action plan or a long-term urban development plan serves as a means of progressive implementation of planned development. The city's action plan therefore serves to meet the long-term strategic priorities and objectives of the city's development. The city plan is drawn up in annual periods, which corresponds to the annual budget period of the city - that is, for each year, a "city action plan for the year (x) is planned for the next year (x + 1)". The action plan is drawn up in the form of a list of projects and individual so-called project cards.

2.3 Process map and process description

The process of drawing up the city action plan includes, for the sake of clarity, the separately elaborated Subprocess of the project card in detail. At the beginning of the pre-selected period (at the beginning of the year), a continuous collection of incentives is carried out (see subprocess "Creating project cards"). These (feasible) incentives are developed and included in the project stack. At the end of the set period, the outlook from the previous action plan and the individual project cards is updated. Subsequently, an "Action plan for year x with a view to year x + 1" is drawn up on the basis of the processed project cards. The action plan thus prepared is submitted to the City Council for consideration. In case of shortcomings, the action plan is returned to the working group for revision. Otherwise, the action plan is submitted to the council for approval. If the council is not approved, then it is returned to the working group again and must be re-recommended by the City Council. Otherwise, the action plan is approved and the projects are handed over to the individual coordinators who are responsible for the management of the entrusted project.

The working group carries out monitoring of the action plan. All described is evident from the flowchart below (see Figure 1).

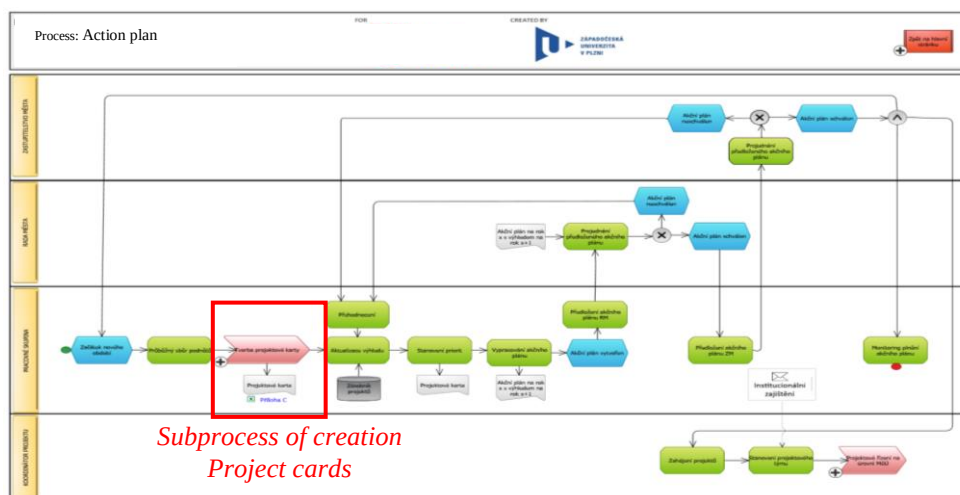


Figure 1 The process of creating an action plan

Reference: Own elaboration.

The subprocess of the action plan is the creation of a project card. Sub-cards are processed continuously as incentives come from either the office or the public. The initiator has the initiative, develops a Project intent (when he can use services of a professional consultant) and submits it to the working group for assessment. The working group will assess it. If it is ok, then the project is considered in terms of feasibility and there may be 3 situations:

- the project is unrealistic and the process ends;
- the project is postponed to a later period and is therefore moved to the archive
- or the project is realizable and gets into the mentioned project stack and at the same time project card is pre-completed (based on the project intent).

All described is evident from the flowchart below, see Figure 2.

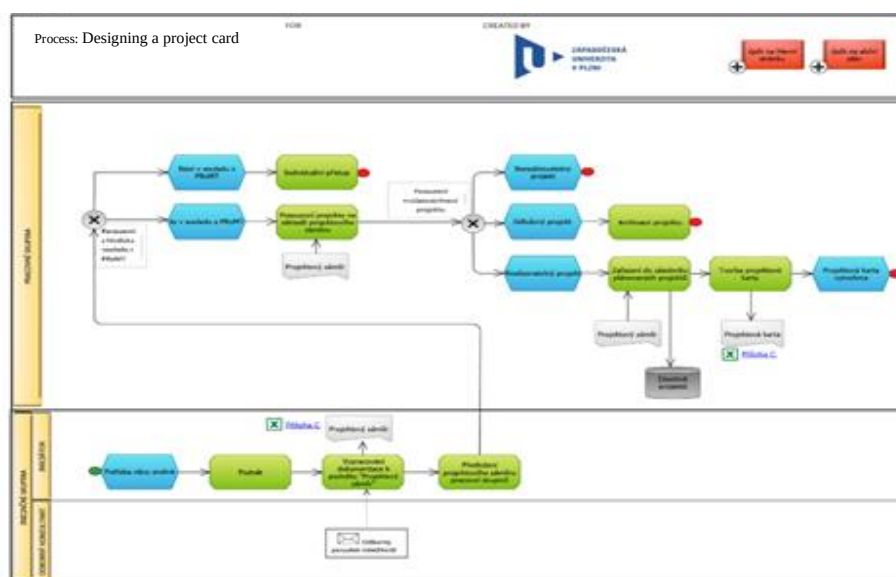


Figure 2 Designing a project card

Reference: Own elaboration.

In this manner all the selected processes that have been identified in advance have been mapped and plotted.

2.4 Mapping of substitutability in individual activities

After mapping out all the identified processes, it was subsequently mapped the substitutability of the activities of individual departments. In the first place, it was necessary to analyze and elaborate detailed descriptions of the work contents of the employees and the resulting knowledge matrix of individual workers by individual departments. Based on this, it was possible to define a strategic education process in order to maximize the possible substitutability and targeted development of the office's staff. At the same time it was possible to define crisis locations based on these documents and to set crisis solutions in case of absence of a key worker.

Mapping of substitutability in individual processes and activities:

- Verification of job descriptions of key or problematic workers
 - o identifying processes and activities in which substitutability is possible and where such substitutability is completely absent. Working papers processed in a uniform form across the office - selected departments processed. The benefit of standardization is mainly clarity and consistency, the first page of the document can also be used as a source of information in case of job occupation,
 - o in total job descriptions have been developed for 45 employees from six departments.
- Creating knowledge matrix for key workers
 - o drawn up on the basis of standardized job descriptions,
 - o the knowledge matrix includes all the key activities that are performed within the department and assigned to the worker under the responsibility for performance. There are three roles to play:
 - a worker performs an activity as major or minor,
 - a worker can fully represent a worker in the absence of a given activity or has a potential for development in this activity,
 - the third role is used to write a worker's comment.

A total of 6 knowledge matrices were developed for each department.

- Determining activities in which there is no substitutability.
 - o on the basis of defined knowledge matrices, activities where is the lack of substitutability are identified.
- Setting up crisis solution
 - o in the short term, substitutability can be solved by other employees of the department having the closest relationship to the activity.
- Defining the training process to maximize substitutability
 - o on the basis of knowledge matrices, recommendations on the training of workers are laid down. Those workers who are aware of the activity will expand their knowledge to maximize substitutability.

	Janůvka	Nová Ves	...
1. Koordinace a řízení činnosti odboru			
2. Koordinace realizace občanských projektů nebo programů			
3. Koordinace realizace vzdělávacích projektů, programů nebo akcí			
4. Zajištění ekonomické a organizační agendy odboru			
5. Zajištění agendy rozvoje města			
6. Příprava podkladů pro realizaci a realizaci a kontrolu realizace Programu rozvoje města Tachova			
7. Zajištění agendy občanských - PR			
8. Příprava návrhů na modernizaci a zveřejnění činnosti Města Tachova			
9. Příprava podkladů a zajištění činnosti města ve vztazích s občany a subjekty			
10. Příprava podkladů a zajištění činnosti a dokumentace			
11. Správa, aktualizace, kontrola a zpracování statistických údajů a programových dokumentů			
12. Správa a údržba a kancelářská agendy při provádění zvláštních veřejných prací			
13. Příprava podkladů a provedení řízení a zveřejnění města			
14. Zpracování projektů pro investiční, kulturní a veřejné služby, dotace a granty			
15. Průběžná a konečná činnost v oblasti projektování a zveřejnění veřejných služeb a grantů			
16. Zajištění agendy dotačních programů a řízení Evropské unie a kulturních fondů a grantů			
17. Koordinace činnosti Města Tachova v oblasti dotačních služeb a grantů			
18. Zajištění agendy správy a péče o město a v rámci dotačních služeb			
19. Archivace dotačních služeb a grantů a veřejných služeb			
20. Správa a údržba služeb a veřejných služeb města			
21. Koordinace činnosti správy a poskytování služeb a podpora a dotace			
22. Správa a údržba veřejných služeb a veřejných služeb a podpora			
23. Zajištění ekonomické správy odboru (účetnictví a kontrola veřejných služeb)			
24. Agendy mezinárodních partnerství odboru			
25. ...			
26. ...			
27. ...			
28. 1. Složení pracovní náplně			
29. 2. Složení pracovní náplně			
30. 3. Složení pracovní náplně			
31. 4. Složení pracovní náplně			
32. 5. Složení pracovní náplně			
33. 6. Složení pracovní náplně			
34. 7. Složení pracovní náplně			
35. 8. Složení pracovní náplně			
36. 9. Složení pracovní náplně			
37. 10. Složení pracovní náplně			
38. 11. Složení pracovní náplně			
39. 12. Složení pracovní náplně			
40. 13. Složení pracovní náplně			
41. 14. Složení pracovní náplně			
42. 15. Složení pracovní náplně			
43. 16. Složení pracovní náplně			
44. 17. Složení pracovní náplně			
45. 18. Složení pracovní náplně			

Figure 3 A preview of a knowledge matrix of workers

Reference: Own elaboration.

3. RESULTS AND DISCUSSION

Based on the business process analysis, it was found that the organizational structure of the company was also required to be checked.

3.1 The current state of the organizational structure

In general, the organizational structure is rated as standard. The current organizational structure of the office corresponds to the usual standard of organizational structure across public administration (city authorities) throughout the Czech Republic. The organizational structure cannot generally be considered as incorrect.

In terms of management issues, however, the management structure is assessed by management experts as inefficient and incorrect.

The underlying shortcomings (or areas for improvement) of the current organizational structure in terms of management are:

- The excessive flatness of the organizational structure
The organizational structure has a high management margin and a low number of management levels. Specifically, this is the position of the Secretary of the Office, who is directly in charge of 12 departments, each department having a very different and very specific content. Secretary position is so very busy, and we can say that we cannot guarantee effective and systematic management and development of all departments.
- Missing direct link of city management to individual parts of the office
The Mayor of the City is directly in charge of the Crisis Staff, the Security Council, the Flood Commission, the Deputy Mayor and the Secretary. And the secretary, as mentioned above, essentially controls the rest of the office. The deputy mayor, if we read from the current organizational structure, does not seem to be managing anything.
- Division of departments due to their content
In this case, there is no shortage but rather a space where there is a high potential for improving and increasing the efficiency of the office's operation.

3.2 Proposed organizational structure

The proposed organizational structure considerably addresses the constrained position of the Office's secretary, who ought to be in charge of the internal role of the Office. (Figure 4)

Furthermore, the proposed organizational structure in terms of substitutability is considered in this way:

Model situation:

- if the Mayor is absent - the first deputy may be represented,
- if the Deputy Mayor is absent –he/she will be represented by one of the heads of the department because the Deputy Mayor is dealing primarily with those who should be the most in the picture - that is, they should be able to do the function most effectively.

Another alternative works with a more classical idea, a situation where, in the absence of any member of the city management, the secretary represents. This way, however, is a step back from the point of view of the overloading of the secretary, as there is a strong premise that the management system will slip back to the original state where the secretary manages all departments.

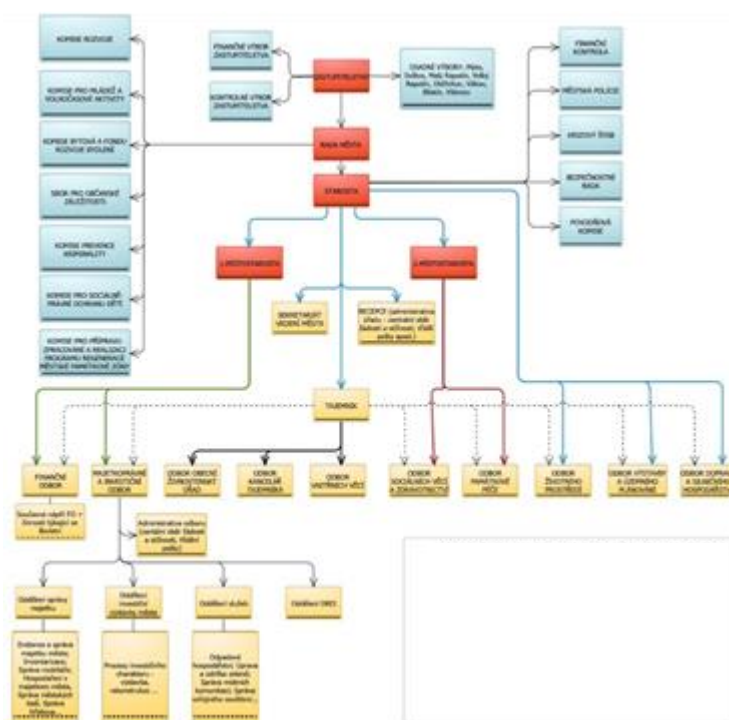


Figure 4 Organizational structure of the city office
Reference: Own elaboration.

4. CONCLUSION

Selected processes were analyzed and mapped into the project, which subsequently led to the processing of knowledge matrix, including the substitutability of jobs.

Because of the scale of the project, only some recommendations can be outlined. The first recommendation is to create a partial process catalogue that allows you to proceed in the same way. This is also related to the use of individual guide books that have been created for selected activities.

To use the knowledge matrix and the associated worker substitutability, it is necessary that the matrix is kept "alive", that is, to keep the data up-to-date. Data updates can be performed on the basis of regular meetings.

Acknowledgements

This article was created with the support of an internal grant from the University of West Bohemia, SGS-2015-065 entitled Development of Sustainable Production System Parameters.

References

- [1] Dvořák, J. a. (2006). Management inovací. Praha: Vysoká škola manažerské informatiky a ekonomiky, ISBN 80-86847-18-7.
- [2] www.managementmania.com, „Procesní audit“ [Online]. (24. 8. 2017). Available: <https://managementmania.com/cs/procesni-audit>
- [3] www.ipaczech.cz, „Analýza podnikových procesů,“ [Online]. (1. 10. 2017) Available: <https://www.ipaczech.cz/cz/ipa-slovník/analýza-podnikovych-procesu>.

INNOVATION OF EMPLOYMENT PROCESS

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ABSTRACT

This article focuses on the innovation process implemented in the company operating in the automotive industry. The main objective is to propose the innovation and subsequent standardization of the selected business process of recruitment and selection of agency workers to the position of the manufacturing operator for two production halls, an assembly hall and an injection molding hall. The study consisted of mapping and analyzing the current state of the process, identifying significant shortcomings and problems on the basis of which improvements were proposed, subsequent standardization and evaluation of the results of the innovated process.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: Innovation, innovation of process, recruitment.

1. INTRODUCTION

Innovation is a well-known, often used term, and its importance is multiplied in today's globalized world, where there are usually many changes that the enterprise must be able to react to and adapt to them in order not to negatively affect its existence. The company must innovate, constantly come up with new ideas whose implementation should ensure that the company's position is maintained or strengthened in a competitive environment.

The innovation of the process is the introduction of significantly improved or new methods of production, services and supply relations. Thus, there are significant changes in production processes, logistics services, equipment, techniques and technologies and software. However, significant improvements can also be applied to associated support activities such as purchasing, maintenance, accounting, human resources, etc. [1], [2]

Business Process Innovation activities include examining process behavior, identifying the causes of problems (linked to productivity, ongoing process processes, or the quality of output processes), and then removing non-productive activities and costs that will lead to a gradual increase in quality, productivity or business process time. [3]

There are two approaches to process innovation: radical and continuous. Radical improvements lead to the introduction of a one-off radical change that will result in a dramatic change in company performance. Continuous improvement is seen as a change that leads to gradual improvement or improvement of processes. [4]

The study focuses on continuous innovation of the support process. The support process serves to enable the main and management processes to be performed and to serve the internal customer as well as the controlling processes. The main processes bring added value in the form of the product for which the external customer is willing to pay, and thus the processes by which the strategic goals of the business are met. Management processes go across the business and do not add value. It is the processes used to manage individual activities in order to preserve the consistency and logic of other processes in the enterprise. [5], [6]

Innovation is, in this case, focused on the recruitment and selection process of new agency workers at the position of the manufacturing operator for two production halls, an injection molding hall and assembly hall. The main reason why this study concern this process is that the current selection and training of new workers is inefficient. Leaders and trainers spend a great deal of time on staff recruiting, especially training, and can't do so for production. Another reason is the growing staff turnover at the position of the operator of production. Fluctuation is primarily due to the employment of poor workers who need to be dismissed sooner or later.

2. MATERIAL AND METHODS

The solution to the given problem was based on the current situation, which was mapped, then subjected to analysis and evaluation. After identifying shortcomings and problems, there was a proposal to innovate the recruitment process. The purpose of the mapping was to capture the process of recruiting the agency worker from the first employee's arrival to the company, through initial training, testing and admission decisions, to training of the worker at the workplace in the assembly hall and injection shop.

The company acquires the position of the operator of the production from external sources, through HR agencies. Approximately 180 operators work in the production of the company, of which approximately 80 operators are agencies, ie they have signed a contract with an agency. A large number of current and accepted operators come from abroad, mainly from Poland, Ukraine and Romania. Some operators understand and speak partly Czech, but there are also those who do not understand the Czech language.

At present, the company can only rely on as many aspirants for production operator position as the coaches have available in a single day for the assembly hall. Every shift, both in the assembly hall and in the injector hall, has two coaches. Therefore, if it is necessary to occupy the operator's position in the halls, four candidates may be admitted to the test or in the extreme situation six candidates, with the fifth and sixth candidates being handled by the shift leader.

The process of recruiting a new worker on the assembly hall was divided into five subprocesses after the mapping, whose name was chosen intuitively and the time sequence is shown in the figure below. The process of recruiting staff for the injection molding and assembly hall differs, and the picture below also illustrates their difference. The recruitment process is repeated with the arrival of a new employee.

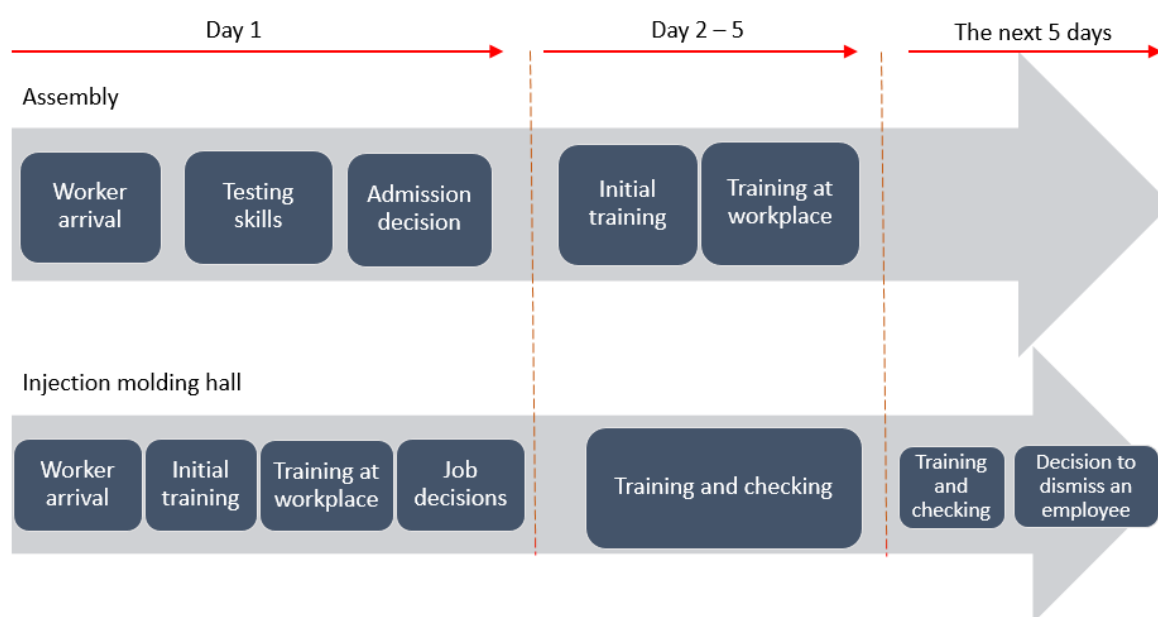


Figure 1 The process of recruitment for injection molding and assembly hall

Reference: own elaboration, 2017

Each subprocess was analyzed in detail, and for the sake of clarity, process maps were created using the EISOD software system and its ORYX module. An example of a subprocess process map can be found in the figure below. The maps illustrate the succession and context of the individual activities occurring in the subprocess, including those inputs / outputs to / from the activity, and who implements them and is responsible for them.

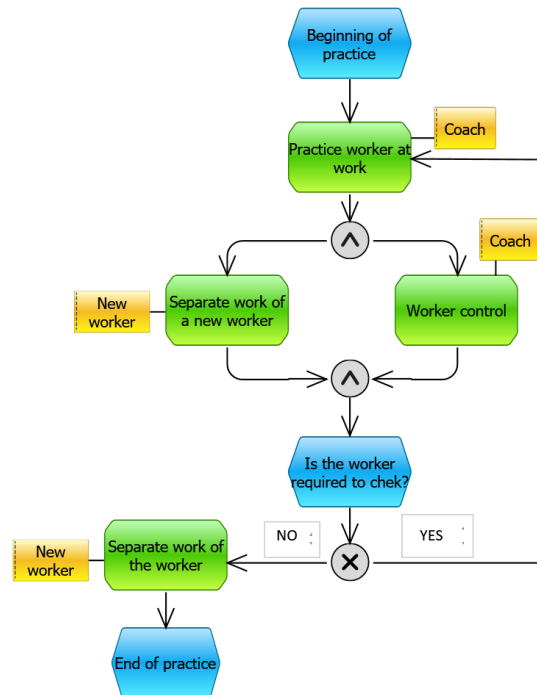


Figure 2 Process map of subprocess "Practice"

Reference: own elaboration, 2017

It was also necessary to analyze the documents related to the processes, especially the document "Requirement to fill a job". This document serves for communication between the head of the center, who completes the form based on the need for a new workforce, and the personnel department, which processes the document and then sends it and communicates with the HR agency. Other documents analyzed were descriptions of the activities of the shift manager, coach and operator. From the job description, it emerged that the only requirement for a worker in the position of a manufacturing operator to be sent to a personnel agency is the completion of basic education.

From the above analysis, it is clear that the current recruitment process is inadequate and contains a large number of inefficiencies, problems and shortcomings that are outlined below.

A big problem is already at the very beginning of the whole process, due to undefined requirements for a worker, so the agency sends every job to the enterprise, and in the worst case where the company necessarily needs human resources, it accepts a lower quality worker. It will be done by training and eventually a new employee may voluntarily leave the company (for example, because he does not like the job, his job is not described in the agency, and he or she will rather work elsewhere) or the masters and trainers themselves think that it is not appropriate to employ the worker further, precisely because he or she is low quality (skilled) and this is connected with it additional costs, arising for example due to manufacturing scrap rates, failure to cope with their tasks, which slows down and disrupts production etc. It is also the reason for the increasing fluctuations of workers.

During process mapping and current status analysis, several of the following problems and shortcomings were noted:

- Accepting poor workers;
- different processes in the assembly hall X injection molding hall;
- ambiguous and incoherent responsibilities for a new worker, initial training;
- worker without supervision;
- inappropriate descriptions of work activities;
- trainer's difficulty - leaving the coach due to accumulation of work on the position he was performing before the arrival;
- idle non-operating) operator;
- language barriers;
- inappropriate training areas;

- a limited number of new staff tested;
- lack of presentation skills of trainers in staff training;
- unnecessary testing in one of the halls;
- individually conducted initial training.

3. RESULTS AND DISCUSSION

Regarding all identified shortcomings, it is clear that the recruitment process needs to be upgraded. The various options for improvement, based primarily on the removal of defined deficiencies, are listed below.

On the basis of the identified shortcomings, the following measures are proposed:

1. Reconciliation of recruitment processes for the assembly hall and the injection molding hall.
2. Create skill tests and ensure that these tests are conducted outside the production workplace.
3. Providing a separate room for testing and training new staff.
4. Improving cooperation and active involvement of the personnel agency.
5. Modification of job descriptions of production positions.
6. Clearly defined responsibilities for performing testing, training, and practice.
7. Translator - Collaboration with existing staff (foreigners), translation of working procedures, training documents, dictionary of the most used words.
8. Ensuring the training of the presentation skills of the workers who will train the training.
9. Better elaboration of the way of training - presentation of OSH, etc.

In order to remove the most important shortcomings, the resulting radical innovation of the recruitment process for new agency workers was presented.

The new proposed process is based on a completely different approach, in particular to the selection of workers, which must include, in particular, selection tests in order to select a suitable candidate or a worker with the expected assumptions for the operator position. Thus, a worker who is able to work in a company in terms of manual skills and at the same time has the presumption that he will stay in the company and will work in the required performance and quality.

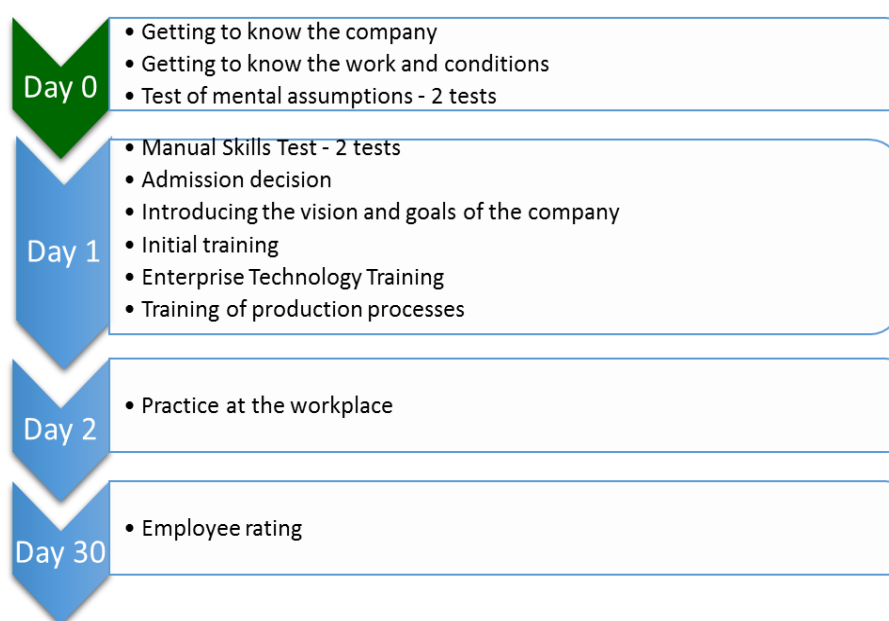


Figure 3 Innovated recruitment process for agency workers

Reference: own elaboration, 2017

In order not to send any workforce to the company, it is necessary that a selection of candidates is already carried out in the personnel agency. The whole process of recruiting new agency workers was therefore divided into two phases. The first phase of the process is carried out in the personnel agency (shown above in blue). The second phase (shown in green) is carried out at the premises of the company, but testing will not take place directly on the machine in the production hall and entrance and legal training in the company's dining room, but in a separate room (one of the company's meeting rooms).

The different activities of the innovated process shown in the above figure have been elaborated in the following table so that each activity is always assigned to a worker who will carry out the activity and will also be responsible for it. It is also necessary to adjust the description of the work activities of individual positions for all the responsibilities assigned.

Table 1 Responsibilities for individual process activities

Activity	Subject in charge
Introducing the company	Agency company
Getting familiar with work activities	Agency company
Test of mental assumptions - 2 tests	Agency company
Manual skills test - 2 tests	Masters in injection molding and assembly halls
Adoption decisions	Masters in injection molding and assembly halls
Introducing the vision and goals of the company	Personnel department
In-service training for OSH, FP	Personnel department
Enterprise technology training	Head of centers
Training of production processes and documents	Head of centers
Practice at the workplace	Coach
Employee rating	Coach

Reference: own elaboration, 2017

Testing mental assumptions is recommended to divide into two parts. The first part can be called a mental test or a literacy test, and aims to determine whether the candidate can read, understand the assignment, and complete the assignment. Tests need to be in the language versions, so that foreigners looking for work can also go through the tests. These tests are recommended to be handled in such a way that individual questions can be answered by selecting from several options for simpler and faster evaluation and, in the case of foreigners, a translator was not needed. The second test is a colour test, which is designed in paper form for testing in an agency company. The aim of the test is to show that the candidate is mindful and able to distinguish colours. Language mutations and choice of answers are also required. For both tests the assessment must be determined; in this case, point rating can be used. If the applicant reaches a minimum threshold, an agency worker must send information about the candidate, including the evaluation of his company's tests, as a confirmation of the selection test and at the same time as the applicant's recommendation for further testing.

The second test, which is already carried out directly in the company, consists of manual skills tests, which are also divided into two tests. The first test is a skill test. When testing skills, it is advisable to have the tests prepared so that after evaluation it is possible to determine the position to which the applicant fits more, whether the production operator for the assembly hall or the hall of the injection molding. For the position of the production operator in the injection molding plant, the test can be used in the form of a shape cut or to measure the force of the candidate's push. At the position

of the assembly plant operator, the assembling test (depending on how it is actually in production) can be used to assemble the correct assembly from the prepared pattern and workflow. The second test is a test of specific expertise or a quality test. According to the provided model, the job of the applicant may be to find poor quality products (surface defects and mechanical defects) that are mixed with high-quality products. Tests can be scored point-based and based on the tasks handled at a predetermined time.

The evaluation of the tests follows the decision of the masters whether the candidate will be accepted and in what position (according to the evaluation of the tests) or not.

The task of the study was also to develop a process standard. The purpose of standardization is to ensure the stabilization of change. In the worst case scenario, the process could be restored to the original state, for example, the personnel agency would, despite the established process, send to the company candidates who did not pass the mental assurance test or would not send the workers to the specified date. [7]

Therefore, it is important to ensure that the innovated process is respected by both the personnel agency and the company. Therefore, an agency worker's cover sheet, which the agency sends to the company when the candidate is selected and recommended for further testing, was designed and created. This document must be signed by both the applicant and the person responsible for the activities carried out to demonstrate that the testing has taken place, including OSH training, etc. The document is called "Schedule for incorporation of a new agency worker" and basically illustrates the course of the process, including the responsible persons, their necessary signatures and signatures of the applicant, and a timetable.

4. CONCLUSION

Thanks to the study and the selected innovation, the original recruitment process for agency workers has changed from the very beginning. In particular, the agency has been involved in the recruitment process, the involvement of the HR department in the process (training) has been established and the realization of sample tests conducted outside the production premises has been ensured.

The advantage of implementing the selection tests is that the right candidate with the required skills and abilities will be selected, which in the future will be signed on the quality and productivity of production. Carrying out these tests outside the production area will ensure smoothness and no disruption to production, and no current worker will wait for work (will be used).

The selected innovation stipulates that already staffing agencies working with a company must make a basic selection of candidates on the basis of tests, so no workforce with which otherwise the coaches would waste their time will be sent to the company. A further selection of workers is carried out in a separate room of the company (no longer in production), and on the basis of the manual skills tests the position to which the worker is best suited can be derived. This avoids duplicate worker training and saves time.

Furthermore, the demand for manual tests and familiarization with the company right from the start encourages candidates to self-assess and reflect on whether they will actually be able to do the job they want and, most importantly, whether they want to work for the company. Even if a candidate succeeds in a manual test, he can think twice about whether to do the job. This also has the effect of reducing employee turnover.

For training and practice, not almost all of the candidates are sent as originally, when there was a waste of time for the coach or the master, but only the candidates who have passed the tests and can be said to be of high quality are sent. Coaching time is now also saved by testing and training more staff at a time, as it has been set only one day a week when training and testing can take place. Even with the selected innovation, the coach will not take part in the selection of workers, so he can fully devote himself to production and control. The coach will only train the worker.

However, in the selected innovation, work was newly allocated to the HR department, namely OSH, FP and waste management training. An external trainer can be hired to carry out this training.

Everything contributes to the fact that trainers are devoted to the actual production and control of new workers and, thanks to the selection tests, they will employ high-quality workers who will ensure quality production in the near future.

Acknowledgements

This article was created with the support of the internal grant of the University of West Bohemia, SGS-2015-0665 entitled Development of Sustainable Production System Parameters.

References

- [1] DVOŘÁK, Jiří a kol. *Management inovací*. Vyd. 1. Praha: Vysoká škola manažerské informatiky a ekonomiky, 2006. 246 s. ISBN 80-86847-18-7.
- [2] VOCHOZKA, Marek a kol. *Podniková ekonomika*. 1. vyd. Praha: Grada, 2012. 570 s. Finanční řízení. ISBN 978-80-247-4372-1.
- [3] SVOZILOVÁ, Alena. *Zlepšování podnikových procesů*. 1. vyd. Praha: Grada Publishing, 2011b. 232 s. ISBN 978-80-247-3938-0.
- [4] SVOZILOVÁ, Alena. *Projektový management*. 1. vyd. Praha: Grada, 2006. 353 s. Expert. ISBN 80-247-1501-5.
- [5] Podnikové procesy. *Podnikátor - pomůže Vám v podnikání* [online]. Copyright © 2012 [cit. 25.02.2017]. Dostupné z: <http://www.podnikator.cz/provozfirmy/management/řízení-podniku/n:16449/Podnikove-procesy>.
- [6] GRASSEOVA, Monika, DUBEC, Radek a HORÁK, Roman. *Procesní řízení ve veřejném sektoru: teoretická východiska a praktické příklady*. Vyd. 1. Brno: Computer Press, 2008. 266 s. ISBN 978-80-251-1987-7.
- [7] KOPČAJ, Andrej. *Řízení proudu změn: všedním způsobem nevšední rozvoj firmy: zákonitosti a metody řízení proudu změn*. 1.vyd. Ostrava: Kopčaj-Silma'90, 1999. 298 s. ISBN 80-902358-1-6.

ANALYSIS OF THE HOUSEHOLD ELECTRICITY CONSUMPTION AS THE ELEMENT OF THE ENERGY CONSUMPTION REDUCTION

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ABSTRACT

The growth of the energy consumption due to the households needs increase is one of the most popular problem analyzed in today reports. Directions of the contemporary energy policy of European countries are aimed at reducing the households energy consumption. The main aim of the paper is identification and analysis of the calculation on the household electricity consumption. This analysis allows identifying the most energy-intensive appliances in households and consequently it allows taking appropriate action to reduce not only the energy consumption of the household but also costs of energy using.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: energy, electricity, consumption, reduction.

1. INTRODUCTION

In the modern world economy, electricity plays a very important role. Global electricity consumption is rapidly increasing, despite its more and more efficient use. The growth of the world economy and the growth of the world's population are accompanied by an ever-increasing demand for energy. High costs of coal mining, processing and transport over long distances became an incentive to replace it with other fuels. There was also noticed dynamic growth of the liquid fuels demand for intensively developing transport what resulted in a rapid increase in the oil production and the energy consumption structure. In 1970 it reached almost 56% in Western Europe, while the share of solid fuels decreased to about 33%. Since changes in the structure of energy resources consumption were combined with an increase in demand, the demand for oil rapidly grew. This has led to a strong and ever-growing dependence on highly developed countries from oil. This was used by oil-producing countries, significantly increasing the price of raw material produced at the end of 1973. This triggered the energy crisis and caused a recession in the economy.

In subsequent years, there was noticed further increase in the oil prices and the energy price increase. It had a major impact on the changes in the world's energy economy. The most advanced countries have taken intensive steps leading to a change in the energy resources share structure in the energy production. Many new energy-saving manufacturing technologies have been developed and implemented. The consumption of fuels in transport has also been reduced, especially in the car transport. Actions taken relatively quickly led to the energy demand reduction. The immediate cause of the high demand for energy is, however, the continued development of industry.

Final energy consumption is defined as energy finally consumed in the transport, industrial, commercial, agricultural, public and household sectors. It excludes deliveries to the energy transformation sector and to the energy industries themselves (EUROSTAT 2016). Figure 1 presents data on the energy consumption in European countries in 2015.

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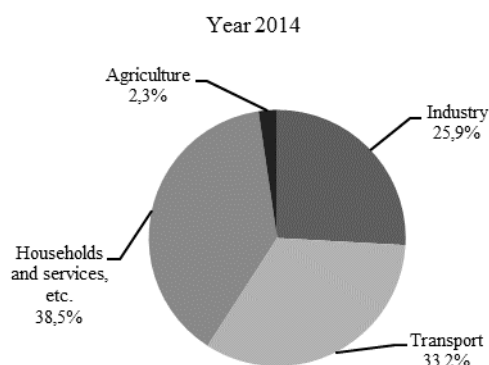


Figure 1 Final energy consumption in European countries in 2014

Source: European Commission. Statistical pocketbook 2016. *Energy and environment*

Data presented in Figure 1 confirm that households and services generate together 38.5% of the energy consumption.

One of the energy forms that is widely used in a modern economy is the electricity. Its consumption, instead of direct combustion of energy resources, especially coal, reduces costs. Hence, there is globally recorded a faster increase in the electricity production than in the energy resources production sector. Depending on used energy source, power plants are divided into three basic types: thermal, water, and nuclear. NASA has seen a list of countries that consume the most energy converted per capita per year. The first four places were taken by Iceland, Norway, Finland and Sweden. Only in fifth place were Americans associated with consumption.

Statistically, Iceland's inhabitants consume 53,274 kilowatt hours each year. More than half, less than 23,174 kWh, is consumed by Norwegians. Scandinavian countries, i.e. Finland and Sweden, also took another place, where the average annual energy consumption per person was 15,738 kWh and 14,030 kWh, respectively. The average American consumes 13,246 kWh in the year, while the Japanese consumes 7,848 kWh. Such high energy consumption in the northern countries is due to low population density, energy intensive industry, rich natural resources (which contributes to easy and cheap energy production), and considerable demand from the harsh climate of this part of Europe (winter is long and dark). For example, in Iceland, the largest consumers of energy are three aluminium smelters. On the other hand, Norwegians mostly have a home heating and water heating system based on the electricity, hence high energy consumption. Northern countries with the highest levels of consumption produce energy based on renewable energy sources. Therefore, their greenhouse gas emissions are low.

Electricity consumption by households fell at a much faster rate than the EU-28 average between 2005 and 2015 in Belgium (where the overall contraction was 27.6 %). The United Kingdom noted a reduction of 14.0 % what was less than 10 % in Portugal and Germany. At the other end of the range, household electricity consumption rose in a majority (18) of the EU Member States, generally by less than 10.0 %. Among the seven Member States with higher increases in electricity consumption, the largest expansions were recorded in Romania (31.0 %), Lithuania (23.0 %), and Bulgaria (17.7 %) (Eurostat 2016).

The growing electricity in European countries has been attributed to increased ownership of appliances and increased use of appliances with, in particular, a greater use of cold appliances to store food. Phenomenon of the electricity consumption growth was also result of wider societal changes, such as, increased living standards and life expectancy, lifestyle changes, automation of jobs previously done by hand and increases in smaller and fragmented households (Boardman et al. 2005). Some worldwide studies concern the effects of appliance ownership and use on electricity consumption in domestic buildings (McLoughlin et al, 2012). A detailed international review and discussion of these effects is provided by Jones et al. R. (2015).

More and more discussions are taking place on the energy future of the world, looking for possible paths that humanity could follow. There are initiatives in the business that save energy by

investing in various types of investments to meet legal requirements. However, in the case of individual households, due to their size and other conditions, it is extremely difficult to enforce certain assumptions (Potkany et al.2015). Lewandowski (2012) points out, however, the enormous potential of individual households in terms of energy savings due to their universality. In this situation, we should focus on educating the public awareness and pointing to direct benefits from the actions taken.

2. MATERIAL AND METHODS

The aim of the study presented in the paper was to determine the energy consumption of individual devices and the simultaneous identification of the main costs generators. The study allows identifying possibilities of taking effective measures to reduce energy consumption in the analysed household. The study was conducted in 2017. It consists of controlling and recording the working time of individual electrical appliances, including the time of incandescent light bulbs. Working times of the whole month were summed up and multiplied by the power of the device. The power of individual appliances has been obtained from the energy labels on the devices, the rating plates or the supplied user manuals.

The energy consumption noted in the research period was multiplied for each unit separately by the cost of 1 kWh of electricity in accordance with the tariff of the holding operator X. To verify the correctness of obtained results, the costs of using the various devices were summed up to a total sum (168.13 PLN). The final sum was compared with the sum for payment on the electricity bill. The amount calculated was slightly different from the amount on the bill. This could be due to the adopted rounding for receiver operating times, discrepancies between actual power consumption values and the value given on the unit (e.g., the mixer is rated as nominal and maximum power, the average of these values has been accepted for testing and the power, similarly with an automatic washing machine or an oven), as well as the averaged power consumption of stand-by devices and switch lights.

The research object is the household X that is a single family house in the Częstochowa district (Poland) with an area of 120 m², built in the 1980s (electrical installation only partially mentioned, which may result in increased electricity losses in the building). There is used G11 tariff as the electricity price tariff, where the cost of 1 kWh is constant around the clock and regardless of the day of the week.

The house is equipped with a boiler for eco-coal with a computer, lack of mechanical ventilation and air conditioning. For typical household appliances and TVs, the majority of households use a gas cooker, an electric vacuum cleaner, an automatic drum machine without a dryer, two flat screen TVs, a tower, and two laptops. Residents also have a desktop computer and a multifunctional printer that allows you to print, scan and copy documents. The farm, unlike many other farms, is not equipped with a microwave, dishwasher or fridge-freezer (it has two separate appliances) (GUS 2015).

The average annual energy consumption of households in Poland is 2173 kWh, which costs an average of 1386 PLN at the price of 0.64 PLN / kWh (GUS 2015). Household X is significantly above average with an annual consumption of 3039 kWh at the price of PLN 0.59 / kWh, which is PLN 1793 per year. It should be noted, however, that the analysed household is inhabited by as many as 6 persons, where the highest proportion of households in Poland are single and double dwellings, whose electricity demand is lower, and by their significant superiority over 5 or more households have significant impact on average consumption (GUS 2015). The energy consumption of the analysed household X was presented in Table 1.

Table 1 A spreadsheet that calculates the amount of energy consumed by the device in a given month and generates the cost

Device	Power in watts (W)	Power in kilowatts (kW)	Monthly of operation (h)	hours device	Monthly power consumption of the device (kWh)	Price per 1 kWh (PLN)	Monthly cost of energy charged by the device (PLN)
Television	55	0.055	90		4.95	0.59	2.92
vacuum cleaner	1600	1.6	4		6.4	0.59	3.78
Iron	2200	2.2	8		17.6	0.59	10.38
Blender	280	0.28	2		0.56	0.59	0.33

All household electrical appliances X are divided into 4 groups: "household appliances" (household appliances such as refrigerators and washing machines, but also small sandwiches, mixers, etc.) RTV "(such as televisions, computers, smart phones with chargers too)," Lighting "and the group" Other ", which was located in the well pump, boiler control, consumed by devices in standby mode, and light switches with signalling lamps .

3. RESULTS AND DISCUSSION

The most energy-intensive group was a group of "white goods", second place went to a group of "TV", then follow "light" and "Other." Figure 2 shows the percentage share of individual groups in total electricity consumption in the analysed household.

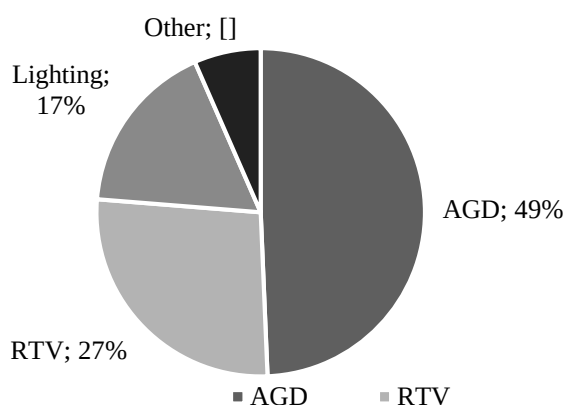


Figure 2 Percentage share of individual device groups in total energy consumption in the household

Source: own elaboration

The highest energy consumption by a group of "white goods" translates into the highest generation costs by this group, including the oven (18.88 PLN/month), hair dryer (18.59 PLN/month) and iron (10.78 PLN/month). In the "RTV" group, the most energy-consuming is a desktop computer, generating costs at the level of 13.45 PLN/month. Cost of energy consumption by individual groups is shown in Figure 3.

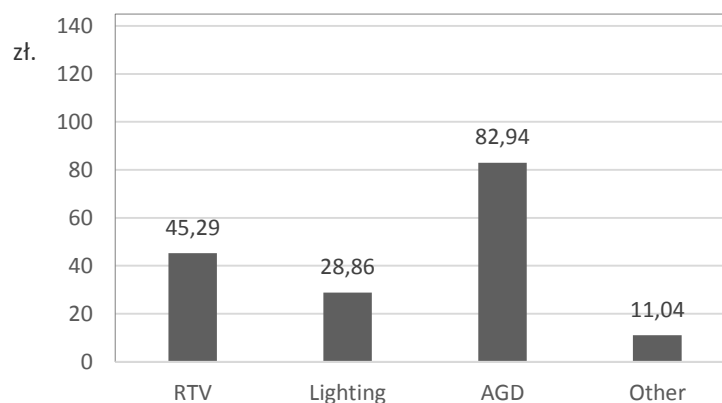


Figure 3 The monthly cost of the energy consumption in the household X by each group of appliances users in the selected month in 2017

Source: own elaboration

The largest energy consumption costs generation was identified by a "household" group due to the large number of appliance using, the necessity of daily use in preparing meals, the 24 hour operation of the freezer and refrigerator, but also from the fact that not all appliances are of the highest energy class and have been in operation for several years. The second group is RTV equipment including the previously mentioned desktop computer, which is also used in addition to laptops. However, the hour of using a 33 Watt netbook costs 0.02 PLN, and the same time of using a desktop computer costs 0.90 (with a total power of 1.52 kW). Almost every night the router stays switched on even it is not used. The X household uses both incandescent, energy efficient and traditional LEDs, as well as halogen lamps, which are available in stores even in low energy classrooms such as D (this group also has the potential for this energy save). The "Other" energy consumption level is the smallest, but stand-by devices have a power output of up to 30W, generating additional unnecessary costs.

4. CONCLUSION

Despite nearly three times the number of inhabitants compared to most households in Poland, electricity consumption is higher, but not more than three times. The number of household members may affect the level of operation of the dryer or television, but it does not affect the refrigerator or freezer.

The analysed household is able to reduce the consumption of electricity, and hence the costs incurred for its use, among others. through:

- replacement of traditional incandescent lamps and halogen lamps for compact fluorescent lamps or so- LEDs,
- renouncing switches with traffic lights,
- limitation of computer use only for laptops,
- Turn off the router when not using it,
- not in stand-by mode,
- purchase and use of the microwave if the portion of the meal is small,
- when it is needed to buy a new device - choose those with high power classes (when choosing A + equipment it can be saved up to 25% of electricity compared to Class A).

On the other hand, in every household without having to pay for the purchase of new high-power equipment to reduce electricity consumption:

- start the washing machine only when the full load is collected,
- take care of the fridge i.e. do not allow it to icing,
- do not leave chargers in contact when they are not in use,
- turn off appliances and lighting when not in use when no one is in the room,
- clean the vacuum cleaner regularly / replace the bag.

The analysis of household electricity consumption X, supported by literature, shows that there is potential for saving energy in private homes and apartments. No specialized equipment is required

for basic analysis, and it is the starting point for taking appropriate measures to reduce electricity consumption. Some of the activities are just a change of habits such as not putting the chargers connected to the contact when not using them or extinguishing the unnecessary bulbs, which in no way affect the lowering of the standard of living. Buying high-end equipment is unmistakably associated with higher investment costs compared to lower-end devices, but they consume less power, making their operation much cheaper, making the purchase cost-effective.

Acknowledgements

This work is related to the scientific program of the "Improving quality of processes, products and services" BW 615/201/07 supported by Polish Ministry of Science and Higher Education.

References

- Boardman, B., Darby, S., Killip, G., Hinnells, M., Jardine, C.N., Palmer, J., Sinden, G., *40% House* [online], Environmental Change Institute, University of Oxford, UK. Available at URL: <http://www.eci.ox.ac.uk/research/energy/downloads/40house/40house.pdf/>, 2005 (accessed 17.11.15)
- European Commission. Statistical pocketbook 2016. *Energy and environment*
- Eurostat 2016. *Glossary: Final energy consumption*.
- Ginalski Z., Oszczędzanie energii w domu. <http://www.cdr.gov.pl> (15.09.2017).
- GUS 2015. Energy consumption in the households in 2015. Warsaw.
- Jones, V., Fuertes, A., Lomas, K.J., The socio-economic, dwelling and appliance related factors affecting electricity consumption in domestic buildings. *Renew. Sustain. Energy Rev.*, 43 (2015), pp. 901-917
- Lewandowski W.M. *Proekologiczne odnawialne źródła energii*. Wydawnictwo WNT, Warszawa 2012, p. 415-422
- McLoughlin, F., Duffy, A., Conlon, M., *Characterising domestic electricity consumption patterns by dwelling and occupant socio-economic variables: an Irish case study* *Energy Build.*, 48 (2012), pp. 240-248, 17-38.
- Potkany, M., Vetrakova, M., Babiakova, M. Facility Management and Its Importance in the Analysis of Building Life Cycle. 4th World Conference on Business, Economics and Management (WCBEM) Book Series: Procedia Economics and Finance. Volume: pp: 202-208 Published: 2015

HORIZONTAL PRICE TRANSMISSION OF THE MILK MARKET IN THE CENTRAL EUROPEAN UNION COUNTRIES

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ABSTRACT

The prices of agricultural commodities have been volatile in the last years and dairy sector has not been an exception. Milk producers were affected by price transmission not only in vertical chain but also horizontally. Our paper aims to assess the linkage and patterns between the prices of cow's raw milk in Slovakia and other central European countries. For this purpose the price transmission methodology, such as unit root tests, cointegration tests, error correction models, and Granger causality tests are used. We apply monthly data for producer prices of raw milk in the following EU member states Slovakia, Czech Republic, Poland, Hungary during the period from January 2005 to June 2017. Our results confirm the existence of the Law of one price when milk producer prices in different locations are co-integrated.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: horizontal price transmission, cointegration, milk production, error correction models.

1. INTRODUCTION

Price volatility is an intrinsic part of all markets, as prices adjust to changing market terms. Strong price fluctuations got a lot of attention in empirical literature and especially after the crisis period. Years 2007–2008 were marked as the global food crisis. The agricultural market prices were increasing for many months and in a short period of time dropped from a historic maximum down. This decline was affected by the economic recession and the surplus of products on international markets. That had an effect on welfare of both producers and consumers.

Beside price fluctuations, producers and consumers are affected by price transmission which allows to improve the understanding of price behaviour, especially how prices are transmitted from producer to consumer level within the same food supply chain (vertical) or transmission between the different areas (horizontal). These changes are determined by the speed, magnitude and the nature of the adjustments, which respond to market shocks at the different levels of the chain. (Vavra et al. 2005) Price transmission at various stages of vertical chain got a lot of attention in the literature (Capps & Sherwell, 2007; Fernández-Amador et al., 2010; Stewart & Don, 2011; Bakucs et al., 2012; Bonnet et al., 2015; Zeng & Gould, 2016 and others). The price movements between spatially differentiated markets at the same stage of the supply chain are also known as the spatial price transmission (Garcia-German et al., 2014) and regarding also the European Union is applied the law of one price. According to the EU's Common Agricultural Policy, the agricultural products are required to become spatially integrated within member states. In the case of a well-functioning integrated market in standard conditions, the price changes on world market should be reflected into the domestic prices, relatively smoothly, with a short-lag that is needed to transfer between markets.

With continuously expanding of common market, increasing the trade liberalization and market integration, some studies have examined the influence of international markets on domestic markets and the relationship between prices in different countries and regions (Goetz & von Cramon-Taubadel, 2008; Esposti & Listorti, 2013; Mengel & Cramon-Taubadel, 2014). These price movements can be related with transmission across various agricultural commodities know as a cross-commodity price transmission (Asche et al., 2005; Karikallio, 2015 Nielsen et al., 2007; Esposti &

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Listorti, 2011), then from non-agricultural to agricultural commodities (Mensi et al., 2013; Zilberman et al. 2012; Serra, 2011) or across different purchase contracts for the same commodity (Baldi, 2011).

It is necessary to characterize and to describe better the spatial price relations within different products to understand the concepts such as *market integration*, *market efficiency* or *spatial arbitrage*.

Market integration is an indicator that can explain the differences between the markets, which are related to each other. Fackler and Goodwin (2001) noted that the market integration refers rather to the tradability of products between spatially different markets and may express the degree of price transmission among these markets. Price transmission reflects the extent of market integration and market efficiency. Integrated agricultural markets are considered as efficient markets. To examine the *market efficiency* is often performed through the research of spatial integration. As a result, the analysis of horizontal linkage is considered as a common tool in market integration analysis (Karikallio, 2015). However, the perfect price transmission is not realistic. These price movements may differ, sometimes in the greater, sometimes in lesser scale, depending on differentiation of economies, domestic policies, government restrictions, transfer costs, market imperfections, different price shocks and the other factors.

Barrett (2001), Holst and von Cramon-Taubadel (2013) discuss the differences between market efficiency (as consequence of price equilibrium in spatially different regions) and market integration (as consequence of physical trade flows). These terms are often used interchangeably because of the lack of comparable trade data.

The arbitrage takes advantage of a price difference between two or more separate markets. In an equilibrium concept, in a well- functioning market, the price shocks occurring in one market, cause responses in other markets. As a consequence, the prices of same products in two separate locations will differ by the transport cost from the cheapest market to the most expensive one (Serra & Goodwin, 2006).

A large majority of the studies related with horizontal price transmission have been dealt with the food and raw material markets. According to McCorrison (2012) the linkage between the world and domestic prices also may be weak. In the study of Lloys et al. (2012), the prices of raw agricultural commodities incline to be more volatile compared to the consumer market prices.

Ghoshray (2011) provides the numerical estimates on the empirical relationship between international prices and domestic prices in selected Asian countries. He found that long-term international market prices impact on Thai beef prices, but the short term effects were insignificant extent. Study of Bakucs et. al. (2015) provides a quantitative analysis of the wheat producer pricing behavior on two neighboring wheat markets Hungary and Slovenian. The results show that Hungary is the price leading market and Slovenian wheat prices are determined by Hungarians. Another recent studies in spatial price transmission analyze wheat (Bessler et. al., 2003, Dawson et. al. 2006; Jin & Miljkovic, 2008; Brosig et al., 2011), peach (Raper, 2009), tomato market (Ihle et al., 2010; Santeramo, 2015), fish market (Asche et. al., 2015; Ohen et.al. 2007) or meat market (Liu, 2011; Serra, 2011; Karikallio, 2015). Within milk spatial price transmission Acosta et al. (2014) found that there is evidence for price transmission from world prices to domestic markets for milk prices by using an (asymmetric) error correction model. Bakucs et. al. (2015) analyze the spatial integration of raw milk in 20 EU member states. Results suggest the cointegration of milk prices is less prominent than that of other agricultural sectors (e.g. pork or cereals).

Milk as a major livestock product has recently taken a lot of attention in the literature and over the last decade, studies regarding the milk price transmission has grown rapidly. Milk is a traditional commodity which plays an important role in agricultural sector and in the 2016 the yearly production of raw cow milk in the European Union is equivalent approximately 153,137 thousand tons (Eurostat). Though the milk and dairy products are in the most of the countries of EU competitive on the market the cooperation and trade are also important in the integrated market of EU. Until the year 2015 the milk production was regulated by milk quotas. It was the one of the significant policy measures used by governments in the European Union to intervene in agriculture. Their purpose was to bring rising milk production under the control. These regulations had an effect to all member states.

The objective of this study is to analyze the interconnection of raw cow's milk markets in the following central European countries: Slovakia, Czech Republic, Poland and Hungary and to find out the extent of price transmission among each other. The Czech Republic is the most important milk producer in the region, followed by Poland and Hungary. The lowest production is reached by the

Slovak Republic. Another objective is to analyze the existence of a long-term equilibrium relationship between milk prices in the countries and the rate of adjustment to the price shocks, i.e.: to examine the linkage between the countries in terms of the horizontal price transmission. The next section discusses econometric methods appropriate to the analysis. These methods are later used in an evaluation of spatial integration using monthly milk prices. The final part summarizes the results and concludes the remarks.

2. MATERIAL AND METHODS

We apply time-series modelling techniques to evaluate horizontal price transmission between the countries: Slovakia, Poland, Czech Republic and Hungary. Because time series may contain unit roots, and causality tests are sensitive to unit roots, before specifying and estimating the Engle-Granger models, it is required, to examine the order of integration of individual series.

As the first step, we test the stationarity of time series using the augmented Dickey–Fuller (ADF) root test. The ADF test is used to determine the stationarity of time series. If the time series has a unit root, we consider it to be non-stationary. The ADF test is based on the principle of testing the presence of a single root in the autoregressive model. Within a test equation, which depends on the character of the time series, we use the test with trend (t) and constant (α_0):

$$\Delta y_t = \alpha_0 + \theta y_{t-1} + \gamma t + \alpha_1 \Delta y_{t-1} + \alpha_2 \Delta y_{t-2} + \dots + \alpha_p \Delta y_{t-p} + a_t \quad (1)$$

The number of lags of a dependent t variable is determined by the Akaike Information Criterion (AIC).

$$AIC = \ln|\hat{\Omega}| + (p^2 k) \frac{2}{T} \quad (2)$$

where T is the length of the time series, Ω is the residual covariance matrix, p is the number of variables, k is the degree of lag of the model. The lag with the minimum value of the calculated criterion is selected as the appropriate lag.

In order to use the error correction model models, the following conditions must be met: Each variable is said to be a non-stationary, “integrated of order 1” or I(1). The variable is a random walk process, but its first difference is stationary. If the two non-stationary series move together over time then we say they are “cointegrated.” If the variables are cointegrated, there is a linear combination of variables that is stationary. We consider a regression model for two I(1) variables (prices) over the time, X_{1t} and X_{2t} , given by

$$P_1 = \alpha + \beta P_2 + \varepsilon \quad (3)$$

$$\varepsilon = P_1 - \alpha - \beta P_2 \quad (4)$$

The term, ε , is interpretable as the deviation from the relation in (2). If P_1 and P_2 are cointegrated, then the deviation is a stationary process with mean zero.

As the second step, a cointegration test is used to determine if the time series are cointegrated, whether the linear combination of the examined variables is stationary. Cointegration analysis allows us to identify the short-term relationships and also helps to find the long-term, equilibrium cointegration relationship between variables, which is known as an equilibrium. If the cointegration test indicates the existence of a long-term equilibrium relationship between a pair of variables, then we estimate the ECM model:

$$\Delta p_t = \alpha + \theta p_{t-1} + \sum_{k=1}^q \delta_k \Delta p_{t-k} + \varepsilon_t \quad (5)$$

Where p_t is the vector of n price variables, Δ is the first difference ($\Delta p_t = p_t - p_{t-1}$), ε_t is the error term for the residuals, α is the vector of estimated parameter locating constants, θ is the $n \times n$ matrix of estimated parameters which describe the long-term relationship and error correction, δ_k is the set $n \times n$

matrix of estimated parameters which describe the short-term price relationship for each of the q lags included in the model. For this analysis VECM is simplified as follows:

$$\Delta p_t^h = \alpha + \theta(p_{t-1}^h - \beta p_{t-1}^w) + \delta \Delta p_{t-1}^h + \rho \Delta p_{t-1}^h + \varepsilon_t \quad (6)$$

Where p_t^h is the home price in logarithmic form, p_t^w is the foreign price in logarithmic form, Δ is the first difference ($\Delta p_t = p_t - p_{t-1}$), α , β , θ , δ , ρ are estimated parameters and ε_t is the residual deviation.

If the prices are expressed in logarithmic form, cointegration coefficient is long-run elasticity of domestic to foreign prices, thus β is the elasticity of price transmission in long-run. The expected value for imported commodity is in interval between 0 and 1 and for exported more than 1.

The Coefficient of error correction (θ) shows the deviation rate from the long equilibrium. The expected value is from -1 to 0. The higher absolute value for the correctional coefficient, the faster home prices return to the long-term equilibrium relationship.

The coefficient of change (δ) in world prices is the short-term elasticity of domestic prices in relation to foreign prices. It represents the percentage adjustment of domestic prices after one percent (1%) of price shock in foreign market.

The coefficient ρ is an autoregressive coefficient showing the impact of the change in domestic prices on prices in the next time period. The expected value of this coefficient is in interval -1 to 1.

Our sample contains the average monthly cow's raw milk prices for each country. The time-series data cover the period from January 2005 to June 2017. Producer prices were obtained from the European Commission's milk market observatory. The prices of each country are transformed and utilized in the Euro currency. All the variables are in natural logarithms.

3. RESULTS AND DISCUSSION

The development of raw milk prices in all countries is very similar (Figure 1). The most significant increases in prices are recorded over the period 2007-2008 and in the year 2014. Similar trends of development suggest a link between markets within the region. This assumption will be verified during the next analysis.



Figure 1 The development of cow's raw milk in EUR/100kg

Source: Eurostat

Before specifying and estimating the Engle-Granger model, it is necessary to examine for the order of difference stationarity, because cointegration and error correction models require the use of non-stationary variables.

The results of the ADF tests for stationarity of the variables are presented in Table 1. The table below shows that the T- statistics for all the variables (Czech Republic, Hungary, Poland, Slovakia) are greater than the critical values at 5% level of significance and the constant and trend term were

included. Thus, the results show that the null unit root hypothesis can not be rejected, suggesting that all the variables are non-stationary in their level forms. In the next step the first differences were tested. The results assume that all analysed time series are integrated in the first order I (1).

Table 3 Augmented Dickey Fuller test results

Variables	Augmented Dickey Fuller (ADF) test	
	Level form	1st differences
<i>Czech Republic</i>	-3,3596	-4,6238
<i>Hungary</i>	-2,8474	-5,2163
<i>Poland</i>	-3,2630	-4,0363
<i>Slovakia</i>	-3,0082	-3,8160

Source: own calculations

Note: The critical value at the 5% level of significance is -3,44

To find out whether variables are cointegrated, the ADF unit roots tests were employed on the residuals, thus we verified the assumption that the markets are integrated and that there is a mutual long-term relationship between the prices. The cointegration tests consist of testing the stationarity of the residues from the cointegration regression of the investigated price pairs. If these residues are stationary, we can conclude that the price pairs are cointegrated. The cointegration tests were conducted for each examined price pair. These results suggest that between the variables there exist long-term relationship. From the table below the T-statistics on residuals for each price pair is less than the critical value at 1% level except for Polish and Czech market. This price pair is integrated at the 10% level of significance. These results suggest that between the variables there exist long-term relationship. Based on the results of the integration tests, the next analysis examines the linkage between the prices in countries.

Table 4 Cointegration tests results

Variables	T-stat	R-square	D.W.
HU-CZ	-4,5992	0,86	0,58
CZ-SK	-4,7402	0,84	0,32
CZ-PL	-3,3328	0,80	0,21
PL-SK	-4,7682	0,87	0,38
PL-HU	-4,6648	0,83	0,45
SK-HU	-4,8784	0,89	0,49

Source: own calculations

The Table 3 shows the results of long-term elasticity price transmission for all price pairs. Dependent variables are found in the rows and independent variables are listed in the columns.

Table 3 Long-term elasticities

	<i>Czech Republic</i>	<i>Hungary</i>	<i>Slovakia</i>	<i>Poland</i>
<i>Czech Republic</i>	X	0,8201	0,8127	0,9528
<i>Hungary</i>	1,0522	X	0,9444	1,1032
<i>Slovakia</i>	1,0386	0,9406	X	1,1243
<i>Poland</i>	0,8379	0,7560	0,7736	X

Source: own calculations

Long-term elasticities were estimated for all price pairs in both directions. The results of estimated elasticity with values close to 1 suggest a closer relationship between the prices. The values above 1 indicate the export of commodity from the country, which was set up as a dependent variable. As shown in Table 3, there is a higher export from Poland to Slovakia and Hungary, and from Slovakia to Czech Republic, compare to another countries. The values less than 1 indicate the import of commodity is of a greater extent.

In the next step, the error correction models for the all price pairs were estimated and presented in Table 4. Parameters of these models determine the speed of adjustment to deviations from the long-term equilibrium (error correction parameter) and also the short-term elasticity of the transmission.

Part a shows the error correction coefficient, which indicates the rate of adaptation of domestic prices to potential prices shocks. If it represents the deviation in the short-run, it is considered as the speed of return of prices to a long-term equilibrium relationship. The higher absolute value for the correction coefficient, the faster home prices return to the long-term equilibrium relationship. The coefficient of the error correction term is not statistically significant just in the pair of Polish and Czech market. The results indicate that the fastest speed of adjustment to the price shocks of other countries is found for Hungarian market, as well as the Slovak market reacts faster to the price shocks in Poland. Data show the opposite for the Polish market where the return to the long-term equilibrium takes longer.

Table 4 The Error-correction model results

		ECM coefficients	Short-run elasticities
Variables		<i>a</i>	<i>b</i>
Dep.: CZ			
Indep.: HU		-0,1760	0,3916
	SK	-0,1189	0,5457
	PL	-0,1417	0,5962
Dep.: PL			
Indep.: HU		-0,0743	0,3908
	SK	-0,1191	0,6272
	CZ	-0,0122	0,0683
Dep.: SK			
Indep.: HU		-0,1818	0,5209
	PL	-0,2796	0,5284
	CZ	-0,1603	0,5997
Dep.: HU			
Indep.: CZ		-0,2769	0,7483
	PL	-0,2962	0,6537
	SK	-0,2691	0,8651

Source: own calculations

The short-run elasticities reported in the part *b* indicate how the prices in the domestic country react to the price shocks of the foreign countries. All prices are estimated for both directions. The most sensitive reaction to the price shocks of Hungary milk market is found in Slovak in Czech market. However, the Hungary market reacts the less to the price shocks at the Slovak and Czech markets.

4. CONCLUSION

This study analyse the interconnection of raw cow's milk markets in the central European countries, i.e.: Slovakia, Czech Republic, Poland and Hungary and to assess the linkage and patterns between the prices of cow's raw milk. To clarify the relationships between the prices on the markets the unit root tests, cointegration tests, error correction models, and Granger causality tests were used. We apply monthly data during the period of January 2005 to June 2017. The coitegration tests confirm the market pairs are cointegrated and between variables exists the long-run relationship. The fastest speed of adjustment to the price shocks of the other countries is found for Hungarian market. Slovak market reacts faster to the price shocks of Poland. Data show the opposite situation in Polish market where the return to the long-term equilibrium takes longer. The most sensitive reaction to the price shocks of Hungary is found for Slovak and Czech market. The Hungary market reacts the less to the price shocks at the Slovak and Czech markets.

Acknowledgements

This work was supported by the Slovak Research and Development Agency under the contract No. APVV-15-0552 and by the Ministry of Education, Science, Research and Sports under contract no. VEGA 1/0797/16.

References

- Acosta, A., Ihle, R., & Robles, M. (2014). Spatial price transmission of soaring milk prices from global to domestic markets. *Agribusiness*, 30(1), 64-73.
- Asche, Frank, Atle G. Guttormsen, Tom Sebulonsen, and Elin H. Sissener. "Competition between farmed and wild salmon: the Japanese salmon market." *Agricultural Economics* 33, no. 3 (2005): 333-340.
- Bakucs, Z., Falkowski, J., & Fertő, I. (2012). Price transmission in the milk sectors of Poland and Hungary. *Post-communist economies*, 24(3), 419-432.
- Bakucs, Z., Fertő, I., Benedeka, Z., & Molnar, A. (2015). Determinants of Horizontal Milk Producer Price Integration. In 2015 Conference, August 9-14, 2015, Milan, Italy (No. 212042). International Association of Agricultural Economists.
- Bakucs, Z., Bojnec, S., & Fertő, I. (2015). Spatial product market integration between two small, open neighbouring economies. *Agribusiness*, 31(2), 171-187.
- Bouamra-Mechemache, Z., Jongeneel, R., & Réquillart, V. (2008). Impact of a gradual increase in milk quotas on the EU dairy sector. *European Review of Agricultural Economics*, 35(4), 461-491.
- Baldi, L., Peri, M., & Vandone, D. (2011). Price discovery in agricultural commodities: the shifting relationship between spot and futures prices. In EAAE 2011 Congress, Change and Uncertainty Challenges for Agriculture, Food and Natural Resources, August.
- Barrett, Christopher B. "Measuring integration and efficiency in international agricultural markets." *Review of Agricultural Economics* 23, no. 1 (2001): 19-32.
- Bessler, D. A., Yang, J., & Wongcharupan, M. (2003). Price dynamics in the international wheat market: modeling with error correction and directed acyclic graphs. *Journal of Regional Science*, 43(1), 1-33.
- Bonnet, C., Corre, T., & Réquillart, V. (2015). "Price Transmission in Food Chains: The Case of the Dairy Industry. S McCorrison) Food Price Dynamics and Price Adjustment in the EU, 65-101.
- Capps, O., & Sherwell, P. (2007). Alternative approaches in detecting asymmetry in farm-retail price transmission of fluid milk. *Agribusiness*, 23(3), 313-331.
- Dawson, P. J., Sanjuán, A. I., & White, B. (2006). Structural breaks and the relationship between barley and wheat futures prices on the London International Financial Futures Exchange. *Review of Agricultural Economics*, 28(4), 585-594.
- Fackler, P.L. & Goodwin, B.K. (2001). Spatial market integration. In Rausser, G. and Gardner, B. (eds), *Handbook of Agricultural Economics*. Amsterdam, NL: Elsevier Publishing, 971-1024.
- Fernández-Amador, O., Baumgartner, J., & Crespo-Cuaresma, J. (2010). Milking the prices: the role of asymmetries in the price transmission mechanism for milk products in Austria (No. 2010-21). *Working Papers in Economics and Statistics*
- Garcia-German, S., Garrido, A., & Bardaji, I. (2014, August). Evaluating Transmission Prices between Global Agricultural Markets and Consumers' Food Price Indices in the EU. In 2014 International Congress, August (pp. 26-29).
- Ghoshray, A. 2011. Underlying Trends and International Price Transmission of Agricultural Commodities (May 2011). Asian Development Bank Economics Working Paper Series No. 257. Available at <http://dx.doi.org/10.2139/ssrn.1876185>
- Goetz, L., & von Cramon-Taubadel, S. (2008, August). Considering threshold effects in the long-run equilibrium in a vector error correction model: An application to the German apple market. In 12th Congress of the European Association of Agricultural Economists (pp. 1-12).
- Holst, C., & von Cramon-Taubadel, S. (2013). Trade, market integration and spatial price transmission on EU pork markets following Eastern enlargement (No. 1307). *Diskussionspapiere, Department für Agrarökonomie und Rurale Entwicklung*.
- Karikallio, H. (2015). Cross-commodity Price Transmission and Integration of the EU Livestock Market of Pork and Beef: Panel Time-series Approach. In 2015 Conference, August 9-14, 2015, Milan, Italy (No. 211832). International Association of Agricultural Economists.
- Jin, H. J., & Miljkovic, D. (2008). Competitive structure of US grain exporters in the world market: A dynamic panel approach. *East Asian Economic Review*, 12(1), 33-62.
- Lloyd, T. A., McCorrison, S., Morgan, C. W., & Zgovu, E. (2012). The experience of food price inflation across the EU in TRANSFOP (No. 5). Working Paper.
- Liu, X. (2011). Horizontal Price Transmission of the Finnish Meat Sector with Major EU Players. Paper presented at the EAAE 2011 Congress, Change and Uncertainty Challenges for Agriculture, Food and Natural Resources, August 30-September 2, Zurich.
- McCorrison, S. (2011). 2 Commodity Prices, Government Policies and Competition. Trade, Competition, and the Pricing of Commodities, 2.
- Mengel, C., & Cramon-Taubadel, S. V. (2014). Distance and border effects on price transmission: A meta-analysis (No. 37). *GlobalFood Discussion Papers*.

- Mensi, W., Beljid, M., Boubaker, A., & Managi, S. (2013). Correlations and volatility spillovers across commodity and stock markets: Linking energies, food, and gold. *Economic Modelling*, 32, 15-22.
- Nielsen, M., Setälä, J., Laitinen, J., Saarni, K., Virtanen, J., & Honkanen, A. (2007). Market integration of farmed trout in Germany. *Marine Resource Economics*, 22(2), 195-213.
- Raper, K. C., Thornsby, S., & Aguilar, C. (2009). Regional wholesale price relationships in the presence of counter-seasonal imports. *Journal of agricultural and applied economics*, 41(1), 271-290.
- Ohen, S. B., Abang, S. O., & Idiong, I. C. (2007). Price transmission and market integration: vertical and horizontal price linkages for live catfish in Nigeria. *Journal of Agriculture and Social Science*.
- Santeramo, F. G. (2015). Price transmission in the European tomatoes and cauliflowers sectors. *Agribusiness*, 31(3), 399-413.
- Serra, T. (2011). Volatility spillovers between food and energy markets: a semiparametric approach. *Energy Economics*, 33(6), 1155-1164.
- Serra, T., Gil, J. M., & Goodwin, B. K. (2006). Local polynomial fitting and spatial price relationships: price transmission in EU pork markets. *European Review of Agricultural Economics*, 33(3), 415-436.
- Stewart, H., & Don, P. B. (2011). Retail dairy prices fluctuate with the farm value of milk. *Agricultural and Resource Economics Review*, 40(2), 201-217.
- Vavra, P., & Goodwin, B. K. (2005). *Analysis of Price Transmission Along the Food Chain*, OECD Food, Agriculture and Fisheries Working Papers, No. 3, OECD Publishing. Doi:10.1787/752335872456.
- Zeng, S., & Gould, B. (2016). Is There Asymmetric Price Transmission in the US Fluid Milk Market?. In 2016 Annual Meeting, July 31-August 2, 2016, Boston, Massachusetts (No. 237346). Agricultural and Applied Economics Association.
- Zilberman, D., Hochman, G., Rajagopal, D., Sexton, S., & Timilsina, G. (2012). The impact of biofuels on commodity food prices: Assessment of findings. *American Journal of Agricultural Economics*, 95(2), 275-281.

IMPLEMENTATION OF ENTERPRISE SOCIAL NETWORKING SYSTEM IN HIGHER EDUCATION BASED ON OFFICE 365

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ABSTRACT

Enterprise social networking systems are becoming important communication channel in the private sector as requirements on managers and their teams are changing. The teams are often multinational and members of the team are in the various places of the world. Research teams in higher education are also becoming multinational and the members of the research teams are often located in different parts of the world as well, and it is important to provide the most effective communication possible. Even though private sector is implementing social networking systems, the educational institutions are different in many ways. The aim of this paper is to describe the planning process of the implementation of the social networking system in the educational organization. We are discussing the advantages and disadvantages of the system in the higher education, differences between traditional email communication and social networking and we are observing the time and effort spent on the administration of the social networking system and its overall contribution to the education process.

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Peer-review under responsibility of the Organizing Committee of GSCMEM 2017.

Key words: enterprise social network, communication, email, Office 365.

1. INTRODUCTION

Social media networks play a crucial role in people's lives for the last decade. More than 75 % of the millennials has at least one account on social network such as Facebook, Twitter, LinkedIn or other (Pew Research Center, 2015). In other words, social media became the essentials of our lives for communication, sharing the information, finding friends and completing tasks. Companies are continuously searching for the means of communication that will be more effective, less time consuming and intuitive for their new millennial employees. As 65% of adults in general now use social networking sites, social networks became choice number one for employers (Pew Research Center, 2015). There is plenty of options for them to implement. Organizations can choose robust enterprise social networks or implement only necessary parts like instant messaging system, intranet, etc.

The study shows that 80 % of the Fortune 500 are using social networks as a communication tool (Kevin Shively, 2014). "Social technologies are the fastest growing sector in the enterprise software industry," (Ramdani et al., 2010). Enterprise social networks (ESN) provide users with several benefits. It is easier than ever to share any information in seconds whether it is a document, message or any other type of information. ESN also allows user to collaborate on the same document and in real time make changes on the same document. That means users can save time by not sending reviews through the email and wait for the response of the reviewer, but they can make changes to the document instantly, add comments and more. This could be a great time saver in the larger multinational teams which are working on the same documentation or any other files. Despite many advantages of ESN, the email remains still major communication tool in most companies and organizations. As Derks and Bakker (2010) stated "e-mail is not a new communication medium but the wireless e-mail system facilitated by a smartphone enable users to engage in e-mail in new ways".

Trend journal reports, frequent email checking increases the stress, lowers IQ and it is more difficult to resist than to the smoking (BREJČÁK, 2014). Most people do not avoid the email at all, and according to a survey of 1,100 British employees, more than half of them is responding to a

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message immediately, as soon as possible after receiving the message. Almost 21 percent of them do not have a problem to interrupt the meeting to answer the email (BBC News, 2005). It is clear from available literature that emails can affect employee's work and personal life in a bad way and can distract them from important things.

"Internal communication is one of the key factors that affect the performance of the organization and thus their profitability. The primary objective of the survey is to provide a useful picture of internal communication in our region and help organizations set priorities and strategic objectives for its further development", explains Martin Onofre, founder and president of AICO when they performed survey in 2015 (AICO, 2015).

In this paper, we will also analyze current internal communication of the organization, its effectiveness and potential problems or advantages and disadvantages.

2. MATERIAL AND METHODS

To examine whether to use social network or not in particular organization we had to process the input data of user's behavior according to the email communication. We had to consider also unique needs between the communication outside and inside the organization. We looked for the answers to three main research questions:

- Why is the email the most used communication tool in the organization?
- What are the barriers to implement modern communication tools?
- Would enterprise social network help to improve effectiveness of the communication in the chosen company and in what way?

To answer these questions, we analyzed the obtained raw data from the IT department at the Faculty of Management Comenius University in Bratislava and accomplished an interview with employees. The obtained data included exact numbers of received and sent emails differentiated by the time, sender/receiver and subject, so we were able to precisely select those emails which were sent to the particular recipient with particular subject thus we can identify them as a conversation thread.

2.1 Data analysis

We examined data of 40 users which represents approximately 12 % of all employees at the Faculty of Management Comenius University in Bratislava which is sufficient sample for our research. We selected these users from several departments at University as their communication behavior may differ. First, Group 1, there were lecturers communicating with their students and head of department they were members of, and they are members of several comities, research or international groups. PhD. Students, Group 2, are mostly communicating with their supervisor, students and other users outside the University. Last, but not least we will examine administrative staff, Group 3, which includes users from different administrative departments. We will exclude email communication from IT department for their specific needs (automated emails, subscription emails, etc.) and as a result it could significantly affect the results of the research. We also divided these users into 3 groups we observed. The fourth group, Group 4, was based on combination of different users from each of the previous groups to prove our research. All groups had 10 members. We also selected users with the most send and received emails in the organization in the TOP 10 users group. This TOP 10 group is a group that we consider most suitable for implementation of ESN as we expect that their communication are mostly instant messages or in other words emails that are send or received from the same user in the communication thread.

2.2 Interview Methodology

Another important part of our research were personal interviews. In these interviews, we were asking interviewees about their style of communication and their habits in the communication. The goal was to perceive what leads them to use email, or any other type of communication, if they were searching for another mean of communication than they usually use and what prevents them to adopt modern technologies or new means of communication.

Questions:

1. What is the most used type of communication tool in your work life?
2. Can you define the time you spent on your work email? (reading, sending/receiving, replying)
3. What is the most used type of communication tool in your personal life?
4. Do you have an active user account on any social network? (Facebook, Twitter, LinkedIn)
5. How often are you active on social networks?
6. Would you prefer to communicate with your colleagues and students via social networks?
7. In your opinion, what are the major obstacles in implementation of social media in your organization?

We came up with these questions to help us to better understand what are the obstacles to adopt new modern communication tools and if these new tools could help to improve the communication and overall efficiency of work.

3. RESULTS AND DISCUSSION

3.1 Data Analysis Results

To answer our research questions, we had to analyze the input data. The data are shown in Table 1. Data was collected for a period of 180 days and are shown as average numbers per user per 180 days.

Table 1 Average values per user

	Sent	Sent inside	Received	Receive inside
All examined users	1141	639	2622	2156
Top 10 users	3622	2717	4972	2983
Group 1	1552	1185	3671	2658
Group 2	235	185	605	563
Group 3	583	293	1711	890
Group 4	790	583	1996	1370

In Table 1 we compared all sent/received emails inside and outside the organization. This shows us basic picture of how the communication looks like in the organization. Most of the emails were held within the organization. In the Top 10 users group we can see that 75 % of all sent emails are sent inside the organization. We can clearly see that users in this group are producing more emails on average than other groups (2717 emails on average per user per 180 days) and it is very likely they are also responsible for the time other users are spending on reading or replying on those emails.

In the Group 1 we can see that on average the users are sending more than 76 % of all emails inside the organization. Lecturers are most likely to use email to communicate with their students. In fact, more than 46 % of all their emails sent inside the organization were sent to students. Remaining 54 % of the emails were sent to their colleagues, administrative staff or others.

Group 2, PhD. students, are also copying the profile of the previous groups. Almost 79 % of all sent emails are held inside the company and sent mostly to students or colleagues from a department. We can consider this group as a young researcher that are most likely to use modern technologies. Due to strong organizational culture they are taught that emails are the main communication channel in the organization. Most of them accept that fact and start to use email even they are not using email in everyday life and they prefer social networks or any other mean of communication.

In the third group, Group 3, we were observing the emails sent from administrative staff of the organization. We can see different behavior of the users. Most of their emails are sent to users outside the organization. In fact, only 50 % of all emails that were sent within 180 days were sent inside the organization. It does not mean that administrative staff is dealing with less emails, but they are dealing with different kind of emails they must handle. Mostly because they are communicating with contractors, suppliers, other organizations or companies, etc.

The last group, Group 4, is a combination of users from the previous groups. We can see that in average they send 790 emails and more than 73 % of those emails are sent inside the organization. That just confirms previous observing that in average, more than 70 % of all send emails are sent inside the organization. On the other hand, this do not have to be a problem. If most of all emails are held inside the organization it does not shows us any problems in the communication. In fact, we should consider more than that. We should focus on the nominal value of all sent emails which is 1141 emails in 180 days per users on average. That means more than 6 emails per day for observed period from which more than 4 of them are send inside the organization.

In the analysis, we also spotted that more than 29% of all conversations had more than 6 emails sent within 30 minutes to the same recipient. We can consider these emails as instant messaging. Average time spent on replying and reading these emails was 1 minute and 26 seconds. This time was recorded since the receiver opened the emails, read it, wrote the reply and sent it. All the data are confident and we were not able to connect users with the times spend on the email.

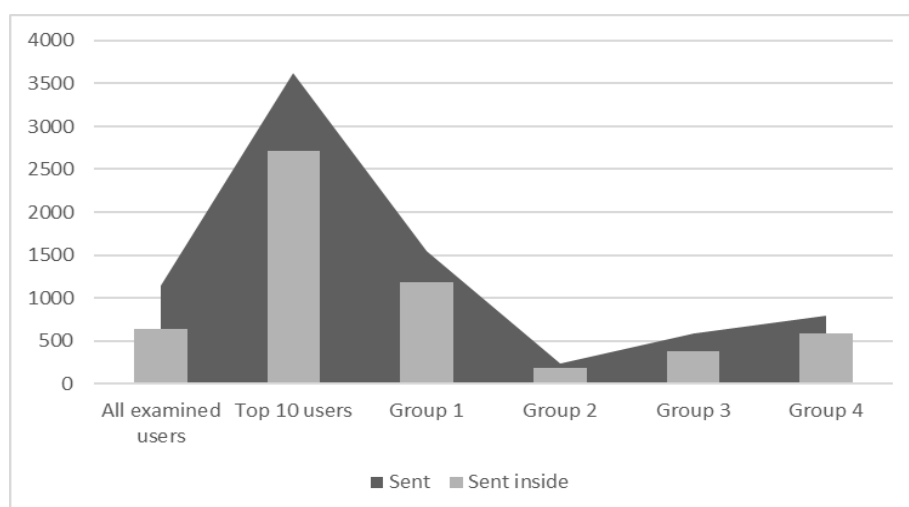


Figure 1 Average values of sent emails per user

The Figure 1 describes the ratio between emails sent inside and outside the organization. The graph shows us that most of the emails are held inside the organization.

3.2 Interview Results

3.2.1 What is the most used type of communication tool in your work life?

Most of the interviewees, as we expected, told us that the most used communication tool in the organization is emails. 3 users told us they use Skype for Business, but they also said there are obstacles in using Skype for Business in the organization as most of the users do not use it.

3.2.2 Can you define the time you spent on your work email? (reading, sending/receiving, replying)

It was hard to get an answer to this kind of question from our interviewees as they are not counting the time they spend on replying, sending or reading the emails. When we analyzed the data, it was clear that users spent almost 1 hour of their working day by reading/sending emails. That represents 12,5 % of their working time. We also take in to consideration that interviewees answered they spend most of the time on email. Sometimes 5 or 6 hours on average. This could be an interesting fact. By our research we found out that on average they spend only 1 hour on email, but the feeling of the user is 5 hours. That could also mean that emails can cause problems that lead to frustration and inefficiency.

3.2.3 What is the most used type of communication tool in your personal life?

As we expected almost all users, 75 % of them, told us they use social networks in their personal life. Another 20 % of them answered they use both email and social network as their main communication channel. The rest use only email.

3.2.4 Do you have an active user account on any social network? (Facebook, Twitter, LinkedIn)

85 % of users have an active account on any social network.

3.2.5 How often are you active on social networks?

More than 60 % of all examined users are active on social networks every day. 30 % are active few times a week and 10 % of users are active less than once a week.

3.2.6 Would you prefer to communicate with your colleagues and students via social networks?

Surprisingly, 80 % of all interviewed users answered that they would not prefer to communicate with colleagues and students on social networks. Even though most of them are using social networks in every day's life they are not willing to use social networks at work.

3.2.7 In your opinion, what are the major obstacles in implementation of social media in your organization?

Most users in the organization fears the modern technologies. Most of them think they are hard to use and they do not want to start to learn new procedures and study tutorials. Also, lot of researcher do not have time to learn modern technologies (ESN) when there is stable tool (email) to communicate with their colleagues.

Secondly, they also answered that there is almost no one using these technologies, so they are not using it neither. We can call it vicious circle as there is a lack of users using the modern tools there are almost no users to communicate with.

4. CONCLUSION

From the results, it is obvious that enterprise social networking system would be efficient and suitable solution for the Faculty of Management Comenius University in Bratislava. In fact, the main framework for the solution is set and it is only matter of time when users will explore all the benefits. On the other, we should consider all other factors that influence successful implementing of ESN – user's habits, organizational culture, motivation, whether it is financial motivation or other, age of the employees and more.

First of all, it is a human factor and behavior of employees we have to consider. It is an organizational culture that employees use mostly emails as their communication tool. Most of the tasks are done in person or via email even though we can consider more than 25 % of all email conversations as instant messaging. It could be challenging for IT department and management of the organization to overcome this stereotype in communication. We have to also consider average age of employees. Most of the administrative and educative staff is in category 45+ (45 years old and more) and it is more challenging to implement modern technologies for users in the category 45+ working in higher education where modern technologies are implementing slower in general. This situation occurs mainly because higher education in Slovakia is underfinanced and educational institutions tend to use technologies more years than it is their lifespan.

The data also shows us that email plays a crucial role in the educational environment and it also replaces most of the social network communication tools. On the other hand, research shows us that email can be very inefficient and most of the information flow can be reduced by implementation instant messaging system or intranet. Faculty of Management is in the situation that the number of emails, received and sent inside the organization is enormous and most of the information could

already be found on the website or the same information is sent by email by more senders and we can call it unnecessary duplication. This of course leads to inefficient work.

We can see from the results of the interviews that there is a will from employees to use ESN. The problem is that this tool is not commonly used by everyone in the organization and employees are not motivated to start to use modern technologies as they are satisfied with email even though it is not effective. Sharing employee expertise and opinion not only humanizes large corporations, but also encourages further employee engagement and so enhanced productivity (Dialogueconsulting.co.au, 2013). This could also help the others to discover new possibilities and get in touch with systems they could use easily in everyday life.

We recommend that management of the organization starts to use ESN to promote new types of communication and stimulate employees to begin using ESN as well. As soon as this change comes employees will experience the benefits of ESN. Even though the email communication will represent a major communication channel the users could save time spend on reading and sending emails and can focus on other more necessary tasks.

The potential problem could be that average users in the organization can have a problem to learn innovative ways of communication. It will cost not only time spend on learning how to use modern technologies, but it could also cause error rate to increase, because of the lack of skills.

To confirm our research results we will proceed with pilot testing of implementation of enterprise social network to the organization. As a focus group, we selected 5 users. We will continue to work closely with users and monitor their behavior and changes in the communication to prove or deny the results of the research. This research is also very specific and can rely on input data and may differ from organization to organization.

References

- AICO. 2015. V slovenských firmách je potenciál internej komunikácie nevyužitý. [Online] AICO, 01 2015. [Accessed: August 08, 2017.] <http://www.internalcommunication.eu/sk/novinky/v-slovenskych-firmach-je-potencial-internej-komunikacie-nevyuzity>.
- BBC News. 2005. 'Infomania' worse than marijuana. [Online] 04 22, 2005. [Accessed: August 08, 2017.] http://news.bbc.co.uk/2/hi/uk_news/4471607.stm.
- Brejčák, P. 2014. Časté kontrolovanie e-mailov zvyšuje stres, znižuje IQ a odoláva sa mu ťažšie ako cigarete. [Online] 06 25, 2014. [Accessed: August 09, 2017.] <http://www.etrend.sk/technologie/caste-cekovanie-e-mailov-zvysuje-stres-znizuje-iq-a-odolava-sa-mu-tazsie-ako-alkoholu.html>.
- Derks, D. and Bakker, A. 2010. The Impact of E-mail Communication on Organizational Life. [Online] 2010. [Accessed: August 29, 2017.] <https://cyberpsychology.eu/article/view/4233/3277>
- Dialogueconsulting.com.au. 2013. Introduction to Implementing Enterprise Social Networks – Research Report [Online] May, 2013. [Accessed: September 05, 2017.] <http://www.dialogueconsulting.com.au/documents/2013/05/research-paper-implementing-enterprise-social-networks.pdf>
- Kevin Shively, 2014 - <https://simplymeasured.com/blog/new-study-80-of-fortune-500-companies-active-on-facebook-and-twitter/#sm.00000x23fjyigfcv0vfpqae5fd3hw>
- Perrin, A. 2015. Social Media Usage: 2005-2015. Pew Research Center. October 2015. [Online] October 08, 2015. [Accessed: September 05, 2017.] https://static1.squarespace.com/static/56698c26e0327c6cd4b4a9c0/t/56cb504e356fb0ad1dc200dc/1456164942915/PI_2015-10-08_Social-Networking-Usage-2005-2015_FINAL.pdf
- Ramdani, B. and T. Rajwani, Enterprise 2.0: the case of British Telecom. Journal of Strategic Management Education, 2010. 6(2).