



# CER Comparative European Research 2015

## Proceedings | Research Track

of the 4th Biannual  
CER Comparative European Research  
Conference

International Scientific Conference for Ph.D. students of EU countries

October 26-30, 2015 | London



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# Introduction

The conference Proceedings you are holding is a collection of selected peer-reviewed texts presented at the international scientific conference Comparative European Research - CER 2015 (October 26-30).

The biannual international scientific conference is organized under the auspices of the SCIENCE scientific platform every March and October and follows up on activities aimed at providing greater support for the scientific activities of Ph.D. students and beginning researchers. The various biannual CER conferences represent a space for the international assessment of the qualitative standard of scientists and the results achieved by the various academic institutes. The CER conference is an ideal place for comparing the standard of scientific work, particularly on a European scale.

The Proceedings from the 2015 CER conference contains several dozen academic texts whose main purpose is the presentation and sharing of knowledge always in one of ten conference sections. The conference Proceedings prioritize only those articles which are good enough to offer readers new insights into the issues analyzed, or which extend the known boundaries of science. The guarantor of the CER 2015 conference is a signatory of the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities, and therefore all papers are made available to professionals and the general public via OpenAccess.

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## IMPLEMENTATION OF THE GREEN MANAGEMENT ON AN EXAMPLE OF THE FIRST CLASS ACCOMMODATION FACILITIES IN PRAGUE

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**Abstract:** Stakeholders in tourism are increasingly aware of their impact on the environment. Therefore they get involved in various voluntary programs, where they seek appropriate measures by which to contribute to improving the environment at the local level. This way, in a certain measure, they may contribute to solving global environmental problems such as global warming, waste management problems, drinking water shortages in specific areas of the world etc. Sustainability is currently one of the major priorities of tourism all over the world. One part of sustainable tourism is the green management. According to the hotel trends, accommodation facilities use it, too. Adopting green practices is beneficial to the hotel industry. This paper deals with applying of the green management elements in the First Class accommodation facilities in Prague. It analyses the implementation of the green management elements and principles of sustainable development in the accommodation services. Moreover, we focus on the accommodation facilities and their use of environmental measures.

**Keywords:** eco-friendly hotel, green management, hotel industry.

### 1. Introduction

The impact of the global growth of tourism on the environment has become a major issue in the hospitality (Chou, 2014). Applying the elements of the green management is one of the characteristic trends in accommodation services. Accommodation facilities realize that the importance of the environmental protection is necessary and in addition, they use this concept as a useful marketing tool to differentiate from the competition.

According to the 1992 United Nations Conference on Environment and Development, by installing visible eco-friendly technology (such as solar panels, low flow showerheads, recycling bins, etc.), accommodation facilities can lower their environmental impact while also gaining attention for conservation from customers. Due to hospitality's high visibility around the world, the industry has not only the potential to save millions of dollars by "going green" but also become a channel for social change (Ryan, 2002).

Nowadays we can hear or read that green is in. Green is in vogue. Green is the new black. A lot of consumers are asking for it. Organizations are requesting it. The future of business is being built on green and social responsible organizations. The green bandwagon is overloaded with posers and images of green without the true understanding of what green means, the methodologies of achieving green, and the applicability of green management (Tran, 2009).

Despite the opportunity, some hotel managers remain hesitant to invest in green initiatives because they are not convinced whether or not such investments are financially beneficial. That is, while implementation of some new green practices and elements requires significant initial investments, quantifying returns is often difficult for investments which produce less tangible results such as improvement to a firm's reputation for being conservation oriented (Bird et al., 2007).

Nevertheless, being green is fast becoming an essential component of almost every commercial building and interior design projects. At the same time, more architects and designers are looking for high quality green products in order to meet new green building guidelines, which continue to evolve at a rapid pace and, as a result, there are many entities involved in establishing standards and certifying that they have been met. With that said, green, as applied here, is a term now widely used to describe buildings designed and constructed with minimal negative impact to the environment and with an emphasis on conservation of resources, energy efficiency and healthful interior spaces. Green can also be used to describe sites that are designed in an environmentally sensitive manner with minimal damage to the surroundings (Tran, 2009).

In other words, the concept of green management consists of three components: green building, green energy, and green waste. Green building is the practice of increasing the environmental efficiency in which structures use resources (energy, water, and materials) while reducing impact on human health and the environment during the life cycle of the building. This can be done through better setting, design, construction, operation, maintenance, and waste removal (Frej, 2005 in Tran, 2009). A similar concept is natural building, which is usually on a smaller scale and tends to focus on the use of natural materials that are available locally (Hopkins, 2002, in Tran, 2009). Other commonly used terms include sustainable design and green architecture. The related concepts of sustainable development and sustainability are integral to green building. An effective green building can lead to:

- reduced operating costs by increasing productivity and using less energy, materials, and water,
- improved public and occupant health due to improved indoor air quality,

- reduced environmental impacts by, for example, lessening storm water runoff and reducing the urban heat island effect.

Practitioners of green buildings often seek to achieve not only ecology but aesthetic harmony between a structure and its natural and built surrounding environment, although the appearance and style of sustainable buildings is not necessarily distinguishable from their less sustainable counterparts.

A number of measures to protect the environment is focused on reducing energy, water, chemicals, office supplies, reduction of waste, increasing the proportion of natural materials, aestheticisation environment, reducing noise and emissions, etc. (Bohdanowicz, 2005).

Accommodation facilities should prefer Czech products and local specialties while purchasing raw materials and products; try to support local infrastructure, continuous education for employees at work with new technologies, and implementation of the green management. Accommodation facilities should also inform their guests about their environmental awareness. It is necessary to focus on waste separation and reuse of recycled material. There are some element examples in different areas (figure 1):

Area	Elements
economic and social activities	<ul style="list-style-type: none"> <li>- purchase of raw materials and products in the region,</li> <li>- support local infrastructure,</li> <li>- use of public transport and bicycles,</li> <li>- employment of local population.</li> </ul>
communication and education of employees and guests	<ul style="list-style-type: none"> <li>- workflows and their control</li> <li>- promotion of ecological program to the public,</li> <li>- compliance with environmental principles by guests,</li> <li>- compliance with environmental principles by employees.</li> </ul>
management	<ul style="list-style-type: none"> <li>- implementation of Eco-Management and Audit Scheme,</li> <li>- implementation of ISO 14001,</li> <li>- purchase larger volumes and minimizing packaging,</li> <li>- purchase products that really need AF,</li> <li>- purchase products from suppliers in the region,</li> <li>- purchase quality and truly useful products,</li> <li>- purchasing of environmentally friendly products,</li> <li>- measuring guests' satisfaction.</li> </ul>
waste management	<ul style="list-style-type: none"> <li>- waste separation in the background of hotels,</li> <li>- sorting bins for plastic, paper, etc. in each room,</li> <li>- reuse recycled materials,</li> <li>- composting organic waste.</li> </ul>
energy savings	<ul style="list-style-type: none"> <li>- utilization of geothermal energy and waste heat,</li> <li>- regulating heating and air conditioning,</li> <li>- compact fluorescent lamps,</li> <li>- appliances min. class A (A +, A ++),</li> <li>- low energy technologies,</li> <li>- thermal insulation of buildings.</li> </ul>
water savings	<ul style="list-style-type: none"> <li>- installation of single-lever mixers and perlators</li> <li>- installation of energy-saving shower heads,</li> <li>- installation of two-stage flush toilets,</li> <li>- gray-water reuse,</li> <li>- rainwater harvesting.</li> </ul>

Figure 1: Green management elements

Source: Processed under Belešová, 2014; Scholz, 2014.

Accommodation facilities invest financial resources into the lighting, where they can attain significant savings. Incandescent bulbs are most often replaced with the

compact fluorescent lamps. They reach about 80 % less energy consumption compared to the incandescent lamp for the same light flux and also significantly lower power dissipation.

Another advantage of the compact fluorescent lamps is that they have a considerably longer service life, which reaches an average of 6,000 hours of lighting. However, they are currently increasingly coming to the forefront of LED technology (Light Emitting Diode). Compared to the common light sources, their durability is much higher. However, it should not be installed at the places where there is frequent switching off lights. What is more, the lifetime of LED lamps is in the range 30,000 to 100,000 hours of lighting, but the product which promises life of 100,000 hours are often not very reliable. The usual lifetime of LED lamps is around 30,000 hours, but it also may be lower or higher (figure 2).

Properties of luminaires / Lighting Fixtures type	Incandescent light bulb	Compact Fluorescent Lamp	LED lamp
Power input	40 W	11 W	5 W
Price	0.40 €	3.70 €	10.70 €
Lifetime	1,000 h	6,000 h	30,000 h
Number of operating hours per year (5 hrs./day)	1,825 h	1,825 h	1,825 h
Number kWh per year (5 hrs./day)	73 kWh	20 kWh	9 kWh
Lighting costs per year (1 kWh = 0,17 €)	12.41 €	3.40 €	1.53 €
Annual energy savings in €	---	9.01 €	10.88 €
Payback period fluorescent lamp	---	165 days	395 days
Savings over the lifetime of the lamp	---	29.62 €	178.85 €

Figure 2: Lamps and their efficiency

Source: Own elaboration, 2015.

Accommodation facilities tend to apply differently in the selection of saving measure. Some hotels are decided according to what is currently the most urgent; others focus on measures that will bring the biggest savings at the lowest cost. Energy conservation measures are realized mainly in the heating area, ventilation and air conditioning, lighting, rooms for guests, kitchens, and laundries (Patúš, Gúčik, 2005). Experience shows that energy consumption can be reduced by up to 40 % in the case of the adoption of good measures in the accommodation facilities, while the utilization of intelligent power management systems and installing new technologies (Křížek, Neufus, 2014).

Accommodation facilities in First Class begin or have already begun to implement environmental management which results from the moral, social and political reasons. Individual hotel affects only a small part of the global environment but with suitable environmental measures can contribute to improving the environment at the local level. For hotels, it is not easy to implement environmental management. Managers even though start to be creative of the utilization of existing materials and convert to efficient and environmentally friendly. We can see economics

advantages in eco-friendly accommodation facilities, too (Scholz, Voráček, 2015).

The implementation of the green management is mostly associated with acquiring various certifications that reflect environmental friendliness of provided and offered services. These certifications contribute to the protection of employees, guests, and even the surroundings (Beránek, 2013). Accommodation facilities in the Czech Republic are mainly certified by The Flower and Environmentally Friendly Service systems. In the European Union there is also utilization of the Environmental Management System certification, in the United States of America there is well-known LEED certification (Leadership in Energy & Environmental Design).

## 2. Material and methods

The aim of this paper is to analyze the implementation of the green management elements in selected accommodation facilities in the First Class in Prague.

There were used primary data collected by questionnaire survey and secondary data. The questionnaire survey consisted of twelve questions. They were mostly closed and some were half open questions. At the end of the questionnaire there were three segmentation questions and respondents had space for their views and comments.

The primary survey was conducted in Prague in the Czech Republic. The questionnaires were distributed via e-mail and in person. The survey was conducted since November 2014 until April 2015.

In Prague there are over 600 accommodation facilities; 42 Luxury hotels, 178 First Class hotels, 184 hotels in the Standard class, 10 hotels in the Economy class and 1 hotel in the tourist class, 32 hotels garni and over 80 boarding houses and 22 tourist campsites etc. We contacted 129 accommodation facilities in First Class in Prague; 35 % of them answered willingly. There was created a sample of 45 accommodation facilities after sorting out incomplete or incorrectly completed questionnaires.

We used the methods of scientific work; and i.e. the analysis method, a method of generalization, mathematical, and statistical methods.

## 3. Results

Accommodation facilities that utilize elements of the green management have a certain competitive advantage. Their goal is to apply different elements of the green management and contribute to the environmental protection. The results of the research can be summarized as follows:

- 38 % of the accommodation facilities have sorting containers,
- 35 % of the accommodation facilities use compact fluorescent and LED lamps,
- 26 % of the accommodation facilities have windows thermal insulation,
- 25 % of the accommodation facilities have their own heating control in each room,
- 22 % of the accommodation facilities reduce the flow of water saving perlaters,

- 8 % of the accommodation facilities use cleaning products and laundry detergents friendly to the environment,
- 7 % of the accommodation facilities educate employees to green management,
- 6 % of the accommodation facilities minimize the use of disposable products,
- 5 % of the accommodation facilities inform guests about environmental efforts
- 5 % of the accommodation facilities have implemented environmental housekeeping.

We state that the surveyed accommodation facilities did not reach good results. In comparison with the research performed by Scholz (2015), who dealt with the same issues at the hotels in Luxury class in the Czech Republic, we expected better results (figure 3). Surveyed accommodation facilities prefer products in the packages that can be sorted and stored in containers for separate collection. Furthermore, 26 % of the accommodation facilities have windows thermal insulation and 25 % of the accommodation facilities had individual heating control installed in the rooms. If the room is not occupied by the hotel guests, it is not environmentally friendly to use the air conditioning or heating in the room. It is completely sufficient if the heating or air conditioning is turned on a few hours before the expected arrival of the guests. The best results were connected with the utilization of sorting containers (38 %), and compact fluorescent lamps and LED lamps (35 %).

<i>Green management elements</i>	<i>***** AF in the Czech Republic</i>	<i>**** AF in Prague</i>
windows thermal insulation	100	26
compact fluorescent lamps and LED lamps	100	35
sorting containers	100	38
green management employees education	82	7
each room has its own heating control	78	25
cleaning products and laundry detergents friendly to the environment	69	8
implementation of environmental housekeeping	66	5
minimizing the use of disposable products	49	6
informing guests about environmental efforts	35	5
reducing the flow of water saving perlaters or shower heads	33	22

*Figure 3: Utilization of the green management elements  
Source: Own elaboration, 2015.*

Less than 1/4 of the accommodation facilities (22 %) reduces the flow of water saving perlaters and shower heads. Accommodation facilities can save up to 70 % reduction in water consumption in wash basin and kitchen sinks by water perlaters without reducing user comfort.

Saving shower head can reduce water consumption by 40 %, i.e. at 12 to 15 liters per minute compared to a traditional one, in which the water consumption is about 20 liters per minute. Investment in this equipment is not high; the total price of each perlator is approximately 20 €. Only 8 % of the accommodation facilities use cleaning and laundry detergents which are environmentally friendly. The easiest way is to control data on the package during their selection and purchase. Furthermore, 7 % of the accommodation facilities educate employees about the environmental management. Environmental housekeeping is used by only 5 % of the accommodation facilities. It means the change of thinking and subsequent change in working practices of the accommodation facilities that use this tool. Only 5 % of the accommodation facilities inform guests about their environmental efforts. At present, customers are sophisticated, are more experienced and do not choose the accommodation only by price, destination attractiveness and the hotel location, but also an approach to sustainable development, social deliberateness and environmental protection it is significant for them. Accommodation facilities should willingly inform guests about hotel's behavior towards the environment.

#### 4. Conclusions

Customers' willingness to pay for green initiatives may vary according to hotel types or segments (i.e., economy, mid-priced, and luxury segments). Based on the confirmed facts, besides economic efficiency the implementation of the green management elements is considered socially and morally beneficial.

Generally, many accommodation facilities will therefore try to apply various environmental elements. They help to minimize negative impacts on the environment, reduce energy consumption, distinguish accommodation facility from the competition, positively promote and attract new customers. The application of the environmental elements brings high purchase and operating costs, costs related to the environmental certification, long-term investments payback period, complex operation and others. Despite the disadvantages of the environmental elements application it will devote more attention mainly ecology in the hotel industry in the future.

But in our research, the accommodation facilities in the First Class in Prague did not reach very satisfying results. We think if they invested more funding into these environmental elements, would have increased their revenues and they would enjoy increased customers' favor.

#### References

[1] Belešová, S. Ekologické prvky ako súčasť sociálnej zodpovednosti hotelov. *Folia Turistica* 4. Banská Bystrica : UMB – Ekonomická fakulta, 2014. pp 49-54. ISBN 978-80-557-0697-9.

[2] Beránek, J. a kol. Moderní řízení hotelového provozu. Mag Consulting. 2013. 338 p. ISBN 978-80-86724-45-4.

[3] Bird, R., Hall, A. D., Momente, F., Reggiani, F. What corporate social responsibility activities are valued by the market? *Journal of Business Ethics*, 2007, 76 (2), pp 189–206. ISSN 1573-0697.

[4] Bohdanowicz, P. European Hoteliers' Environmental Attitudes: Greening the Business. *Cornell Hotel and Restaurant Administration Quarterly*. 2005, 46 (2), pp 188-204. ISSN 1938-9663.

[5] Chou, C. J. Hotels' environmental policies and employee personal environmental beliefs: Interactions and outcomes. *Tourism Management*. Elsevier Ltd. 2014, 40, pp 436-446. ISSN 0261-5177.

[6] Křížek, F.; Neufus, J. Moderní hotelový management. Praha: Grada Publishing, 2014. 196 p. ISBN 978-80-247-4835-1.

[7] Patúš, P.; Gúčík, M. Manažment ubytovacej prevádzky hotela. Banská Bystrica : Slovak-Swiss Tourism, 2005. 126 p. ISBN 80-88945-81-X.

[8] Ryan, C. Equity management, power sharing and sustainability-issues of the "new tourism". *Tourism Management*, 2002, 23 (1), pp 17-26. ISSN 0261-5177.

[9] Scholz, P. Uplatňování prvků ekologického managementu v ubytovacích zařízeních v České republice. *Ekonomická revue cestovního ruchu*. 2014, 47 (1), pp 42-52. ISSN 0139-8660.

[10] Scholz, P. Ekonomické aspekty uplatňování environmentálního managementu na příkladu hotelů třídy luxury v České republice. *Sborník příspěvků Mezinárodní vědecké konference*. Hradec Králové: Hradecké ekonomické dny, 2015, pp 57-63. ISBN 978-80-7435-548-6.

[11] Scholz, P.; Voráček, J. Organizational culture and green management: innovative way ahead in hotel industry. *Proceedings of the 10th International Forum on Knowledge Asset Dynamics – Culture, Innovation and Entrepreneurship: connecting the knowledge dots*. Bari: Institute of Knowledge Asset Management, Arts for Business Ltd, University of Basilicata and Polytechnic University of Bari. 2015, pp 1109-1121, ISBN 978-88-96687-07-9.

[12] Tran, B. Green Management: The Reality of Being Green in Business. *Journal of Economics, Finance and Administrative Science*, 2009, 14 (27), pp 21-45. ISSN 2077-1886.

## INFORMATION SECURITY RISK MANAGEMENT IN SLOVAK ENTERPRISES

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**Abstract:** *The use of information and communication technology (ICT) in enterprises is associated with many risks that have a negative impact on business processes. An enterprise may disclose business secrets, there might be leakage or loss of confidential data and information, which results in financial problems, loss of competitive advantage, increase in costs, etc. Enterprises, whose daily activities are supported by ICT, need to be protected. The solution is related to active information security risk management and implementation of security policies that include procedures for the introduction of security controls. Applied security controls reduce probability and impact of risks. An important tool for information security risk management is the regular evaluation of security incidents and the security policy development. In this paper, sectional conclusions of the scientific research project focusing on information security risk management in Slovak small and medium-sized enterprises (SME) are described.*

**Keywords:** *risk management, information security, security incident, SME*

### 1. Introduction

Information is an asset that is essential to any enterprise and needs to be suitably protected. That is especially important in the increasingly interconnected business environment [1]. Enterprises encounter risks of information security breaches more often, but in many cases do not realise when such security incidents happen. Due to the expansion of the Internet, enterprises are easier to attack on the information technology systems [2]. The paper focuses on the current issue of information security and risk management that result from security events. Moreover, the implementation of IS/IT security policy by businesses, the frequency of risk assessment and the importance of individual security incidents perceived by Slovak SME are examined. The research follows priorities of the European Union and the operational programme – Informatisation of Society in Slovak Republic.

The key issue is applied to small and medium-sized enterprises (number of employees from 10 to 249) which have an irreplaceable position in the economy of each country. In the annual report, Slovak Business Agency claims that SME make up 99.9% of the total number of businesses in the Slovak economy, provide jobs for more than 72% of the active workforce and contribute to the creation of added value by over 55% [3]. Unlike large enterprises, they are more dynamic and flexible. SME significantly develop competitive environment, create job positions and are an important source of innovation.

The paper provides a summary of the partial results of a current project for researchers and PhD students at the University of Economics in Bratislava, „Information security risk management in SME, no. I-15-103-00.”

### 2. Information Security Risk Management

The current business environment is characterised by constant changes, unexpected reality, crises, etc. SME need to respond to such obstacles effectively, adapt

quickly and incorporate tools, techniques and methods into its conventional management operations, which help to overcome those unfavourable conditions. It is rare to experience a risk free environment.

At the turn of the 80's to 90's of the 20th century, a concept of risk management was founded – Enterprise Risk Management (ERM), which is defined as a comprehensive approach covering the integration of measurement and evaluation of business risks in corporate decision-making processes [4]. The concept of risk management is constantly growing in importance. Theorists and practitioners agree that risk management is an integral part of any management practice regardless the level of management and dictate its obligatory inclusion into common management structures of businesses.

Risk management focuses on ensuring the safety and stability of the business system, risk analysis and possible threats. At the same time, it seeks appropriate corrective and preventive countermeasures to minimise the negative impacts of risk events and their overgrowth to danger and crisis [5]. In other words, it is a process leading to the risk identification, evaluation and definition of an optimal method of treatment. The optimal method generates minimal costs while the business objectives are respected [6]. Risk management must not be understood as one-time or periodic activity, but as a permanent activity, which does not only identify and describe the risks, but analyses, evaluates and examines as well [7].

Information security risk management takes over definitions and procedures of risk management theory that are applied to the area of information security. Information security deals with the protection of information assets against the risks that come from internal or external business environment. Slovak SME have different opinions on risk perception. Many businesses perceive risk as an opportunity to grow, others approach to risk aversion. Then the risk resonates as a threat and loss.

However, this perception is not complete, because the risk is described as the possibility of getting what we invested as well [8]. Fear of potential risks stimulates business management to modest objectives and cautious strategies, which reflects in reducing the business value in the long run.

Information security risk management is a continual process that establishes the context, assesses the risks, treat the risks using a risk treatment plan to implement the recommendations and decisions. This process can be applied to the organisation as a whole, or its department, a physical location, a service, any information system, etc [9]. Enterprises willing to reach an adequate level of security must be able to identify security holes and develop a mechanism to prevent any misuse thereof. [10] Frequent evaluation of information security risks and compliance with the rules defined in the IS/IT security policy (IS/IT – Information System and Information Technology) leads enterprises to eliminate security incidents or reduce their likelihood or impact to a minimum and increase the resistance, stability and security of sensitive data and business secrets.

The 21st century is said to be the century of information technology associated with information security risks. Increasing level of security becomes a top priority for SME in this period. We agree with Šimák's statement that the current risks of modern information society are information risks. Information forms the basis for decision-making processes because information describes the material and content nature of the issue. Processing of information is time consuming and demands the ability of people. In many cases, the processing is not solvable without the use of computer technology. Hardware and software themselves are a source of risks of total destruction of the requested information. Additionally, information transfer is also a source of information risks [11].

### 3. Objectives and Methodology

The main objective of the research paper is determined based on the current state of knowledge of the issue. The main scientific objective is to assess the current condition of the IS/IT security policy implementation in Slovak SME. The scientific objective is supported by several partial objectives: to evaluate the frequency of information security risk assessment in SME based on the results of a conducted survey and to determine the significance and origin of information security incidents in this target group.

Various scientific methods are used to meet the main and the sectional objectives of the paper. Domestic and foreign scientific literature sources are compared to analyse the theoretical background of the issue. Subsequently, the technique of the survey consists of a structured online questionnaire distributed to individual enterprises. The data was collected by convenience sampling from a database of enterprises that participate in surveys with our university. The database is constantly open and is being supplemented by new respondents. The number of respondents expressed in percentage and segmented into

selected groups is presented in the following tables in chapter 4.

When designing the questionnaire, valid construct, content and criteria were justified. Reliability and accuracy of the questionnaire is determined by the following factors: frequency of items, homogeneity and complexity of the tasks. Results of the analysis of survey sections are obtained by methods of descriptive statistics and the application of quantitative and qualitative statistical methods. New knowledge is formulated by comparing the results of the sectional problem areas. A method of comparison also serves as a verification tool of theoretical assumptions and practical knowledge. Using a general analysis of individual problematic parts of the research, the synthesis of knowledge is applied.

### 4. Results

The survey shows that 52,63% of Slovak SME developed and implemented the IS/IT security policy in the enterprise. All analysed enterprises in combined and state ownership possess the IS/IT security policy, whereas SME with foreign capital investment lack the implemented policy. 40,00% of SME in private ownership developed and implemented the security policy. All enterprises, which possess the policy, evaluate the information security risks.

Subsequently, we examined the frequency of information security risk assessment in individual enterprises. It is interesting to note that 42,11% of respondents did not implement the IS/IT security policy, but 65% of them assessed information security risks. Table 1 shows the frequency of information security risk assessment in SME depending on the business activity and the number of employees.

Table 1 Frequency of information security risk assessment

Type of business Number of employees	Frequency of risk assessment				Σ
	Even more	Once a month	Once a year	Never	
Non manufacture	20,48%	6,02%	38,55%	10,84%	75,90%
50 - 250	0,00%	3,61%	10,84%	0,00%	14,46%
10 - 49	8,43%	2,41%	3,61%	8,43%	22,89%
< 10	12,05%	0,00%	24,10%	2,41%	38,55%
Manufacture	1,20%	2,41%	16,87%	3,61%	24,10%
50 - 250	0,00%	2,41%	0,00%	0,00%	2,41%
10 - 49	1,20%	0,00%	16,87%	1,20%	19,28%
< 10	0,00%	0,00%	0,00%	2,41%	2,41%
Σ	21,69%	8,43%	55,42%	14,46%	100,00%

Enterprises assess security risks once a year. However, we consider 55,42% of SME as insufficient. 21,69% of businesses evaluate the risks more than once a month. Up to 14,46% of SME do not assess the information security risks at all. The best results in the risk assessment reach non-manufacturing enterprises. These are mainly service

providing businesses that are subject to information security events to a greater extent.

#### 4.1 Information Security Incidents

A deviation from established criteria, procedures and standards leads to information security violation by the execution of a security incident. The following table presents the records of security incidents in SME segmented by the type of businesses and the number of employees.

*Table 2 Records of information security incidents in SME*

Type of business Number of employees	Information security incident		$\Sigma$
	Yes	No	
<i>Non manufacture</i>	19,28%	56,63%	75,90%
50 - 250	3,61%	10,84%	14,46%
10 - 49	3,61%	19,28%	22,89%
< 10	12,05%	26,51%	38,55%
<i>Manufacture</i>	1,20%	22,89%	24,10%
50 - 250	0,00%	2,41%	2,41%
10 - 49	1,20%	18,07%	19,28%
< 10	0,00%	2,41%	2,41%
$\Sigma$	20,48%	79,52%	100,00%

More than 20% of enterprises recorded the information security incident. This relates to non-manufacturing small enterprises in particular (12,05%), because they use more ICT in their processes than manufacturing enterprises. However, respondents of small enterprises lack the IS/IT security policy. Only 14% of small businesses implemented the policy.

Security incidents were not experienced by 79,52% of surveyed enterprises. The high percentage may indicate that the SME do not own the tools to record and assess security incidents or they do not pay much attention to risks. These results are evidenced by 55,42% which evaluate the information security risks only once a year and 14,46% which do not evaluate the risks at all.

In the survey, all cases of information security incidents came from external environment. Internal security incidents were not recorded by the respondents. 72% of small businesses that recorded information security incident indicated the maximum rate (very often) of the execution of security incidents in their business.

The objective of our survey is to analyse the significance of individual security incidents that concern the researched enterprises. The results are shown in table 3.

Enterprises attach the greatest importance to unauthorized penetration into the information system (ERP – Enterprise Resource Planning),  $M = 5,92p$ ,  $SD = 1,49p$ , and to unauthorized modification of sensitive information,  $M = 5,90p$ ,  $SD = 1,4p$ . Business information (e.g. business secrets, personal information, knowledge, financial and management data, etc.) is crucial to create business added value. The theft or any change of such information might lead to loss of credibility, business know-how and thus competitiveness. The most important data is stored in

business information systems. Information systems are frequently exposed to various types of threats which can cause different types of damages that might lead to significant financial losses [12]. For this reason, the greatest threat to businesses is the information security incidents directed to the information systems.

*Table 3 Significance of information security incidents for small and medium-sized enterprises*

Security incident	N	Min	Max	Mean	Std. Deviation
Malware	83	,00	7,00	5,1807	1,92001
Botnet	83	1,00	7,00	5,8795	1,53335
Unwanted content	83	2,00	7,00	5,4458	1,84294
Techniques of obtaining information	83	,00	7,00	5,3253	1,96375
Vulnerability of assets	83	1,00	7,00	5,0361	1,90280
Unauthorised modification	83	2,00	7,00	5,9036	1,41089
Unavailability of IS/IT services	83	1,00	7,00	4,8193	1,87503
Attempt to penetrate IS/IT	83	1,00	7,00	5,1446	1,71174
Unauthorised penetration to ERP	83	1,00	7,00	5,9157	1,49148
Valid N (listwise)	83				

All of the presented security incidents are considered significant by the respondents as they exceed the average value of the significance 3,5p on the point scale from 0 (insignificant) – 7 (very significant). Unavailability of IS/IT services has the lowest mean score  $M = 4,82p$ ,  $SD = 1,88p$ , but it belongs to significant security incidents as well. Most business processes depend on continuous operation of IS/IT services. Otherwise productivity decreases, unforeseen downtime arises and normal operation of the business fails.

#### 5. Conclusions

Enterprises ignoring to use the ICT may have trouble keeping up with the competition and lose market share. On the contrary, there are enterprises that use ICT to support management of their business processes and if used correctly, they get a significant competitive advantage. Such enterprises face various information risks – security incidents, which threaten their information assets. The solution is to implement appropriate and active information security risk management including the risk assessment, the formation of criteria, procedures and recommendations in the IS/IT security policy of the enterprise.

Many Slovak SME pay close attention to security incidents that directly affect the storage of confidential data, i.e. data having the greatest value. For this reason, the unauthorized penetration into the ERP system, together with the unauthorized modification of sensitive information are the most significant security incidents to SME. On the other

hand, 79,52% of SME did not record any security incident. The percentage confirms that businesses know how the security incidents might directly endanger their essential information assets, but lack effective risk management and tools to evaluate the information security incidents. This argument is supported by 55,42% of SME which assess risks only once a year and 14,46% of SME which do not assess risks at all. The research shows that approximately every other enterprise develops the IS/IT security policy, which is a positive finding. However, Slovak enterprises need to incorporate information security risk management into their security policies and actively follow the recommendations, procedures, guidelines and criteria in case of the security incident execution.

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### References

- [1] Said, A.R., Abdullah, H., Uli, J., Mohamed, Z. A., *Relationship between Organizational Characteristics and Information Security Knowledge Management Implementation*. Taylor's 6th Teaching and Learning Conference 2013: Transformative Higher Education Teaching and Learning in Practice (TTLC 2013), pp. 433 – 443, Malaysia, November, 2013
- [2] Huo, C., Meng, L., Chen, K. *Research on the University Network Information Security Risk Management Model Based on the Fuzzy Sets*. International Conference on Automation, Mechanical Control and Computational Engineering AMCEE, pp. 89 – 93, China, April, 2015
- [3] SBA agency. Annual report 2012. Slovakia. [http://www.sbagency.sk/sites/default/files/annual\\_report\\_2012.pdf](http://www.sbagency.sk/sites/default/files/annual_report_2012.pdf)
- [4] Szabo, L., Varcholová, T., Dubovická, L. *Manažment rizika*. Bratislava, Ekonóm, 2005
- [5] Butoracová Šindlerová, I., Butorac, D. Aplikácia krízového manažmentu na malom a strednom podniku zaostávajúceho regiónu s primárnym zameraním na význam ľudských zdrojov v organizácii. *Zborník vedeckých prác katedry ekonómie a ekonomiky ANNO 2008*, Vol. 3, No. 1, pp. 46 – 72, 2008
- [6] Tichý, M. *Ovládání rizika, analýza a management*. Praha, C. H. Beck, 2006
- [7] Kračmár, J. Riadenie operačných rizík v krízovom riadení podniku. *Krízový manažment podniku*. Vol. 1, No. 1, pp. 36 – 43, 2012
- [8] Sen, S. Risk as a source of opportunity. In *Business Standard*. June 8, 2015. New Delhi. [http://www.business-standard.com/article/management/risk-as-a-source-of-opportunity-115060700672\\_1.html](http://www.business-standard.com/article/management/risk-as-a-source-of-opportunity-115060700672_1.html)
- [9] ISO/IEC 27005, *Information technology – Security techniques – Information security risk management*, 2011
- [10] Alsaif, M., Aljaafari, N., Khan, A.R. *Information Security Management in Saudi Arabian Organizations*. The 10th International Conference on Future Networks and Communications (FNC 2015), pp. 213 – 216, France, August, 2015
- [11] Šimák, L. 2006. *Manažment rizík*. Žilina, Žilinská univerzita, 2006, p. 36
- [12] Jouini, M., Rabai, L. B. A., Aissa, A. B. *Classification of security threats in information systems*. 5th International Conference on Ambient Systems, Networks and Technologies (ANT-2014), pp. 489 – 496, Belgium, June, 2014



## MOTIVATION, PERFORMANCE AND EFFICIENCY

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**Abstract:** *This article talks about the importance of motivating the employees and underlines the motivation as a key factor which influences the performance of employees, their efficiency and efficiency of the company. These facts are supported by a model that expresses the relationship and connection between motivation, performance and efficiency, also how each other influences and highlights the factors which affect the increase of performance maintaining the high motivation of employees.*

**Keywords:** *motivation, performance, efficiency, employees, skills*

### 1. Motivation

In the company it is important to consider, why employees do what they do, why they perform like they perform and why they act the way they act. It is necessary to think if it is just a habit, or it is a result of previous motivation. It is right these facts that many organizations do not realize, while sufficiently motivated employees are able to perform and achieve their dream goals and goals of the organization itself.

Quality of motivation of human potential principally determines the quality of organizational engagement. Individuals and groups with high motivation are able to work more effectively, with a higher inventiveness, a higher responsibility in comparison with the individuals and groups with low motivation [1].

The most valuable thing new employees bring to the company, is their willingness to work for the company. It means that they work voluntarily, so they want to work by their own decision and make it even with pleasure. It is really difficult, almost impossible to achieve this state through special directives or commands, but only through the support of employees' motivation.

When talking about employee motivation, it is about his inner, own, self-imposed decision, why and with what approach will he try to fulfill his tasks. A person has his own reasons why he works in the company and the company often even does not exactly know these reasons. And these reasons may change overtime.

People working for charismatic leaders are motivated to exert extra effort and, because they like and respect their leader, express greater satisfaction. In a similar spirit, Harter et al. (2010) conclude: Improving employee work perceptions can improve business competitiveness while positively impacting the well-being of employees [2]. Simplistically it can be said that motivation is an activity through which is influenced the behavior of people in the way we want them to behave and act. In the company, with help of the proper management style, this can be used by managers to influence and encourage the employees to higher performance through satisfying their needs and desires also with developing their skills and knowledge. With achievement of higher performance also comes

increase of profit and possibility of better competitiveness on the market.

### 2. Performance

The motivation topic is significant principally wherever there where it is about performance [3]. Motivation multiplies the performance that we are able to achieve with certain abilities. Therefore, this relationship can be mathematically depicted as follows:  $performance = skills \times motivation$  [4].

Previous idea about performance is supported in publications of authors like Birknerová and Litavcová, and they enrich it by the division of the work performance by the factors on which performance depends. Work performance of the employee depends on the consistency of subjective (motivation, skills) and objective (working conditions) performance factors. In principle all of these factors can be controlled in a certain desired extent. It is possible to conclude, that in motivation view the desired level of performance is contingent upon an optimal level of motivation [5].

Employee performance is the final result of particular tasks which was made by employee, which is employee responsible for and which will be evaluated. In other words, work performance is the result of a specific work in a certain quality in a certain time.

There are many different opinions on explanation of the performance. It may be simply regarded as a record of achieved results. From an individual perspective it can be a record of a person achievement. Kane (1996) claims, that performance is something that person leaves behind and that exists separately from the purpose. Bernardin (1995) says: Performance should be defined as the result of the work, because it provides the strongest link to the strategic objectives of the company, satisfaction of the customer and economic benefit to the company [6].

Work performance is affected by many factors. First, it is influenced by the skills of employees and the level of their motivation, but it is also influenced by work conditions are created for employees for the full application of their skills and knowledge. Companies, which have the effort to achieve better performance and greater competitiveness through their employees, should focus mainly on the

effectiveness of its motivational systems and working conditions.

Armstrong has defined four basic areas that affect performance as follows:

- Employee, which needs the right level of skills, motivation, support and incentives to work effectively;
- Working group of the employee, whose members will have strong positive or negative impact on attitudes, behavior and performance of the employee;
- Manager, who for the interests in performance has to provide continuous support and act as a role model, coach and stimulator;
- Company, which can create barriers to effective performance in cases when there does not exist a strong connecting vision, but on the contrary there is an inefficient structure, culture or working system, nothing helping policy and system of working relationships or inappropriate leadership style and management [6].

Each company is finally interested in possible activities which it can do to achieve positive results in the work performance of its staff. It can also be said that the achievement of positive results requires paying increased attention to appropriate manner of motivating the employees and the use of such tools that in optimal and suitable way influence the employees in the connection with their performance.

### 3. Efficiency

The performance is preparedness of the employee for a certain activity. It is basically a set of features and dispositions of the employee.

The management of performance is a tool of achieving better results in the company, in teams and even in individuals, thanks to the fact that the performance is understood and managed within agreed planned objectives, standards, and competencies. It is a process of creating of shared idea about what should be achieved.

It is an approach to management and development of people in the way, which increases the probability of achieving as short-term as long-term objectives [7]. In other words, it is about management, influencing and inspiring each employee or working groups to integrate their own self-objectives, visions and attitudes with company objectives, culture and intentions.

On the base of these facts we can determine the objectives of working performance as follows:

- Integration of objectives of company and particular employees and managers;
- Increasing of employees' share in fulfilling the company objectives;
- Not to work more, but more effectively.

To achieve these objectives it is necessary to use system approach, communication, and motivation.

### 4. Linkage motivation, performance and efficiency

Based on the theoretical knowledge and analysis of the conclusions of other authors publications, in the context of this issue it is possible to define and simultaneously

propose relationship diagram shown in following figure (Figure 1).

Figure interprets the relationship of motivation, performance and efficiency. Efficiency of the company is formed by the efficiency of its employees; employees efficiency is made up of a summary of individual employee performance; and the employee performance is strongly influenced by their motivation.

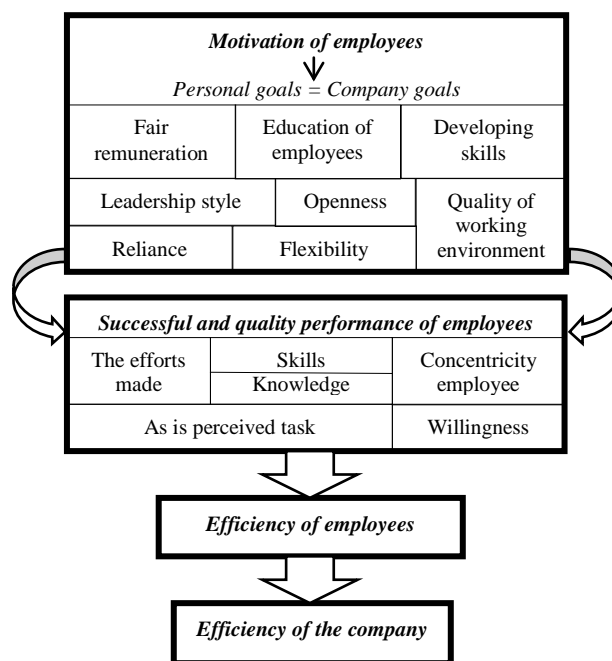


Figure 1: The relationship and linkage between motivation, performance and efficiency.

The basement of the employee motivation in each company is to integrate the employee objectives with the company objectives. If there this balance or connection occurs, the company can say that it is the best way to consistently sustainable success.

Employee motivation is enormously influenced by a fair assessment. If in the company appears an unfair remuneration and evaluation of employees, there would be an immediate decline of motivation of the concerned employee. If this would happen repeatedly, it would lead to employee departure from the company.

Other factor that influences the motivation of employees is development of their skills and knowledge. To avoid the stagnation of employees carrying out their work, it is necessary to provide conditions for their personal development. With supporting of development of employees potential the company obtains not only more skilled workers but also the opportunity to move the company forward through new ideas, innovation, concepts and thoughts of employees who are motivated thanks to the newly acquired knowledge and skills. Substantial impact on motivation has also shown trust of the manager to its employees which is related to the application of the correct management style and transparency of the manager to its employees. This transparency can be understood in

the sense of sharing not only good but also bad news with the employees, hearing their opinions, views and recommendations. To maintain a high motivation contributes also flexibility and certain freedom in performing employees work duties, as an employee has the possibility to use his skills, abilities, and knowledge entirely. Not least it is right a pleasant and high-quality working environment with an atmosphere of trust and friendship which help to make the employee motivation even stronger.

It is a fact that only motivated employees can bring a high-quality and successful work performance, therefore their motivation should be continually improved, increased, and maintained a high standards. Successful quality performance is based on several factors. Specifically on the effort made by the employee that is supported by his acquired knowledge, skills and experiences. Into his performance he has to put also a willingness to solve the task with the highest quality and in most responsible way considering the fact that he has to be fully focused on the problem/task in sense of transferring his attention, orientation and direction of his skills to required fulfilling the objective. For the highest possible quality of performance it is really important to understand the task by employee, respectively to know the result of his work. It would be really ineffective and counterproductive for the company if employee gives all his effort for the task uselessly only because of the misunderstanding the purpose of his job description. If everyone properly motivated employee will make a high quality and successful performance, it will lead ultimately to a high efficiency of employees and finally the company itself.

#### 4. Conclusion

Currently for every company it is important to motivate its employees and managers because everywhere is applicable the principle: unmotivated employee = poor performance. In this relation it is also true that the most is losing right the employer and therefore the company. Desired level of employee performance is conditioned by the level of his motivation. Therefore it is up to each employer to make sufficient effort for supporting employee motivation. The main factors which influence the motivation are fair remuneration, education of employees, developing their skills, the proper management style, transparency of manager to subordinated colleagues, shown trust, flexibility and high quality working surrounding. The performance represents achievements of each employee, which were reached by his skills, knowledge, abilities, willingness and effort of well-performed defined tasks and his concentration to the objective. It is the effort of the employee to fulfill the company objectives, in other words it is effort to unite the objectives of employees with objectives of company. Since motivation affects performance intensively, it is necessary to continuously increase the motivation of employees, respectively permanently maintain at a high level.

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#### References

- [1] Blašková M., Grazulis V., *Motivation of Human Potential: Theory and Practice*, Vilnius, 2009, ISBN 978-9955-19-155-1, page 65
- [2] Robbins, Stephen P., Judge, Timothy A., *Organizational Behavior*, 2013, Global Edition, Pearson Education Limited, Harlow
- [3] Bedrnová, Nový a kol, *Psychologie a sociologie v řízení*, Grada Publishing Praha, 2002, ISBN 80-8594-357-3, page 255
- [4] Rošina, J., *Pracovní motivácia a vzťah k práci*, Slovenské pedagogické nakladateľstvo, 1968, page 29
- [5] Birknerová, Z., Litavcová E., *Motivation to Performance as a Prerequisite for an Increase in The Corporation Competitiveness*, Journal of Competitiveness, 2010, ISSN 1804-171X, <http://www.cjournal.cz/files/21.pdf>
- [6] Armstrong, M., *Řízení pracovního výkonu v podnikové praxi, Cesta k efektivitě a výkonnosti*, Fragment, Praha, 2011, ISBN 978-80-253-1198-1
- [7] Wagnerová, I., *Hodnocení a řízení výkonnosti*, Grada Publishing Praha, 2008, ISBN 978-80-247-2361-7

## MANAGEMENT INFORMATION SYSTEM AS A SUPPORT TOOL FOR EFFECTIVE DECISION MAKING BY MANAGERS IN HEALTH CARE

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**Abstract:** *This article discusses managerial decision making in environment of Slovak health care (hospitals related to self-governing region). At the beginning there are basic concepts of decision-making and management information system as a support tool for decision making by managers. Next, there is mentioned the cost structure of hospitals. In recommendation, there is mentioned possibility of using management information system that can be used for efficient purchase of drugs and medical supplies.*

**Keywords:** *management, decision-making, slovak hospitals*

### 1. Introduction

Healthcare system in Slovakia is a strategically significant sector. The issue of hospital management currently belongs to most heavily discussed topics which has long ago surpassed the boundaries of expert sphere and has become a subject of public discussion. Methods aiming at making hospitals' management efficient and free of debts are searched for. The direness of this issue is proved by the large number of publicly accessible analysis and studies.

Management decisions-making in environment of Slovak health is influenced by the main problem – indebtedness of hospitals. Indebtedness forcing managers to implement decisions that are limited by the amount of available resources.

Management information systems are currently support tool for decision making by managers. Depending on the environment, which are used they have different specificities. Ultimately, managers save time, energy and especially money.

### 2. Literature review

IFP stating in its analysis: “Our analysis has showed the appalling and worsening situation of Slovak healthcare system. Our healthcare system has achieved – even after considering multiple significant factors – ones of the worst results among developed countries. Efficiency which stagnated around the OECD average until the first half of the previous decade has started to decrease dramatically. The decrease in efficiency was mostly caused by increase in real expenditure for healthcare which, differently than in the Czech Republic, has not projected itself into better results. Another significant reason might have been some of the government policies of 2003 – 2005. Slovakia and Hungary are currently achieving the worst results among all OECD countries [4].

“Management can be simplified, made leaner, numerous expert activities can be outsourced, but decision-making remains its permanent part.” Papula and Papulová compare decision-making to choosing between options [3]. Decision-making takes place on all management levels such as deciding about plans, strategy-making, implementation of a specific approach etc. It can therefore be classified as one of

the most significant activities. Jiří Fotr defines decision-processes as “processes of solving decision-making problems with multiple (i.e. at least two) solution variants.” [1]. Decision-making is thus based on the process of choosing individual variants and on choosing a decision as an optimum variant. If there is a single solution to a problem, it does not represent a decision-making problem.

“Management information systems are often explained as all the information systems business, in disregard of hierarchical levels of management. In particular, the systems for the recovery of corporate resources (financial, people, production, sales and marketing, logistics ...). Significantly they support managerial functions of planning and controlling. We know these basic types of reports: periodic reports, summarizing statements, reports on exceptional situations and comparative reports.” [2].

In literature there are different definitions, but overall, the various authors agree on the view that management information systems support management decision-making and make it more effective. By integrating this system into the company it is possible to support the work of managers in decision making process.

### 3. Research methodology

In order to be similar to the model applied in practice in the health sector it must be designed based on existing models and new knowledges. To create we must know the existing functional models in enterprises, as well as in healthcare and combine this knowledge to create a new operating models.

To verify the accuracy of solutions it can be used similar to the model that is functional in the autonomous region of Zilina. There is verified model where drugs are bought on the basis of information from individual hospitals. Decision-making is always performed by Director of the Department of Health. After the model was applied, there was the increased bargaining power and reduce the cost of drugs. This model currently connects four hospitals belonging to the self-governing region. This model is used but only to drugs. But it does not include special health material. Also there is the possibility of saving financial costs, and increase bargaining power.

#### 4. Recommendation

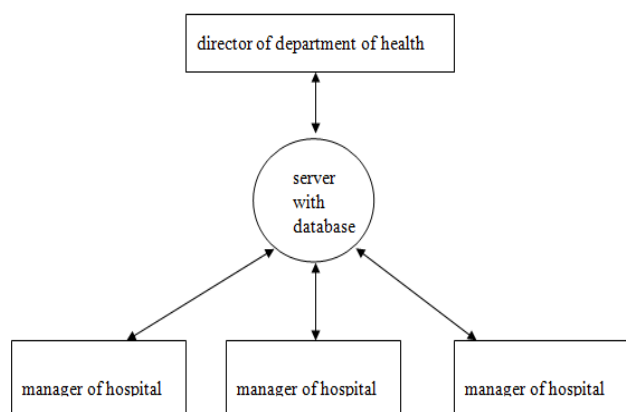


Figure 1 Model of buying drugs and medical material

The picture shows a model that links the Director of the Department of Health through the server with a database of drugs along with hospital managers. In this model, there are several elements:

- **director of department of health** –director of the department should be the person who has the management skills and experience in the department of health. Thus maintaining management (economic) view, but also the department. Unless the director wants to regulate the purchase of drugs or medical material he must have at least basic knowledge about those products. If not, the decision is not effective
- **server with database** –server connects directors of the hospital where they can see the system with items with prices. Based on the needs of its hospitals they may create new items. The database facilitates decision-making.
- **manager of hospital** –directors of hospitals should be in the first place managers or economists. Of course there is also a need for some knowledge of industry where they work.

Unless managers want to order a particular drug or medical material in the database they choose them and also the amount. As the market expands, the database can add new items. Then Director of the Department of Health periodically checks these requirements and evaluate them. When evaluating he prioritizes distributors or drugs or devices that are less expensive. In addition, bulk handling these orders increases the bargaining power of hospitals, and reduces the costs.

This model should be introduced not only for medicines, as the self-governing region of Žilina but also for other medical supplies. This way it can be managed and public hospitals that have the same problems.

#### 5. Conclusion

This model of central purchasing management reduces costs and also creates other benefits. Its application is not just to buy the drugs, but other medical material. By introducing this model, it would reduce hospital costs, which would contribute to better management.

Management information system, however, does not evaluate everything automatically, but reflects managers of hospitals and Director of the Department of Health. It is therefore necessary to have good skills in their department.

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#### References

- [1] FOTR, J., ŠVECOVÁ, L. A KOL., Manažérské rozhodování, Praha, Ekopress, 2010, 20.
- [2] HITTMÁR, Š., Manažment, Žilina, EDIS, 2011, 195-196.
- [3] PAPULA, J., PALULOVÁ, Z., Strategické myslenie manažérov. Bratislava, Kartprint, 2010, 21.
- [4] [http://www.i-health.sk/analyzy/1412\\_sirsi-pohlad-na-efektivnost-slovenskeho-zdravotnictva](http://www.i-health.sk/analyzy/1412_sirsi-pohlad-na-efektivnost-slovenskeho-zdravotnictva)

## ENVIRONMENTAL APPROACH OF THE LARGE ENTERPRISES: LESSONS FROM THE CZECH REPUBLIC

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**Abstract:** *This paper is designed to provide a contribution to the analysis of corporate environmental awareness, describing the perception of environmental approach in a sample of fifty Czech large enterprises in the area of identifying key environmental activities (including their support) and to perform characterization of corporate environmentalism in the Czech Republic. Based on a review of the literature, the paper defines the concept of corporate environmentalism and due to research experiences companies' environmental behavior is not obvious and clear, which indicates gaps in the use of conceptual environmental approach. Through secondary analysis was defined areas of harmonization of Czech law, environmental impact assessment process, integrated pollution prevention and control, voluntary instruments and finally environmental education and consulting as a tool for supporting environmental awareness. A questionnaire-based analysis shows that environmental awareness*

*of environmental approach is a necessary but not condition for environmental behavior; the impact of support for environmental activities is evident in the areas of employee involvement in the environmental field and in the area of sponsorship. In the context of the use of environmental activities is to minimize the significance of the environmental impacts, the use of voluntary instruments for environmental assessment and waste production. In particular, we have discovered that the large enterprises basically followed in the vast majority of a legislative determination and develop environmental activities voluntarily and understand them as a source of competitive advantage.*

**Keywords:** *Corporate environmentalism, environmental approach, environment, large enterprises*

### 1. Introduction

The goal of the paper is to provide an overview of Czech approach in environmental issues and to perform the current situation in environmental activities reflecting Czech's different business and ecological contexts. This paper reports on the findings of a survey that was designed to define the relation of environmental activities on a sample of fifty Czech large enterprises. These findings confront theoretical approaches and highlight the companies' environmental behavior. Aim of this paper is not to define the importance of large enterprises in the economics and other contexts, so very briefly we point out the role of large corporations in relation to the environment. Large enterprises are often criticized by environmental organizations for problematic behavior in environmental and social areas. There is a big pressure in contemporary society on environmental protection and "sustainable" growth. In this context, the role of enterprises in the development of human resources, the use of applied research and development and the effect on the image of the state and the region as an investment attractive or unattractive area should be mentioned in particular. Large firms, under the influence of government regulations, carry out a range of measures to meet environmental limits. In addition to standard measures to make the production more environmentally friendly, there are also other measures that relate to the production only a little. Furthermore, we consider that environmental protection is an integral part of the strategic thinking of large companies in the Czech Republic. The paper begins with a characteristic of corporate environmentalism based on the literature review with focused on both theoretical

and practical importance. Secondly, we have made the description of the environmental background in areas of harmonization of Czech law with EU legislation, environmental impact assessment process, integrated pollution prevention and control; voluntary instruments and environmental education and consulting. Next part of the paper describes the methodology and interpretation of the research findings and concludes with the summary of the findings and recommendations in area of voluntary approach.

#### 1.1 Overview of the environment background in the Czech Republic

We have defined the environmental background because these aspects must be taken into account if we want to clarify corporate environmental approach. In detail, we have focused on areas of harmonization of Czech law with EU legislation, Environmental Impact assessment process, integrated pollution prevention and control; voluntary instruments and finally environmental education and consulting as a tool for supporting higher environmental awareness. There is growing public consensus that both individual and businesses have an ethical obligation to conserve and protect the environment as a common inheritance. The problem is that environmentally sound decisions often do not mirror those that optimize corporate profits. Many organizations will fail to take environmentally friendly actions unless required by law to do so [6]. Environmental laws reflect this tension and generally establish regulatory schemes to minimize, but not completely prohibit, environmental harms. The

following section will approach introduced in the Czech Republic in environmental issues.

The harmonization of Czech law with EU legislation, and the Czech Republic's accession to the European Union, contributed to major advances in the promotion of environmental issues. As long ago as 1998 the Czech Republic adopted, among other things, rules for the introduction of Eco-Management and Audit Scheme (EMAS), and prepared the first National EMAS Program. The program was updated in 2002 and is currently governed by EC Regulation no. 761/2001. In order to fully participate in this program, companies must, among other things, introduce an environmental management system which contributes to the continuous improvement of their environmental conduct. In 2015 there is 26 Czech organizations registered in the EMAS Registry, and another more than 1.500 in the EMS system (ISO 14001) from Czech Environmental Information Agency. The milestone in building foundations of environmental issues was August 2003, when the Sustainable Development Council of the Czech Government (SDCG) was established as a standing advisory body of the Government for sustainable development and strategic management. In the Czech Republic are acting two organizations in the field of legislative provision – Ministry of the Environment of the Czech Republic (ME) and Czech Environmental Information Agency (CENIA) with the mission to collect, review, interpretation and distribution of environmental information. Environmental policy and instruments are developed by ME and the principal purpose of environmental policy is to provide a framework and guidelines for decision-making and activities at the international, national, regional and local levels aimed at further improvements in the environmental quality as a whole and in the quality of environmental components. Environmental policy focuses on enforcement of sustainable development principles, continuing integration of the environmental perspective into sectorial policies, and increasing the economic efficiency and social acceptability of environmental protection programs, projects and activities.

In a nutshell, development of the Environmental Impact Assessment (EIA) process was implemented into the Czech Republic's legal system on 1 July 1992, upon the entry into force of Czech National Council Act No. 244/1992 Coll., on environmental impact assessment. The process constituted both an important element in the system of preventive environmental protection instruments and, simultaneously, a significant component of environmental policy. As of 1 January 2002, Czech National Council Act No. 244/1992 Coll., namely its section pertaining to impact assessment of projects, was superseded by Act No. 100/2001 Coll., on environmental impact assessment and amending some related regulations. On 1 May 2004, Act No. 100/2001 Coll. was amended by Act No. 93/2004 Coll., which regulates, in accordance with the laws of the European Communities, the assessment of environmental impacts and impacts on public health and the procedures to be adhered to by individuals, legal entities, administrative authorities and

self-governed territorial units (municipalities and regions) in the course of such assessments. In addition to that, the Act also newly regulated the assessment of environmental impacts of concepts and abolished the valid Czech National Council Act No. 244/1992 Coll., on the assessment of environmental impacts of development concepts and programs. The process of strategic environmental impact assessment (SEA) is based on the systematic examination and assessment of the potential environmental impact. The purpose of this is to determine, describe and carry out comprehensive evaluation of the expected impacts of prepared plans (strategies) on the environment and public health in all decisive contexts. The EIA/SEA process is intended to reduce the detrimental environmental impacts of the evaluated projects and plans. Integrated Pollution Prevention and Control (IPPC) is an advanced system for regulation of industrial and agricultural activities in relation to the environment. The main emphasis is on a preventive approach, where pollution is avoided before it occurs by choosing appropriate production processes, resulting in cost savings on end-use technologies, raw materials and energy used. Integrated prevention outperforms the sectorial approach, which typically only led to transfers of pollution from one environmental component to another, and the end-use technology strategy, which removes pollution once produced largely by means of filters, separators, and other cleaning devices.

The term of voluntary instruments describes such activities of business and other organizations that lead towards a reduction in the negative environmental impacts of their activities, being introduced and implemented by the organizations based on a free (voluntary) decision and going beyond the requirements of legislation in force. Environmental education and awareness raising and environmental consulting are important preventive instruments within the State Environmental Policy of the Czech Republic. The purpose of environmental education is to encourage the population to act and think in line with the sustainable development principles, to be aware of their responsibility for the maintenance of the environmental quality and to respect life in all its forms. Environmental consulting provides the public with qualified expert advice and recommendations, popularizes research results and scientific findings for the benefit of the environment, brings environmentally friendly living standards closer to the needs of the public, and influences the public in the sense of sustainable societal development. The Ministry of the Environment is the principal guarantor for the co-ordination of environmental education and awareness raising and the department in charge of the promotion of environmental consulting in the Czech Republic.

## 1.2 Literature review

In business studies, sustainable development is usually conceptualized as corporate environmentalism [13], [14], [1]. Corporate environmentalism represents “processes by which firms integrate environmental concerns into their decisions” [11], and is defined as “the organization-wide

recognition of the legitimacy and importance of the biophysical environment in the formulation of organization strategy, and the integration of environmental issues into the strategic planning process” [11]. According to Banerjee [11] integrating environmental concerns into managerial decisions - that is, corporate environmentalism - requires managers to simultaneously consider three perspectives: the environment, the stakeholders, and the organization's competitive advantage. Among the former, studies have pointed according to Perkins [10] to the role of regulatory pressure from governments and civil society, together with market incentives in terms of improved cost competitiveness and access to environmentally demanding customers [9], [5], [8]. In terms of the latter, barriers have been identified primarily as technological and financial in nature with firms' capabilities limit their ability to improve environmental performance [7], [2]. Integration of this concept in relation to corporate environmentalism into an organization can be seen [2] in three areas: (1). a paradigm shift calling for a change in managerial mindset toward environmental concerns; (2). a stakeholder issue by which managers should respond to the diverse needs of employees, customers, shareholders, public interests, and the natural environment; (3). a strategic issue where integrating environmental consideration in business decisions provides competitive advantages to the firm [11]. Institutional approaches have predominantly been applied to understand the spread of corporate environmental practices at the national level, a growing number of scholars have also documented - or else hypothesized - how isomorphic mechanisms may transcend national borders via various transnational linkages to foster cross-national environmental convergence [4].

Understanding corporate environmentalism is of both theoretical and practical importance. Public policy initiatives aimed at reducing environmental impact of businesses can be more effective if the process of how business firms integrate environmental issues is better understood. Environmental strategic alliances, involving relationships with other business firms, environmental agencies, or governmental agencies, are becoming increasingly common [12]. There have been several attempts to establish theoretical linkages between the biophysical environment and business organizations. According Banerjee [11] we adopted approach of three themes in theoretical positions of corporate environmentalism involve framing it as a paradigmatic shift, as a stakeholder issue, or as a strategic issue. There are a number of hierarchically conceptualized descriptive frameworks that identify several phases or approaches [15]. Here, we drawn according to [3], hierarchically arranged stances, although some of their descriptions are adapted both to distinguish among phases and to integrate additional models - distinguish six phases and discuss their intersections with social responsibility: rejection, nonresponsiveness, compliance, openness, integration, and collaboration.

### 3. Research methodology and research findings

The research task was aimed on identification of the level of exploitation in environmental activities on the sample of fifty Czech large enterprises and how are environmental activities promoted. The research was based on the scheduled progress of the research, selection and identification of respondents (entrepreneurs, senior executives or managers responsible for the subject area), data processing and analysis. The technique of data collection was completed by interviews with managers, senior executive or entrepreneur owners in fifty enterprises during 2015.

In the table 1 are interpreted results of selected environmental activities of Czech large enterprises. The activities are sorted according to the results of responses and show the proportion of responses according the type of activity. Activities were based on areas that are reflected in the Corporate Social Responsibility reports. Activities of two-thirds of enterprises are aiming to optimization of the manufacturing process to minimize environmental impacts (68% of enterprises), an important fact is that enterprises have these approaches also due to cost savings. Other important factors are represented by employee policy, use of voluntary instruments for environmental protection (64%) and 60% of enterprises are planning environmental impacts on the consumption of resources and materials. The number of enterprises using voluntary approaches is surprising when companies create environmental projects and use these approaches as a tool for competitive advantage and formation a positive impression to environment, customer, suppliers, and citizens. On the contrary was the worst place for impacts on gas consumption (only 26%). Also interesting finding is that more than half of the companies dedicated evaluation of waste and create the condition of waste management approach.

*Table 1 Type of the environmental activities and its utilization rate by large enterprises*

<i>Ranking</i>	<i>Type of activity</i>	<i>Share (%)</i>
1	Optimization of the manufacturing process to minimize environmental impacts.	68
2	Existing employee policy for assurance in environmental company's issues.	64
3	Use of voluntary instruments for environmental protection	64
4	Planning environmental impacts on the consumption of resources and materials.	60
5	Evaluation of waste.	56
6	Planning environmental impacts of energy consumption.	44
7	Planning environmental impacts on water consumption.	44
8	Evaluation of quantity and quality of wastewater discharged.	44
9	Impact assessment of air pollution and ozone layer.	40
10	Planning environmental impacts on gas consumption planning environmental impacts on gas consumption.	26

Source: own processing

The second area of our research was in identifying a way of promoting environmental activities by large enterprises;



which means to find out the ways and forms of support (e.g. sponsorship, employee involvement, financial and material donations, environmental projects or public involvement in the community or other form of support). We found (see table 2) that although the eminent number of enterprises integrated to the environmental activities, there are very few companies engaging in specific ways to support these activities. The quarter of companies (26%) does not develop any activities to promoting environmental project.

*Table 2 The kinds of support in area of environmental activities by large enterprises*

Ranking	Type of activity	Share (%)
1	Company does not support any environmental projects	26
2	Involving employees in environmental activities	20
3	Sponsorship	18
4	Cooperation on environmental projects	15
5	Financial or material donations	12
6	Public involvement in the community within the environment	9

Source: own processing

Top-rated activities are focused on involvement of employees (as well as a tool to increase employee commitment) and regular sponsorship. We thought that firms will prefer to initiate their own environmental projects where they can manage their effects, but this approach is ranked third (only 15% of companies). Although companies can apply tax relief, so that aid was used for only 12% of companies surveyed. The enterprises are beginning to realize the significance of the impact of its operations on the environment and begin to develop voluntary initiative in access to environment, mainly due to cost reduction and the secondary effect is the strengthening of the competitive position and the possibility to realize more contracts in tenders or involvement in the supply chain.

#### 4. Conclusions

Corporate environmentalism has the potential to chase existing ways of thinking in organizations and organizational members are important agents of change in this process. In several firms, senior managers have helped develop and implement environmental management strategies. A questionnaire-based analysis shows that environmental awareness of environmental approach is a necessary but not condition for environmental behavior; the impact of support for environmental activities is evident in the areas of employee involvement in the environmental field and in the area of sponsorship. In the context of the use of environmental activities is to minimize the significance of the environmental impacts, the use of voluntary instruments for environmental assessment and waste production. The implementation of voluntary instruments (or voluntary environmental activities) at the corporate level is thus of great importance both for the business itself and for society as a whole. The preventive nature of the voluntary instruments leads to a

sounder environment, thus significantly contributing to the realization of sustainable production and consumption, or sustainable development. There are then other benefits at the corporate level, such as improved competitiveness, better image, and operational cost savings.

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#### References

- [1] A. Menon, "Enviropreneurial marketing strategy: The emergence of corporate environmentalism as market strategy," *The Journal of Marketing*, Vol. 61, No. 1, pp. 51-67, 1997
- [2] A. Sawhney, *The new face of environmental management in India*, Aldershot: Ashgate, 2004.
- [3] C. Bullis, and F. Ie, "Corporate Environmentalism," in May S., Cheney G., & Roper J., *The Debate over Corporate Social Responsibility*, Oxford University Press, 2007, pp. 321-335.
- [4] D. L. Levy, and A. Kolk, "Strategic responses to global climate change: conflicting pressures on multinationals in the oil industry," *Bus Polit*, pp. 275-300, 2002
- [5] M. T. Rock, *Pollution control in East Asia: lessons for newly industrializing economies*. Washington, DC: Resources for the Future, 2002
- [6] M. W. Seeger, and S. J. Hipfel, "Legal Versus Ethical Arguments: Contexts for Corporate Social Responsibility," in May S., Cheney G., & Roper J., *The Debate over Corporate Social Responsibility*, Oxford University Press, 2007, pp. 155-166.
- [7] N. Dasgupta, "Environmental enforcement and small industries in India: reworking the problem in the poverty context," *World Development*, Vol. 28, pp. 945-68, 2000
- [8] P. Utting, *The greening of business in developing countries: rhetoric, reality, and prospects*. London: Zed Books, 2002
- [9] R. Jenkins, *Industry and environment in Latin America*. London: Routledge, 2000
- [10] R. Perkins, "Globalizing corporate environmentalism: convergence and heterogeneity in Indian industry," *Studies in comparative international development*, Vol. 42, pp. 279-309, 2007
- [11] S. B. Banerjee, "Corporate environmentalism: The construct and its measurement," *Journal of Business Research*, Vol. 55, No. 1, pp. 177-191, 2002
- [12] S. B. Banerjee, "Corporate environmentalism and the greening of marketing strategy: implications for marketing theory and practice. in: *Charter M, Polonsky MJ, editors. Greener marketing: a global perspective to greening marketing practice* (2nd ed.), Sheffield, UK: Greenleaf Publishing, 1999, pp. 16-40.
- [13] S. B. Banerjee, E. S. Iyer, and R. K. Kashyap, "Corporate environmentalism: Antecedents and

- influence of industry type,” *The Journal of Marketing*, Vol. 67, No. 2, pp. 106-122, 2003
- [14] S. E. A. Dixon, and A. Clifford, “Ecopreneurship – a new approach to managing the triple bottom line,” *Journal of Organizational Change Management*, Vol. 20, No. 3, pp. 326-345, 2007
- [15] T. Cannon, *Corporate responsibility*. London: Pitman, 1994

## ADVERTISING SPOTS AND INFLUENCE OF EMOTION ON THEIR MEMORIZATION

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**Abstract:** Broadcasting of television advertising spots belongs to one of the most expensive. The expectation is high effectiveness of advertising messages, attracting of attention, invoking of emotions and storage in long-term memory of recipients. One of the direct methods to determine the effectiveness of advertising is neuromarketing research. The main objective of this study is to test the effectiveness of selected television commercials in the Super Bowl XLVIII, in New Jersey, Feb. 2. 2014 from the perspective of their emotional impact on the viewer of using neuromarketing survey. GSR (galvanic skin response) was the method of psychophysiological responses monitoring. Percentage expression of changes in skin galvanic reflex within individual advertising spots was compared with the results of the recall tests, which measure the depth of the memory footprint of individual advertising spots. Neuromarketing survey carried out in the area of remembering advertising was complemented by a survey in the area of neuromarketing ethics. Separate survey was carried out which aimed to examine how the public perceives neuromarketing from an ethical perspective. The paper originated in the research project "Linking Eye Tracking with neuromarketing research" and was supported by the Internal Grant Agency of the University of Finance and Administration, Faculty of Economic Studies.

**Keywords:** advertising, neuromarketing, emotion, memory, efficiency, ethics

### 1. Introduction

Broadcast of television commercials at the time of the Super Bowl final belongs to one of the most expensive, because half minute spot advertising costs in the most expensive advertising time record four million dollars [1]. The logical expectation of advertisers is very high efficiency of such advertising, which means that advertisements broadcast during a break of the match should attract the attention of viewers, evoke emotion, and consequently the spot should be stored in the long-term memory of recipients. A human does not remember each advertisement, but neuromarketing research can detect conditions that lead to memorization of advertising [2]. One of the direct methods to determine the effectiveness of advertising is an application neuromarketing. Research, which is also used in this study. The main objective of this study is to test the effectiveness of selected television commercials in the Super Bowl 2014 using neuromarketing survey from the perspective of their emotional impact on the viewer. Super Bowl is the final match, which culminates in the playoffs the North American National Football League in American football. It is played annually since 1967 [3]. LaBarbera and Tucciarone mention the fact that the GSR offers high accuracy in predicting consumer response to advertising stimuli [4]. Kohan found that peaks in skin resistance occurred when the interest in advertising increased, while these peaks did not comply with verbal communication about the interest. He came to the conclusion that the response measured by the GSR is better because it was less distorted [5]. By using biomedical techniques we examine unconscious emotions and motivations of the human brain in neuromarketing, which accelerate the decision-making process of the consumer behavior. From this reason, there are more and more public discussions on the issue of its

ethical aspects. Thus we speak about the "possible" abuse of subliminal perception and about the search of so-called. "Buy" button in the brain that would cause required buying decision [9]. Neuromarketing survey carried out in the area of remembering advertising was complemented by a survey in the area of neuromarketing ethics. Separate survey was carried out which aimed to examine how the public perceives neuromarketing from an ethical perspective.

### 2. Neuromarketing

Neuromarketing is currently an interdisciplinary field that interacts with psychology, medicine, technique and other sciences to examine sensorimotor and affective consumer response to marketing stimuli [6]. Neuromarketing is the "application of knowledge of neuropsychology, cognitive psychology and neuroscience to the environment of marketing decision-making" [7]. The results of neuromarketing research can therefore, according to Vysekalová (2014), serve for the effective management of corporate marketing and communication mix of the company. In its essence neuromarketing can be understood as linking of biomedical engineering and marketing research [8]. During neuromarketing research using biomedical engineering is thus monitored for example, brain activity, heart activity, or other psychophysiological reactions of the recipients.

Within neuromarketing it is possible to observe or discover effectiveness in marketing communications area. It is spent over \$ 400 billion on advertising campaigns yearly [9] and the logical target of the firms is so that these invested funds brought the desired effect. However, in the field of advertising, the banner blindness, which reduces the effect of advertising message, is an obstacle because consumer overlooks advertising due to advertising oversaturation

[10]. This confirms [11], who states that one of the problems of the effectiveness of advertising messages is an advertising oversaturation of recipients, by extension consumers, and they consequently create a custom filter to ads. This can be illustrated by the fact that the average 60 years old person saw approximately 2 million of ads within his life, however, there is question of how many promotional messages were memorized [2].

Neuromarketing is based on the fact that the consumer or respondent himself is often unable to accurately describe their feelings or emotions, while there is a problem with the willingness of the respondent to answer truthfully and undistorted in the classical marketing investigations [2]. Emotions, that are for humans very important because they attach importance to one event over the other, are relatively crucial in marketing [12]. In the field of marketing and advertising thus emotions allow consumers to give a subjective preference of one over the other advertising. It is necessary to emphasize the fact that emotionally tinged memory traces are stored in the memory of a man indelibly [13]. Any advertising message should therefore seek to invoke emotion from consumer so that consumer memorizes advertising messages. There is also a need to mention one essential characteristic of emotions, they are spontaneous, innate and cannot be consciously controlled [12]. In addition to the impact on consumer acceptance of advertising messages, emotions also have influence on any decisions that the human does, because it is from 70 to 90 % emotional, rather than rational, as the man himself believes [14].

*Table 1 Modality of psychophysiological responses [16]*

<i>Psychophysiological reaction</i>	<i>Biomedical technique</i>	<i>Monitors</i>
Bioelectric activity of the brain	EEG Electroencephalography	Changes in brain activity
Muscle tension	EMG Electromyography	Level of muscle tension
Frequency of heartbeats	BVP Bloodvolume pulse	Changes in heart activity
Cutaneous galvanic reflex	GSR Galvanic skin response	Changes in conductivity of the skin due to sweating
Surface temperature of the skin	TEMP	Changes in the surface temperature of the skin due to emotions
Breathing frequency	RSP Pneumography	The frequency of abdominal and thoracic breathing
Eye stroke monitoring	EyeTracking	Tracking time of objects of interest using an eye camera

The advantage and a principle of neuromarketing is monitoring of unconscious psychophysiological recipients' reactions to marketing stimuli presented. An overview of these processes that can be monitored in neuromarketing is described in Table 1. It is almost impossible to influence

these processes by conscious humans' efforts, although some exceptions can be observed by trained yogis [15].

### **3. Methodology of investigation of emotionality influence of commercials on their memorization**

In relation to the stated objective of the study neuromarketing survey in the area of effectiveness of television commercials was carried out. Methodology of survey is described below.

Recipients - a selection based on the selection criteria of a total of 12 recipients was made to carry out the neuromarketing investigation. The first selection criterion was the age of the recipients, who must be in the range of 18 to 35 years. The second selection criterion was the gender, when the number of men or women in the sample must not exceed 60 % so that the sample of recipients is gender-balanced. Based on the selected criteria 5 women and 7 men aged 18-35 years were selected, all of whom were students of University of Finance and Administration in Most.

Commercials - Three television commercials deployed during the finals of the Super Bowl 2014 were presented as stimuli to recipients during the testing. At the time, the broadcast of Super Bowl XLVIII on Fox broke the record for the most-watched program in American television history, with an average audience of 111.5 million viewers, becoming the most-watched event in U.S. television history and surpassing the previous record of 111.3 million viewers who watched Super Bowl XLVI in 2012 [17]. Commercial space during a break in the Super Bowl final belongs to one of the most expensive, so it is advisable to check the effect of such advertising on the recipients. Commercials of Pepsi [18], Toyota [19] and Doritos [20] were selected for neuromarketing investigation. In order to ensure a calm relaxed state of recipients a neutral visual stimulus was chosen, which was formed by the video of the sky and slowly moving clouds. The order and length of individual spots is summarized in Table 2.

*Table 2 Parameters Areas of Interest*

<i>Order</i>	<i>Name of the spot</i>	<i>Length</i>
1	Neutral spot	15 seconds
2	Doritos	30 seconds
3	Neutral spot	10 seconds
4	Pepsi	31 seconds
5	Neutral spot	10 seconds
6	Toyota	60 seconds
7	Neutral spot	35 seconds

The Last neutral spot was used as reference level of values to the of Doritos, Pepsi and Toyota commercials during the data processing.

Data Collection - All television spots listed in Table 2 were merged into one video file, not to disrupt the presentation of stimuli and thereby interfere with the course of data collection. Data gathering took place in a quiet undisturbed room in which the same lighting conditions were secured for all recipients. Videos with various ad spots were screened to recipients using a digital

projector Epson at full resolution. Sound was conveyed to recipients by headphones Philips, on which the respondent could set individual volume level that was individually pleasant. Recipients were invited to investigation individually, so that they could not meet when leaving the survey and exchange impressions during the measurement process.

After the completion of monitoring of psychophysiological responses, measurement sensors were removed from the hands of the respondent and he/she was subsequently subjected to recall test after the measurement completion. In cognitive psychology, a recall test is a test of memory in which participants are presented with stimuli and then, after a delay, are asked to remember as many of the stimuli as possible [21]. Recipients were screened by recall test again after three and seven days after measuring of psychophysiological responses. Using this method, a memory footprint depth of individual spots was identified among survey recipients. Recipients were therefore within the recall test asked to describe the storyline of individual commercials, including the brand they promoted.

Monitoring of psychophysiological responses – Data of psychophysiological responses are obtained by galvanic skin response (GSR), which reaction is controlled by the sympathetic nervous system [22]. Therefore, psychological or physiological excitement as a measure of emotional and sympathetic responses of recipients is indicated [23]. Recipients were attached to the non-dominant hand two sensors by which data were collected. Sensors were attached to the non-dominant hand with velcro to the last article of forefinger and middle finger. Most of the sweat glands in the body is located on the inside of the palms [24]. Monitoring was conducted by the device Nexus-10 with medical class II attestation.

Data processing and interpretation of results - During the psychophysiological responses (GSR) monitoring a total of 73 344 statistically processable data were collected from all recipients, which were analyzed in the statistical program IBM SPSS Statistics. These data were first modified by the method of data adjustment, so that the data can be compared with each other regardless of their absolute values. During the data adjustment, it was necessary to create a resting GSR level of each respondent, which was performed on data from a neutral spot No. 7 where median values were calculated for each respondent. Data from GSR measurements and the neutral the spot No. 7 were compared within individual commercials and the result of data adjustment is the percentage expression of changes in galvanic skin reflex from baseline level of data coming from the neutral the spot No. 7. Using these values, it is possible to determine to what extent the individual ad spots affected the emotional reactions of recipients in every second of the spot watching. The results are summarized in Figure 1.

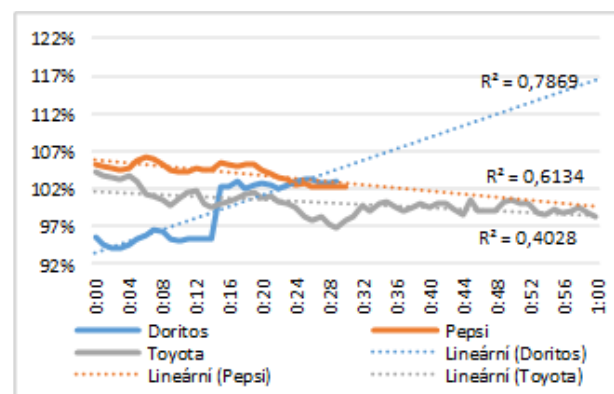


Figure 1: Reaction of GSR on commercial spots

Respondents were influenced by advertising spots differently. For advertising spot Doritos, the psychophysiological responses of respondents had a growing tendency, where the parameter of the searched dependence is expressed by linear regression  $R^2=0.7869$ . Commercials of Pepsi and Toyota had a downward tendency of the psychophysiological reaction ( $R^2=0.6134$ ;  $R^2=0.4028$ ).

Furthermore, the results of recall tests which measure the depth of the memory footprint of individual commercials, were also evaluated. Recipients always had the same task in all three recall tests, namely, to describe the storyline of advertising spot. Three recall tests were carried out, first immediately after the television commercials video watching, the second after 3 days and the third after 7 days. To evaluate the recall test, a rating scale on the basis of commercials storyline was developed. This scale assesses in percentage the level of memorized information from each advertising spot. The answers of recipients in each recall tests were compared with this created scale and based on this it was possible to determine the depth of the memory trace. An arithmetic average was executed from the observed results of all recipients, results are summarized in Figure 2.

Figure 2 shows that the most enduring and profound memory footprint is shown by commercials of Doritos brand, which even a week after seeing an advertisement has about the same value as the first measurement. The course of the polynomial trend connector of recall tests dependence of psychophysiological respondents' reactions to Doritos commercial:  $y = -0.0208x^2 + 0.0542x + 0.3917$ , while the value of reliability:  $R^2 = 1$ . When comparing the results of the recall test with the psychophysiological responses monitoring it is obvious, that most recipients were influenced by Doritos advertising spot, where psychophysiological responses on the spot of the recipients had a rising trend. The growing tendency indicates the increasing attention paid to the spot and particularly emotional commitment. The course of the polynomial trend connector of recall tests dependence of psychophysiological respondents' reactions to Pepsi commercial:  $y = -0.0333x^2 + 0.1583x + 0.1833$ , while the value of reliability:  $R^2 = 1$ . The course of the polynomial trend connector of recall tests dependence of

psychophysiological respondents' reactions to Toyota commercial:  $y = -0.025x^2 + 0.1x + 0.3167$ , while the value of reliability:  $R^2 = 1$ .

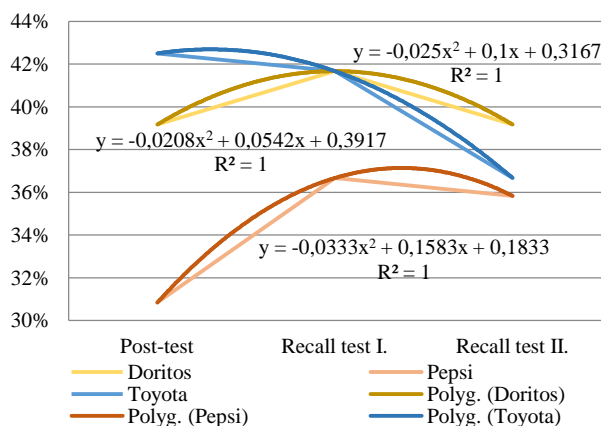


Figure 2: Total memorability

#### 4. Methodology of investigation of neuromarketing perception from an ethical perspective

The survey was composed of two parts - the pretest questionnaire and also from its own research, which investigated the ethical perception of neuromarketing. In the initial phase so called "neuromarketing guide" was conceived which was annexed to the questionnaire, and the aim of this guide was to neutrally and impartially present neuromarketing to the respondents. Guide contained the essence and principles of neuromarketing, methods used in neuromarketing and benefits of neuromarketing, while its extent was on the A4 page. The guide was included to the questionnaire as an attachment mainly due to the fact that neuromarketing is a relatively new approach and the public may not be fully aware of this term. A questionnaire that included a total of 10 questions was then compiled, the first question was a filter question and inquired whether the respondent has ever heard of neuromarketing, if not, he was asked to study the enclosed neuromarketing guide. The questionnaire also incorporated closed questions, segmentation and semi-open questions, which were placed at the end of the questionnaire and surveyed basic demographic data of respondents such as gender, age and education. Created questionnaire and neuromarketing guide were also tested on 10 randomly selected respondents, on which clarity and neutrality of the guide was determined.

**Selection of respondents and data collection** - The questionnaire survey was conducted in the Usti region in the Czech Republic and a total of 148 respondents, was approached, who were selected by a random selection. The data were collected electronically using the CAWI method through a Survio portal (CAWI - Computer-assisted web interviewing is an Internet surveying technique in which the interviewee follows a script provided in a website.). 11 questionnaires of a total of 148 questionnaires had to be removed due to incompleteness, so a total of 137 questionnaires were processed. The structure of the sample is summarized in Table 3.

Table 3 Structure of the sample

		Quantity	%
Sex	Men	73	53
	Women	64	47
Age	18-29 years	47	34
	30-45 years	63	46
	46-60 years	26	19
	61+ years	1	1
Education	Higher	27	20
	Secondary	58	42
	Apprenticeship certificate	41	30
	Primary	11	8

**Results** - The conducted survey found that 75 % of respondent does not know the term "neuromarketing" and never heard of it. Although the respondents did not know neuromarketing they were asked in the questionnaire to study the attached neuromarketing guide and then resumed responding. For a large majority of respondents neuromarketing presents an ethical method of market research. The results are summarized in Figure 3.

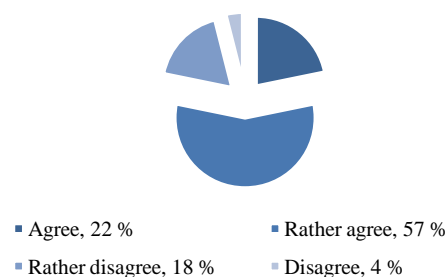


Figure 3: Neuromarketing is an ethical method

Respondents were also asked whether they would be right in the store negatively affected by information that for a product which they want to buy neuromarketing research methods were used. The results showed that the majority of respondent think that this information would not affect their decision-making process while shopping and product supported by neuromarketing would not be disadvantaged or damaged in the eyes of the customer. The results are summarized in Figure 4.

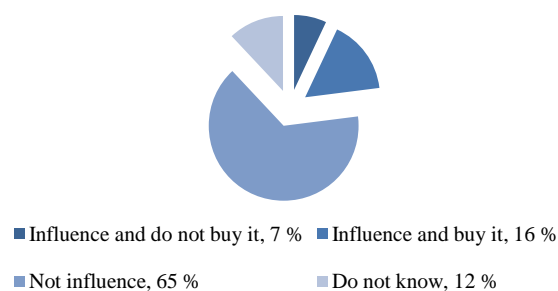


Figure 4: Neuromarketing is an ethical method

The survey carried out in the area of neuromarketing ethics proved quite surprising finding that a large majority of respondents does not consider neuromarketing as unethical method. At the same time, 65 % of those surveyed said their decision about purchase of neuromarketing supported product would not be affected and even 16 % of respondents would be positively affected and would probably buy the product. It is, however, questionable whether they would purchase because of neuromarketing exposure to the decision of the customer or they would purchase only on the basis of information that neuromarketing was used for the product.

## 5. Conclusions

On the basis of processed neuromarketing investigation the effectiveness of commercial spots on respondent was verified. For findings the GSR method was used, which monitors changes in electrical characteristics of the skin caused by an external stimulus that triggers an emotional response [16]. Using the GSR method it was found that Doritos commercial spot most significantly influenced the emotional reactions of recipients, this spot maintained deepest memory footprint among recipients. For Doritos advertising spot, the psychophysiological response of respondents had increasing tendency (parameter of searched dependence is expressed by linear regression  $R^2=0.7869$ ), which indicates increasing attention paid to the spot and especially emotional involvement, Fig. 1. Thus there is a possibility of using neuromarketing as possible method for evaluating of advertising effectiveness, where the effect of Doritos ad has been demonstrated already by GSR measuring and the recall test confirmed the emotional effect of advertising on the recipients.

It was mainly the pilot testing of methodology that could be applied to a larger number of recipients and other modalities of biomedical technology. By applying other methods, such as EEG (Electroencephalography), HRV (heart rate variability), or EMG (electromyography), it would be possible to monitor emotional expressions of recipients in more detailed extent.

GSR is used in neuromarketing research, for example, along with the EEG method to determine consumer response to marketing communication or products. A possible way to implement neuromarketing research focused on experimental measurements of emotion is a method which monitors, using EEG, neurophysiological responses of participants of experiment on different visual stimuli and evaluates them in relation to the feature typology according to H. J. Eysenck.

The main limitation of the GSR method is the inability to determine the directionality of influence, we know how much, but we do not know whether respondent likes it or not. Of course it is relatively easy to perform oral interviews after physiological measurements and ask recipients to indicate at individual elements (e. g. commercials) whether they liked or disliked them. It should be noted that memorizing is influenced mainly by the degree of emotional impact of advertising. The essential is to encourage consumer's incentive to purchase

with a sufficient impact on the subconscious level, and not whether advertising generates positive or negative emotions.

More than half of the respondents has neutral decision-making attitude in the process of choosing between the product promoted on the basis of neuromarketing research and identical product advertised in the traditional manner, i.e. knowing that the company used neuromarketing does not affect their attitude toward the brand.

However, it should also be noted that the survey was mostly made of closed questions, but to obtain better information and respondent's argumentation it would be suitable to include semi-open questions in the possible follow-up survey which would investigate the reasons for the respondent's decisions. Alternatively, it would be appropriate to include scaling procedures, Likert scale or technique of unfinished sentences, where it would be possible to detect the deeper attitudes of respondents on the issue. It would also be appropriate to carry out investigations in other regions of the Czech Republic and possibly replace the random selection of respondents by a random choice or quota selection that would better reflect the structure of the Czech population. Even so, it is necessary to say that the number of respondents and their structure in the sample is sufficient to determine trends in the area of perception of neuromarketing from an ethical perspective. The results showed quite surprising findings that should be proved in further investigations.

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## References

- [1] Marketing: *Sales Media. Podívejte se už dnes na reklamy, které poběží na Super Bowlu 2014*. [online]. 28. 01. 2014 [cit. 2015-08-30]. © 2008–2013 EMPRESA MEDIA, a.s. Available at: [http://marketingsales.tyden.cz/rubriky/marketing/podivejte-se-uz-dnes-na-reklamy-ktere-pobezi-na-super-bowlu-2014\\_296321.html#](http://marketingsales.tyden.cz/rubriky/marketing/podivejte-se-uz-dnes-na-reklamy-ktere-pobezi-na-super-bowlu-2014_296321.html#).
- [2] Lindström, Martin. *Nákupologie: pravda a lži o tom, proč nakupujeme*. Vyd. 1. Brno: Computer Press, 2009, xiii, p. 232. ISBN 978-80-251-2396-6.
- [3] Super Bowl. In: [online]. Copyright © USA.QeX.cz 2015. Všechna práva vyhrazena. 21.8.2014 [cit. 2015-08-14]. Available at: <http://usa.qex.cz/Super%20Bowl>.
- [4] Labarbera, Priscilla A. a Joel D. Tucciarone. "GSR Reconsidered: A Behavior-Based Approach to Evaluating and Improving the Sales Potency of Advertising." *Journal of Advertising Research*. 1995. 35, pp. 33-53.
- [5] Kohan, X. *A Physiological Measure of Commercial Effectiveness*. *Journal of Advertising Research*. 1968, Sv. 8, 4.
- [6] Kozel, Roman. *Moderní marketingový výzkum: nové trendy, kvantitativní a kvalitativní metody a techniky, průběh a organizace, aplikace v praxi, přínosy a možnosti*. 1. vyd. Praha: Grada, 2006, p. 277. ISBN 80-247-0966-X.

- [7] Vysekalová, Jitka. *Emoce v marketingu: jak oslovit srdce zákazníka*. 1. vyd. Praha: Grada, 2014, p. 289. Expert (Grada). ISBN 978-80-247-4843-6, p. 140.
- [8] Rosenlacher, Pavel. Využití zdravotnické techniky v neuromarketingu. In: *Ekonomika a management ve zdravotnictví*. 3. vyd. Praha: ČVUT, FBMI 2013. pp. 82 – 86. ISBN 978-80-01-05277-8.
- [9] Morin, Christophe. Neuromarketing: The New Science of Consumer Behavior. In: *Society*. 2011, pp. 131-135. ISSN 0147-2011. DOI: 10.1007/s12115-010-9408-1. Available at: <http://link.springer.com/10.1007/s12115-010-9408-1>.
- [10] Janouch, Viktor. *Internetový marketing: prosadte se na webu a sociálních sítích*. Vyd. 1. Brno: Computer Press, 2010, p. 304. ISBN 978-80-251-2795-7.
- [11] Du Plessis, Erik. *Jak zákazník vnímá reklamu*. Vyd. 1. Brno: Computer Press, c2007, xi, p. 215. ISBN 978-802-5114-568.
- [12] Nakonečný, Milan. *Encyklopedie obecné psychologie*. 2., rozšířené vyd., v Akademii vyd. 1. Praha: Academia, 1997, p. 437. ISBN 80-200-0625-7.
- [13] Koukolík, František. *Lidský mozek: funkční systémy: normy a poruchy*. Vyd. 2., aktualiz. a rozš. Praha: Portál, 2002, p. 451. ISBN 80-717-8632-2.
- [14] Vysekalová, Jitka. *Chování zákazníka: jak odhalit tajemství "černé skříňky"*. 1. vyd. Praha: Grada, 2011, p. 356. Expert (Grada). ISBN 978-80-247-3528-3.
- [15] Valuch, M. Jan. *Neurotechnologie, mozek a souvislosti*. 3. přeprac., rozš. a aktual. vyd. [Praha]: Galaxy CZ, 2006, p. 183.
- [16] Pospíšilová, Hana. *Aplikace medicínských diagnostických metod v marketingové komunikaci*. Kladno, 2013. Diplomová práce. České vysoké učení technické, Katedra biomedicínské techniky.
- [17] Espn.go. 2013 NFL Playoffs: Super Bowl draws 111.5M viewers. [online] [2015-08-16]. ESPN, 02.03.2014. © 2015 ESPN Internet Ventures. Available at: [http://espn.go.com/nfl/playoffs/2013/story/\\_/id/10398603/super-bowl-xlvi-telecast-most-watched-tv-event-us-history](http://espn.go.com/nfl/playoffs/2013/story/_/id/10398603/super-bowl-xlvi-telecast-most-watched-tv-event-us-history).
- [18] Halftime Intro: Super Bowl (2014): Pepsi. In: *Youtube* [online]. 31. 1. 2014. [cit. 2015-08-30]. Available at: <https://www.youtube.com/watch?v=iISQEWleMuo>.
- [19] Toyota Highlander Starring Terry Crews and the Muppets - 2014 Super Bowl Ad. In: *Youtube* [online]. 1. 2. 2014. [cit. 2015-07-30]. Available at: <https://www.youtube.com/watch?v=wzFMd9QoAJQ>.
- [20] Doritos "finger cleaner" - 2014 crash the super bowl finalist. In: *Youtube* [online]. 24. 11. 2013. [cit. 2015-07-30]. Available at: <https://www.youtube.com/watch?v=u7Y2IRsxc>.
- [21] Goldstein, E. *Cognitive psychology: connecting mind, research, and everyday experience*. 3rd ed. Belmont, CA: Wadsworth Cengage Learning, c2011, xxxiii, 444 p. ISBN 0495914975.
- [22] Martini, Frederic a Edwin F Bartholomew. *Essentials of anatomy*. 3rd ed. Upper Saddle River, N.J.: Pearson Education, c2003, xiii, 642, p. 53. ISBN 01-306-1567-6.
- [23] Carlson, Neil R. *Physiology of behavior*. Eleventh ed. Boston: Pearson, c2013, xx, p. 748. ISBN 978-020-5239-399.
- [24] Dylevský, Ivan. *Somatologie*. Vyd. 2., přeprac. a dopl. Olomouc: Epava, 2000, p. 480. ISBN 80-862-9705-5.



## ACCESSIBLE TOURISM SERVICES FOR DISABLED VISITORS IN SOUTH BOHEMIA REGION

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**Abstract:** *The number of disabled persons in the European Union and also in the Czech Republic increases. These people belong to a growing market segment in tourism also due to aging of population. In this context, the paper deals with accessible tourism and also it informs about requirements of disabled visitors on accommodation and catering facilities, cultural and sport activities etc. The paper focuses on accessible tourism services in the South Bohemia region and it shows possibilities for disabled visitors to travel and spend time here.*

**Keywords:** *accessibility, design, disability, tourism.*

### 1. Introduction

Tourism is an important part of regional economy with numerous economic and also socio-cultural impacts. The share of Tourism on GDP in the world is 9 % [7], in the Czech Republic 2.9 % [9].

The social tourism support is one of the possibilities that serves to distribute the tourist flows over a longer period of time and also withstand their seasonal fluctuations. Some authors, e.g. Higgins-Desbiolles (2006), McCabe (2009), Minnaert, Maitland and Miller (2009) present social tourism as a tool of increasing quality of life of socially disadvantaged groups and they stress the positive impact of tourism on the recovery of physical strength, health and peace of mind (Linderová, 2015).

Social tourism is one of the most discussed topic in the European Union nowadays. Minnaert (2014) says that social tourism is tourism that specifically encourages the participation in tourism activities of people who are economically weak or otherwise disadvantaged. Cazes (2000) sees social tourism as a complex phenomenon, which allows tourism participation for disadvantaged persons. It respects human rights as right for holiday and right for tourism, it is based on non-profit concept and it accepts social and financial situation of participants. According to Cazes, the aim of the social tourism is active use of leisure time, physical and cultural development of participants.

In practice, social tourism addresses four main target groups – senior citizens, young people, families with low-income and people with disabilities.

Important part of social tourism is tourism for disabled persons.

#### 1.1 Tourism for disabled persons

The European Union uses for social tourism a term “tourism for all”. This term often refers to very different aspects. Sometimes, in particular in social policy context, it is used to underline the need to facilitate holidays for lower income groups, sometimes to take into account the needs of disabled visitors. To avoid misunderstandings is better, when speaking about barrier-free or accessible tourism with regard to people with disabilities respectively

activity limitations the term “Accessible tourism for all” (Leidner, 2006).

Accessible tourism for all is not about creating separated services for disabled people, it aims at full integration, or rather inclusion of people with special needs, in particular disabled and aged people, in the tourism sector. Viewed from the perspective of Accessible tourism for all, tourism policy in the European Union can be said to unite accessibility targets that are part of the otherwise commerce-related aspects of tourism policy and a disability policy that, based on the UN’s Standard Rules, support goals and specific measures at various levels that are designed to enhance accessibility in connection with tourism policy (Leidner, 2006).

Accessible tourism for all is a form of tourism that involves a collaborative process among stakeholders that enables people with access requirements, including mobility, vision, hearing and cognitive dimensions of access, to function independently and with equity and dignity through the delivery of universally designed tourism products, services and environments [6].

The definition of Tourism for All adopted by the Nordic Council on Disability Policy underlines, that everyone – regardless of whether they have any disabilities – should be able to travel to the country, within the country and to whatever place, attraction or event they should wish to visit (Leidner, 2006).

#### 1.2 Disabled visitors and their requirements

According to the World Health Organization there are approximately 1 billion persons with disabilities in the world. This equates to approximately 15 % of the world population having a physical, mental or sensory disability [6].

Disabled people represent a large and growing market also in the European Union, for both business and leisure travel. In the European Union, about 37 million people are disabled. This is expected to rise in the future as the average age of the population increases. Altogether, around 120 million disabled or elderly people in Europe would welcome improved access. Disabled people are loyal customers, often returning to places that provide

good accessibility. Other people may also benefit from improved accessibility, for example parents with pushchairs, people with injuries, and tourists with heavy luggage [5].

Disability results from the interaction between persons with impairments and attitudinal and environmental barriers that hinder their full and effective participation in society on an equal basis with others. The term “disabled person” means any person whose full and effective participation in society on an equal basis with others in travel, accommodation and other tourism services is hindered by the barriers in the environment they are in and by attitudinal barriers [6].

Persons with disabilities include those who have long-term physical, mental, intellectual or sensory impairments. Others who may be included in this group due to problems in accessing tourism products and services are people with temporary disabilities, people with crutches during a temporary period, the elderly, people carrying luggage, small children or people who are big or small in size or stature [6].

Health conditions can be visible or invisible; temporary or long term; static, episodic, or degenerating; painful or inconsequential. Note that many people with disabilities do not consider themselves to be unhealthy [8].

Social tourism is a tourism type oriented on disadvantaged persons. Important is support system of social tourism. It is about financial support and creating of accessible environment.

Accessibility is a central element of any responsible and sustainable tourism policy. It is both a human rights imperative, and an exceptional business opportunity. Above all, we must come to appreciate that accessible tourism does not only benefit persons with disabilities or special needs; it benefits us all [6].

Accessibility refers to how easy it is for everybody to approach, enter and use buildings, outdoor areas and other facilities, independently, without the need for special arrangements. Providing information on accessibility and improving access benefits a wide range of people who want to travel, but who may find it difficult [5].

The tourist service chain, however, begins with information about offers, events, destinations and the possibilities to get there. Accessible information, for example, means that the websites of tourism enterprises (including the transport sector) and destinations must be accessible also for blind and visually impaired users. To achieve better accessibility of the tourism sector would also prerequisite accessible public and private transport facilities and accessible buildings and attractions in destinations (Leidner, 2006).

Persons with disabilities have special needs. So it is important to adapt for them [6]:

- parking areas (special parking spaces with proper identification for vehicles of persons with reduced mobility,
- communication tools, e.g. the use of sign language, Braille, and augmentative and alternative way, adapted telephone, fax, internet,

- horizontal (elevators) and vertical movements (ramps, stairs),
- public hygiene facilities (accessible toilet stalls and washbasins,
- passenger vehicles, including private vehicles for hire, buses and coaches, taxis, trams, funiculars (cable cars), trains, commuter ferries and cruise ships designed to allow safe, comfortable and equitable transport,
- accessible stations and passengers terminals (access ramps, elevators, platform lifts, information in visual and acoustic format),
- accommodation facilities (adapted rooms),
- catering facilities (restaurants, coffee shops, cafés, bars),
- cultural activities as museums, theatres, cinemas (access to material and cultural activities in accessible form),
- sport facilities (access to stadiums, race tracks, etc.),
- green spaces and natural environments (accessible routes, adapted fountain and benches).

## 2. Aim and methodology

The scientific goal of this paper is to detect the readiness of the tourism facilities to the providing services for disabled visitors in South Bohemia region.

We were interested in adapted accommodation and catering facilities, adapted cultural and sport facilities.

When searching for the possibilities for disabled visitors, we used primary and secondary research. We focused on the documents dealing with barrier-free environment. We were also interested in databases of accommodation and catering facilities. Some information we gained from the information centres.

Primary data were collected during the visit of accommodation and catering facilities, which were not defined as strictly barrier-free. We also contacted destination management organisation (JCCR), municipalities and regional office.

Our research was conducted in the period September to November 2014.

## 3. Results

South Bohemia region is the second biggest region in the Czech Republic. It is also part of the country, where a lot of tourist attractions can be found, e. g. National park Šumava, city of Unesco heritage – Český Krumlov or Unesco village Holašovice, many castles and churches.

Approximately 1.18 mil. guests visited the South Bohemia region in 2014. It is one of the most visited regions in the Czech Republic.

### 3.1 Green spaces and natural environments

In the South Bohemia region, there we can find National park Šumava and protected landscape area Šumava. There are located 10 barrier-free tourist routes in this part of the country. The city Český Krumlov offers 7 tourist routes adapted for wheelchair users. What is more, a printed travel guide is also available. Some accessible routes are

located in Třeboň region, where the map of accessible routes is available.

Some of the routes are available just with an accompaniment because of stairs or inadequate surface, some of them are partly accessible due to inadequate surface. Majority of tourist routes are accessible for blind people, as the information brochure in Braille font is available there. Accessible routes dispose of accessible restaurants and public hygiene facilities, accessible parking places.

*Table 1 Accessible tourist routes*

<i>Name of Route</i>	<i>Location</i>	<i>Length (km)</i>	<i>Signification of accessibility</i>
Knížecí pláň – Lake Žďarecké	Šumava	4	AA
Horská Kvilda – Stream Hamerský	Šumava	1	AA
Dobrá - Stožec	Šumava	5	A
České Zleby - Mlaka	Šumava	3	AA
Virgin Forest Boubínský	Šumava	4	AA
Canal Schwarzenberg	Šumava		A
Povydří	Šumava	7	AA
Moss Jezerní	Šumava		AA
Moss Chalupská	Šumava		AA
Rechle	Šumava	3	AA
Natural trail of Health	Třeboň district	3.6	AA
Ema Destin Region	Třeboň district	24	A
Upper Gate	Český Krumlov		AA
Deer Garden	Český Krumlov		AA
Square	Český Krumlov		A
Latrán	Český Krumlov		A
Plešivec	Český Krumlov		A
Castle	Český Krumlov		AA
Castle Garden	Český Krumlov		AA
Lipno Treetop Walkway	Lipno	0.675	A

*Notes: A – accessible, AA – available with accompaniment, PA – partly accessible, U - unavailable*

### 3.2 Cultural and historical attractions

In the South Bohemia region, there are located 167 cultural and historical sights. Just 17 castles and 5 churches are accessible for disabled visitors.

An access for disabled people should be provided at least by handrails wherever possible. The top and bottom of stairways and ramps, and the edge of individual steps, should be clearly marked with a contrasting colour. Paths and passageways should be at least 900 mm wide. Best practice is wider than 1 200 mm. Thresholds should be no more than 25 mm high. Best practice is flush thresholds (i.e. 0 mm). Ramps should not be steeper than 8 % (1:12). Best practice is 5 %. A 5 % (1:20) ramp should be no longer than 10 metres without a landing for resting. Best practice is 6 metres, especially for steeper ramps (e.g. 8 %/1:12). Doors should be at least 750 mm wide. Best practice is 900 mm or wider. Steps should not be higher than 180 mm. Best practice is 150 mm [5].

Some of the castles in South Bohemia region have access for wheelchairs only to garden or to courtyard. The castles Hluboká nad Vltavou, Jindřichův Hradec, Kratochvíle and Třeboň have at least one accessible sightseeing tour.

*Table 2 Accessible cultural and historical attractions*

<i>Name</i>	<i>Location</i>	<i>Signification of accessibility</i>
<b>Castles</b>		
Blatná	Strakonice	A
Český Krumlov	Český Krumlov	PA
Jemčina	Jemčina	PA
Bechyně	Bechyně	PA
Lnáře	Lnáře	A
Orlík	Orlík nad Vltavou	PA
Zvíkov	Zvíkov	PA
Červená Lhota	Červená Lhota	AA
Děčín	Děčín	A
Hluboká nad Vltavou	Hluboká nad Vltavou	PA
Jindřichův Hradec	Jindřichův Hradec	PA
Landštejn	Staré Město pod Landštejnem	PA
Rožmberk nad Vltavou	Rožmberk	PA
Třeboň	Třeboň	A
Zvíkov	Zvíkovské Podhradí	PA
Kratochvíle	Netolice	PA
Nové Hradky	Nové hradky	PA
<b>Churches and monasteries</b>		
Monastery Zlatá Koruna	Zlatá Koruna	AA
Franciscan Monastery	Český Krumlov	A
St. Vít Church	Český Krumlov	PA
Augustinian Monastery	Třeboň	A
Schwarzenberg Crypt	Třeboň	AA

*Notes: A – accessible, AA – available with accompaniment, PA – partly accessible, U - unavailable*

### 3.3 Cultural and sport activities

To the cultural activities belong museums, theatres, cinemas, open air museums etc. In South Bohemia region there are located 77 museums and galleries. Only 30 of them are accessible for disabled visitors. Fully accessible are e. g. Hussite museum and Museum of marionettes in Tábor, Egon Schiele Art Museum in Český Krumlov, Budvar Museum and South Bohemian Scientific Library in České Budějovice etc.

*Table 3 Accessible cultural activities*

<i>Location</i>	<i>Number of museums</i>	<i>Number of theatres and cinemas</i>
Bechyně	1	0
Tábor	8	2
Český Krumlov	5	2
České Budějovice	9	4
Dačice	1	0
Lišov	2	0
Týnec nad Vltavou	1	0
Písek	1	1
Veselí nad Lužnicí	1	0
Jindřichův Hradec	1	1
Strakonice	1	2

Access for persons with disabilities to sports facilities, as well as their participation, as much as possible, in mainstream sporting activities at all levels should be encouraged and promoted [6].

From the sport activities found in South Bohemia region, there are 7 options for disabled visitors. In Lipno there are also accessible ski trails.

Table 4 Accessible sport activities

Name	Location	Signification of accessibility
South bohemian centrum of disabled persons	České Budějovice	A
Playground "Bez bot"	České Budějovice	PA
Hopsárium	České Budějovice	A
Tennis centrum	Český Krumlov	A
Sport area	Hluboká nad Vltavou	A
Bobsled track	Lipno nad Vltavou	A
Ski areal	Lipno nad Vltavou	A
Sport area Prachatice	Prachatice	PA

Notes: A – accessible, AA – available with accompaniment, PA – partly accessible, U – unavailable

### 3.4 Accommodation facilities

Accessible accommodation should be as close as possible and on the ground floor where possible. A suitable telephone, alarm or other means of calling for help must be available. A minimum transfer space for toilets, beds and seating is 750 mm. Best practice is 950 mm or wider. Height of controls for door handles, switches, lifts should be within the minimum range of 900 mm to 1,400 mm from the floor. Best practice is 850 mm to < 1,200 mm. A minimum area of circulation space for all rooms, WCs, bathrooms is 1,200 mm x 1,200 mm (or diameter 1,200 mm). Best practice is 1,800 mm x 1,800 mm (or diameter 1,800 mm) [5].

If a person with visual impairments is occupying a room alone, staff should offer to orientate the guest on the position of furniture and facilities in the accommodation. Important are also accessible parking places close to the hotel. All car parks should have a minimum of one space designated for disabled drivers. Best practice is 6 % of barrier-free parking spaces. That means parking space at least 3,3 metres wide [5].

The South Bohemia region disposes with the highest number of accommodation facilities in the Czech Republic (around 1,300 accommodation facilities, i. e. 61 thousand beds). We found 113 accessible hotels. The highest number of them is located in Český Krumlov (18), České Budějovice (11), Třeboň (8) and Lipno nad Vltavou (7).

The Czech travel agency Bezbátour informs about accessible accommodation facilities on their website presenting 16 of them. Accessible are e.g. hotel Vltava\*\*\*\*, Wellness hotel Frymburk\*\*\*\*, hotel Maxant\*\*\* in Frymburk; hotel Peregrin\*\*\*, hotel Garni Myší Díra\*\*\* in Český Krumlov; Orea hotel Concertino\*\*\*\* in Jindřichův Hradec etc.

The share of accessible accommodation facilities in South Bohemia region is 9.91 %.

### 3.5 Catering facilities

To the catering facilities belong restaurants, cafés, coffee shops, bars, fast foods, pizzerias etc.

In restaurants, cafés and bars, aisles should be wide enough to allow visitors to move around easily when the tables and chairs are in use. It is important to have some tables without fixed seating and enough room underneath the table to allow a wheelchair to fit in comfortably. Service dogs should be allowed to access the catering facilities. Menus should be available in large print and staff should be prepared to read menus to customers on request. Catering facilities should also be particularly aware of the requirements of people with allergies and non-smoking areas should be provided [5].

In researched region, there are located 3 000 catering facilities. We found 204 as accessible. Majority of them is located in České Budějovice (36), Tábor (26), Český Krumlov (23), Třeboň (21).

The share of accessible catering facilities in South Bohemia region is 6.8 %.

### 4. Conclusions

Disabled visitors consider as important the following services: barrier-free access to the accommodation and catering facilities, to cultural and sport activities etc. We state, that in South Bohemia region there exist possibilities to travel for disadvantaged persons.

We highlight importance of universal design and adequate approach of the staff. Universal design means the design of products, environments, programmes and services to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design [6].

### References

- [1] Cazes, G. Social tourism. In Jafari, J. *Encyclopedia of tourism*. London: Routledge Taylor & Francis Group, 2000, pp. 542.
- [2] Leidner, R. Tourism accessible for all in Europe. [online]. NatKo – Nationalekoordinationstelle Tourismus für Alle e. V. NatKo, 2006. [cit. 2015-10-09]. Available at: [http://www.rollinggrains.com/archives/Tourism\\_for\\_all\\_in\\_Europe\\_Leidner\\_2006.pdf](http://www.rollinggrains.com/archives/Tourism_for_all_in_Europe_Leidner_2006.pdf)
- [3] Linderová, I. *Ekonomické a sociokultúrne dopady sociálneho cestovného ruchu*. [online]. Proceeding of Hradec Economic Days 2015, Vol II, pp. 138 – 144, University of Hradec Králové, February, 2015. [cit. 2015-10-09]. Available at: [http://fim2.uhk.cz/hed/images/KOMPLET\\_2\\_CJ.pdf](http://fim2.uhk.cz/hed/images/KOMPLET_2_CJ.pdf)
- [4] Minnaert, L. Social tourism participation: The role of tourism inexperience and uncertainty. *Tourism Management*, Vol. 40, pp. 282 – 289, 2014.
- [5] Office for Official Publications of the European Communities. *Improving information on accessible tourism for disabled people*, 2004. [online]. [cit. 2015-10-09]. Available at: [http://ec.europa.eu/enterprise/sectors/tourism/files/studies/improving\\_information\\_on\\_accessibility/improving\\_accessibility\\_en.pdf](http://ec.europa.eu/enterprise/sectors/tourism/files/studies/improving_information_on_accessibility/improving_accessibility_en.pdf)
- [6] UNWTO. *Recommendation on Accessible Tourism*, 2013. [online]. [cit. 2015-10-09]. Available at:

<http://dtxqt4w60xqpw.cloudfront.net/sites/all/files/docpdf/accesibilityenok.pdf>

[7] UNWTO. *Tourism Highlights 2015*. [online]. [cit. 2015-06-09]. Available at: <http://www.e-unwto.org/doi/pdf/10.18111/9789284416899>

[8] WHO. *World Report on Disability*, 2011. [online]. [cit. 2015-09-02]. Available at: [http://www.who.int/disabilities/world\\_report/2011/en/](http://www.who.int/disabilities/world_report/2011/en/)

[9] [https://www.czso.cz/csu/czso/tsa\\_hlavni\\_ukazatele\\_narodniho\\_hospodarstvi\\_a\\_cestovniho\\_ruchu\\_v\\_cr](https://www.czso.cz/csu/czso/tsa_hlavni_ukazatele_narodniho_hospodarstvi_a_cestovniho_ruchu_v_cr)

## REMUNERATION OF THE EXECUTIVE DIRECTORS IN TERMS OF SLOVAK AND CZECH LEGISLATION IN RELATION WITH THEIR BAN ON COMPETITION

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**Abstract:** *The authors deal with the topics related to issues concerning the remuneration of the executive director of the limited liability companies in Slovak and Czech legal regime, the basis of their relationship with the company and issues connected with ban on competition of such director. Authors compare the regimes of the contractual basis for the executive directors stipulated in the Czech and Slovak legislation with reference to newly amended Czech legal regulation that varies significantly from the Slovak one, also in respect of the gratuitous performance of the executive director function. In the last part of article, the authors deal with ban on competition clause that prevents the executive director from conducting the business of the company on his own behalf. Authors analyze the standards of the ban on competition clause that might or might not be further stipulated by the Articles of Association of the company. Authors argue and give the opinion about the possibility of the executive director to be held under ban on competition clause after the expiration of time when the person acted as the executive director of the company.*

**Keywords:** *executive director, remuneration, performance of an office, ban on competition*

### 1. Introduction

Executive directors of the limited liability companies are appointed by the general meeting of the company from among shareholders or other natural persons. They are usually empowered to be present at the sessions of the company's general meeting. [1]. With reference to the form of executive director's appointment, Act No. 513/1991 Coll. Commercial Code (hereinafter referred to only as "Commercial Code") distinguishes between two groups of executive directors. First group of directors is represented by those who were appointed into their position by Articles of Association when establishing the company. Their appointment as the executives of the company becomes effective since the entry into the Commercial Registry. Second group of executive directors is represented by the executive directors who are appointed by the general meeting of the company. [2]. Slovak Commercial Code does not allow the transfer of the power to appoint the executive directors from the general meeting of the limited liability company to the supervisory board of the company and therefore this authority is solely in scope of general meeting powers. In order to show the full frame of the legislation, we would like to add that the adoption of the general meeting's decision about the appointment and suspension of the executive director shall be approved by the simple majority of the shareholders present at the meeting. However, the Articles of Association of the company might stipulate otherwise and to require the consent of the bigger quorum. The legislator considers the abovementioned decisions as the vital decisions in the life-circle of the company.

### 2. Relationship between the company and the executive director

The relationship between the company and the executive director shall be subject, as appropriate, to the provisions

on mandate agreements, unless the rights and obligations are stipulated otherwise by law or by an agreement on performance of an office concluded between the company and the executive director. [3] The Commercial Code in its Article 66, Section 3 rules that such agreement shall be in writing. Commercial Code does not expressly specify any other rights and obligations of the executive director. Therefore, we would recommend that the agreement on performance of an office specifically entailed rights and obligations of the contractual parties. Rights and obligations of the executive director, rights and obligations of the company itself, executive's commitment of secretiveness, prohibition of competition for the executive director, remuneration of the executive director, refunding of travelling expenses, length and means of termination of the agreement shall be included into the agreement on performance of the office (office of the executive director). Essential (both for the executive director and the company) part of the agreement shall be comprised of conditions governing the remuneration of the executive director, periodicity and maturity date of his royalties (salary). In most cases the salary is paid once per month, there are some agreements where part of the salary is paid once per a year and is dependent on the company's revenues and income. This variable part of the salary is based upon economical ratio of the company that are reviewed based upon the individual annual financial statement approved by the general meeting of the company. As for the Slovak Republic, there are many limited liability companies where the only shareholder of the company is simultaneously the only executive director of the company. In these cases, the salary (the revenue) is not paid at all as the income of the company is the income of one person that is also the executive director of the company.

### 3. Remuneration and legal basis of the executive director in the limited liability company

In relation to the executive director's remuneration, Article 59, section 3 of Czech Business Companies Act stipulates that the remuneration of the executive director shall be agreed in accordance with the provisions of Business Companies Act. If the parties fail to comply with the aforementioned article, there is an irrefutable presumption that the executive director performs his duties in the company without the entitlement for any salary or other reward. We can say that Czech legislator protects the executive director as the law stipulates that if the contractual relations concerning the remuneration of the executive director are invalid due to the company's conduct, the executive director will be entitled to a salary. Salary shall be stated as the salary usually provided to the executive directors at the time of the conclusion of the contract. Current Slovak legislation (as well as former Czech legislation) stipulates that the relationship between the statutory body and the company shall be governed by the provisions of commercial law "mandate agreement", if the agreement on performance of an office does not stipulate otherwise. Such legislation prefers to govern the relationship between the statutory bodies and the companies by the commercial law contracts and obligations, rather than by the provisions of Civil Code. Rights and obligations of the statutory body were constituted by the Commercial Code. Other rights and obligations might have been stipulated by the Articles of Association or the agreement on performance of an office itself. Ever since the Commercial Code became effective, the relationship between the statutory body of the company and company itself has been governed by Article 261, section 3, subsection f) of the Slovak Commercial Code. Adequacy of supportive usage of the commercial "mandate agreement" was desirable. The mandatary shall have empowered the mandatary to act on behalf of the company by issuing the power of attorney. [4].

In practice, there has been a numerous amount of the labour contracts which were seen as the contractual basis for the relationship between the company and the executive director for his performance as the statutory body of the company. Supreme Court of the Czech Republic [5] ruled (referring to decision of the Supreme Court of the Czech Republic issued in the Collection of decisions marked under the identification number R 14/1995) that the performance of the statutory body of the business company shall not be performed based on the labour relation. This decision has later been upheld by the Decision of the Supreme Court of the Czech Republic marked under the identification number 21 Cdo/353/2007. The Court ruled that natural person does not perform his duties as the statutory body of the company based on the labour relation. The ruling of the court was based on the fact that the performance as the statutory body of the company is not the type of the dependent work under the Labour Code and therefore cannot be performed upon the labour contract. [6]. In the next ruling, [7] the Court admitted that the statutory body of the company is entitled to enter into a labour contract with company where he is in

position of the statutory body. The type of work agreed in the labour contract between the executive director and the company shall be different from his performance as the statutory body of the company. For the purposes of the hereinabove stated situation, the Czech legislator amended former Commercial Code and enacted a new institute called "the authorization for the business management". According to this institute, the statutory body of the company was provided with the option to authorize the third person, the employee of the company or the statutory body itself for the business management of the company. The statutory body of the company might have been authorized for the business management only in case the statutory body entered into the labour contract with the company for the purpose of business management performance. By enacting such institute, the Czech legislator intended to eliminate current illegal behaviour of the executive directors of the company and the companies themselves when the executive director of the company entered into a labour contract with the company for the work position that entailed the business management of the company (business management of the company is normally only in scope of executive director's powers) as the "General manager" of the company. [8]. Such contract shall have been the basis for performance as the executive director of the company. However, according to aforementioned; such labour contract intending to be the basis of the contractual relationship for being an executive director is seen as invalid according to current Slovak legal regulation. Even though the statutory bodies authorized the other persons for the business management of the company, they still have been left liable for their duty of care and duty of loyalty, i.e. duty to perform their duties with professional care. In these cases, the statutory body was responsible for the choice of qualified person that has been authorized for the business management of the company by the statutory body of the company. The core of the new legislation was to prevent the statutory body from refraining their duty of professional care when authorizing the other person for the business management of the company. The core of the legal regulation was to establish the liability of the statutory bodies that have been empowered by the other member of statutory body as the commercial law liability, not as the labour law liability under the Labour Code.

Nowadays, newly enacted, valid and effective Czech Business Companies Act stipulates that the executive director is entitled to perform his duties as the statutory body of the company based on the labour contract. The labour contract provides for the contractual basis of the executive director's performance, however, the executive director as the statutory body of the company shall be held liable under the liability rules stipulated in the Czech Business Companies Act rather than those valid for employees in the Labour Code. Such requirement of the Czech legislator is justified as the executive director shall act with due and professional care and shall be held responsible if he fails to comply with these duties of care. As for the issues regarding the remuneration of the executive director, the company standardly committed to

reimburse the costs incurred by the executive director related to the executive director's performance as the statutory body. Some of the companies committed to provide the retirement benefits for the executive director leaving the company under certain circumstances. Certainly, these benefits are not provided to those executive directors who failed to comply with the obligation to act with professional care and therefore violated their obligations towards the company. Under these circumstances or when he is revoked from the function, the company would not provide the executive director with these benefits. Even though the Czech legislator states that the relationship between the executive director and the company shall be supportively governed by the Civil Code provisions of the mandate agreement, the legislator in the legislative intent expressed that conclusion of the written agreement on performance of an office is preferred. Written agreement shall be more specific and specify the rights and obligations of the both contractual parties as the supportive legislative regulation of the mandate agreement is relatively concise and brief. In order to strengthen the legal certainty of both parties (the company and the director), Czech legislator stipulates that the agreement on performance of an office for the executive director of the limited liability company shall be in writing and shall be approved by the general meeting of the limited liability company. The agreement might be approved by general meeting before concluding an agreement with the director or after the conclusion of the agreement. It is important to note that until the general meeting does not approve the agreement, the relationship between the executive director and the company is governed by the provisions of the mandate agreement. [10]

#### 4. Ban on competition

The Constitution of Slovak Republic stipulates that the industry of the Slovak Republic relies on the principles of socially and ecologically oriented market economy. Slovak Republic protects and supports the economic competition. [9] One of the aspects of the market economy and the economic competition is the competition (competitive conduct). Slovak legislation does not define the term competition. From the economic point of view, competition means the model of market organization where the market subjects compete for the best conditions while acquisition of monetary funds and final goods production. Even though the Slovak legislator does not define the term competition, ban on competition is regulated throughout many legislative norms. Ban on competition generally stipulates that one party does not enter into a contract or starts to conduct an entrepreneurial activity that would be similar or competitive with the other party activity. [11] Ban on competition prevents the affected persons from participating in the business activities of the other companies in order to prevent the situations when the person acts advantageously for the company while concurrently causes damage to the other company the person is representing. Ban on competition is deemed by legal scholars to be another essential part of the executive director's duty of loyalty. The provisions on

individual forms of business companies stipulate which persons are subject to the ban on competitive conduct and to what extent. The aim of these Commercial Code provisions is to prevent the statutory body of the limited liability company to act speculatively and in conflict with his duties as the statutory body of the company. Therefore, the executive directors shall not conclude in their own name or on their own account, business deals related to the company's entrepreneurial activity, mediate the company's business deals for other parties, participate in the entrepreneurial activity of another company as a member with unlimited liability, and perform activities as a statutory body or member of a statutory body or other body of another legal entity with a similar subject of entrepreneurial activity. In accordance with the previous lines, we would like to point out the decision of the Supreme Court of Slovak Republic [12] ruling that the shareholder of limited liability company may obtain the trades licence for the same business activities as the company itself provided that the shareholder does not exercise those business activities in practice. If the Articles of Association stipulate the ban on competition also for this matter of fact, such situation shall be seen as the violation of the ban on competition. Just the situation that the shareholders obtained the trades licence for the activities that are also the business activities of the company is not the violation of the ban on competition. Ban on competition is violated only in case when the shareholder really performs the business activities the obtained the trades licence for. Holding the shares in other business company is not seen as the business activity but as the disposal with the person's assets. [13] Legal scholar Boháček stresses that executive directors of the limited liability company are entitled to run a business but it is necessary to investigate whether the business activities are of competitive nature. Statutory body of the company shall not use company's personnel, funds or assets for his own interests (own business activities) and shall not misuse the company's trade secret for his own benefits. [14] Executive director's competitive behaviour shall be recognised in those cases where the executive director misuses the information available in order to achieve unlawful advantages for his personal enrichment at the expense of the company. [15] If the company intends to prevent such situations, it is highly recommended for the company itself to establish the supervisory board of the company that will supervise the activities of the executive director. In order to sustain the higher level of the company's protection, the law establishes minimal standards on ban of competition for the executive director of the limited liability company. This means that the ban on competition legal standards might not be lowered by the company's constitutional documents. Furthermore, the law stipulates that the ban on competition shall be adequately applied also for the members of the supervisory board of the company. Slovak Commercial Code makes it possible for the company to broaden the ban on competition also for the shareholders. We assume that the provision of the Article 136, section 3 of the Commercial Code [16] enables to lower the standards of the ban on



competition for the shareholders of the company and modify the minimal legal standards to be applied on the shareholders.

Ban on competition is recognized by some legal scholars as the special legal regulation of unfair competition in the limited liability company environment. Such regulation prevents the occurrence of interests' collision between the company and the statutory body of the company. Holding the position of the executive director in two business companies with similar scope of business activities might harm and cause damages to one of these companies. Violation of such material legal provision on ban on competition shall be deemed as an action in conflict with the good manners of the economic competition. [17] According to Articles 136 and 196 of Slovak Commercial Code, it is allowed to impose stricter legal standards for ban on competition for the members of the statutory body of the company in the Articles of Association or bylaws of the respective company. Despite that fact, it is still highly questionable whether the company may include the "competitive clause" into the agreement on performance of an office. Competitive clause for the executive director prevents the director to perform as the statutory body of the other company after his termination in the previous company. We can argue that according to interpretation of the Commercial Code, it is possible to include a competitive clause into an agreement on performance of an office. Therefore, the company may agree with the executive director that the executive director shall not perform specific business activities stipulated in the contract (including performance as the executive director of the company) for specific period of time. Eliáš supports such opinion and adds that the company is legitimately justified to include a competitive clause into an agreement on performance of an office and to safeguard such clause with securities for an obligation (contractual penalty for instance) [18]

## References:

- [1] In connection with other rights of the executive director related to his presence at the company's general meeting see highly valued scientific article: MAMOJKA, M.: *Osoby s právom účasti na zasadnutí valného zhromaždenia v spoločnosti s ručením obmedzeným* In Acta Iuridica Sladkoviciensia 4. Sládkovičovo: Vysoká škola v Sládkovičove, 2013, s.148-160.
- [2] PATAKYOVÁ, M. a kol.: *Obchodný zákonník. Komentár*. 4.vydanie. Praha : C.H.BECK, 2013, p.561
- [3] SMALIK, M.: *Zmluva o výkone funkcie konateľa spoločnosti s ručením obmedzeným alebo "pracovná zmluva konateľa"*? In Pracovné a sociálne zákonodarstvo z hľadiska aktuálnych legislatívnych zmien: zborník vedeckých článkov. 1. vydanie. Bratislava: Mercury, 2014, p. 205
- [4] Article 566 of Slovak Commercial Code
- [5] Decision of the Supreme Court of Czech Republic marked 21 Cdo/2093/2006
- [6] The term dependent work is explained in Article 1, Section 2 of Slovak Labour Code
- [7] Decision of the Supreme Court of Czech Republic marked 29 Cdo/2287/2010
- [8] BĚLOHLÁVEK, A.J. a kol. Komentář k zákonu o obchodních korporacích. Plzeň: Aleš Čeněk, 2013, p.372
- [9] Article 55 of the Constitution of Slovak Republic
- [10] LUKÁČKA, P.: *Aktuálne otázky výkonu funkcie konateľa s.r.o.* In Sborník příspěvků 5. mezinárodní vědecké konference doktorandů a mladých vědeckých pracovníků Karviná : Obchodně podnikatelská fakulta, 2012, p. 192-198
- [11] HAMULÁK, J.: *Konkurenčné doložky v judikatúre ústavného súdu Slovenskej Republiky* In Ochrana zamestnanca v rozhodovacej činnosti európskych a národných súdov. Krakov, 2014, s.93
- [12] Decision of the Supreme Court of Slovak Republic marked 4 Obo 101/99
- [13] Decision of Supreme Court of Slovak Republic marked Rt 36/2002
- [14] BOHÁČEK, M.: *Základy amerického obchodního práva*. Praha. LINDE PRAHA, 2007, p.179,
- [15] In relation with the right to be informed in dimension of the limited liability company see more in: MAMOJKA, M.: *K problematike práva spoločníka na informácie a práva na podiel na zisku v spoločnosti s ručením obmedzeným* In Acta Iuridica Sladkoviciensia 1. Sládkovičovo: Vysoká škola Visegrádu, 2010, s.208-216.
- [16] Articles of Association or bylaws might stipulate that the ban on competition shall be applied also to the shareholders of the company. The scope of the ban might be stipulated otherwise than in the Commercial Code
- [17] Decision of the Supreme Court of Czech Republic Ro 48/2001
- [18] ELIÁŠ, K.: *Společnost s ručením omezeným*. 1. vydání. Praha : Prospektrum, 1997, p. 179

## COMMON COGNITIVE BIASES AND THEIR INTERRELATIONS WITH DAILY MANAGERIAL PRACTICE

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**Abstract:** Article aims at enrichment of managerial approach in relation towards selected usual cognitive biases and mistakes that commonly occur when it comes to application of human factor within B2C (business to customer) or B2B (business to business), or when the questions of downsizing or recruiting is at stake.

**Key words:** cognitive biases, managerial approach

### 1. Introduction

Let us start our article by looking more closer, defining what cognitive bias is. Cognitive biases can be characterized as the tendency to make decisions and take action based on limited acquisition and/or processing of information or on self-interest, overconfidence, or attachment to past experience. A cognitive bias may also refer to a systematic pattern of deviation from norm or rationality in judgment, whereby inferences concerning other people and locations may be drawn in an irrational fashion [1].

#### 1.1 Subjectivity of cognitive biases

Individuals are able to eventually create their own "subjective social reality" from their characteristic perception of the input [2]. An individual's construction of social reality, not the objective input, may dictate their behaviour in the social world [3]. Thus, cognitive biases may sometimes lead to perceptual distortion, inaccurate judgment, illogical interpretation, or what is broadly called irrationality[4][5][6]. Some cognitive biases may be presumably adaptive. Cognitive biases may lead to more effective actions in a given context [7]. Furthermore, cognitive biases enable faster decisions when timeliness is more valuable than accuracy, as illustrated in heuristics [8]. Other cognitive biases may be a "by-product" of human processing limitations[9], resulting from a lack of appropriate mental mechanisms (bounded rationality), or simply from a limited capacity for information processing [10][11]. A continually evolving list containing most of cognitive biases that has been identified and isolated over the last six decades of research on human judgment and decision-making in managerial work. Kahneman and Tversky (1996) argue that cognitive biases have efficient practical implications for areas including clinical judgment [12].

#### 1.2 Understanding of cognitive biases

Cognitive biases can often lead ourselves into state that may be described as a perceptual blindness or slight distortion (seeing things that aren't really there), hand to hand with illogical interpretation (person being nonsensical), inaccurate judgments (being just plain wrong), irrationality (being out of touch with reality), and

bad decisions (making the person look dumb, childish or incompetent) may also occur. The outcomes of decisions that are influenced by cognitive biases can range from the mundane to the lasting to the catastrophic.

Probably the most profound definition found so far is: "innate psychological tendencies that cause us to draw incorrect conclusions". As recognised in the present - it was the Nobel prize winning work by Tversky and Kahneman in the early 70's in Behavioural Economics that led to the formulation of the first cognitive biases.

#### 1.3 Kahneman's two systems of making decision

Kahneman and Tversky are well respected authorities in the field of psychology, but their attitude finds many useful implication when we are dealing with people. Their theory starts by splitting the way we make decisions into "System 1" and "System 2" thinking. System 1 thinking is designed to operate quickly and with very little effort. System 2 is responsible for allocating (fixing) one's attention and can be difficult mental activity. This means that in System 2 thinking, the effort is (generally) greater and results are slower than with System 1. For example - when you are beginning to learn how to drive a car, the process of driving is a difficult mental effort requiring extreme levels of concentration. This is classic System 2 thinking. By comparison, after practising and gaining necessary information and experience, let's say - you've been driving for a few years, you can arrive at your destination with no memory of your journey there. All the effortful concentration required to drive has been off-loaded to System 1. Our so called „muscle memory" has taken over and we can drive without any conscious awareness of the decisions we make as we drive. The reason for this may be that the brain is a metabolically expensive organ to run. It is estimated that the brain consumes approximately 20% of the available energy in the body. System 2 tries to optimize this drain of energy by making use of System 1 thinking as much as possible since it is metabolically less expensive to use. However a good manager shall recognise the bilateral danger entitled into this fact. In other words, our brains are actively working against us in this regard. We will always tend to use System 1 thinking by default, the domain of the snap judgement, the jump to the conclusion, the unexamined

assumption - and therefore tend to make mistake - which mistakes? That depends on situation. Even now, managerial and psychological theorists struggle with more than one hundred sources of cognitive biases. Some of them, however, affect the managerial practice more than the other. Let us share some knowledge with members of professional and general public. Bias arises from various processes that are sometimes difficult to distinguish. These include: a) information-processing shortcuts (heuristics)[13] b) mental noise[14] c) the brain's limited information processing capacity[15] d) emotional and moral motivations[16] e) social influence[17][18]. Kahneman and colleagues demonstrated several experimental replicable ways in which human judgments and decisions differ from rational choice theory [19]. In one way - biases can be distinguished on a number of various dimensions as we will explain now.

#### 1.4 Dimensions of cognitive biases

For example, there are biases specific to usage within groups as well as biases at the individual level. Some of these biases are recognised throughout managerial practice and day to day experiences. In another situation - specific biases may affect decision-making, where the desirability of options has to be reconsidered. A distinctive class of biases affect memory,[20] such as consistency bias (remembering one's past attitudes and behaviour as more similar to one's present attitudes). Some biases reflect a subject's motivation, for example, the desire for a positive self-image leading to so called egocentric bias [21] and the avoidance of unpleasant cognitive dissonance. Other biases are due to the particular way the brain perceives, forms memories and makes judgments. This distinction may be sometimes described as "Hot cognition" versus "Cold Cognition", as motivated reasoning can involve a state of arousal. Among the "cold" biases, some are due to ignoring relevant information (e.g. neglect of probability). In another perspective, some of these cognition errors may involve a decision or judgement being affected by irrelevant information. Other common biases give excessive accent to an unimportant but salient feature of the problem. As Hoorens pointed out, the fact that some biases reflect motivation, and in particular the motivation to have positive attitudes to oneself, so smart manager is always aware for the fact that many biases of his/her employees are self-serving or self-directed (e.g. illusion of asymmetric insight, self-serving bias, projection bias). In addition, there are also biases in how subjects evaluate in-groups or out-groups; evaluating in-groups as more diverse and "better" in many respects, even when those groups are arbitrarily-defined (in-group bias, out-group homogeneity bias). Some cognitive biases belong to the subgroup of attention-interconnected biases which refer to the paying of increased attention to certain stimuli. It has been shown, for example, that people addicted to alcohol and/or other drugs pay more attention to drug-related stimuli. Common psychological tests to measure those biases are the so called *Stroop Task* [22] and the *Dot Probe Task* (these tests access selective attention) [23].

#### 1.5 Types of different cognitive biases identified within working environment

Let us point out important ideas concerning cognitive biases, that commonly occur within managerial routine and day to day working environment interactions added with the current knowledge. *Fundamental attribution error (FAE)* - Also known as the correspondence bias is the tendency for people to over-emphasize personality-based explanations for behaviours observed in others. At the same time, individuals under-emphasize the role and power of situational influences on the same behaviour. This makes a lot of sense when you're avoiding risks and losses. Jones and Harris' (1967) [24] classic study illustrates the FAE. Despite being made aware that the target's speech direction (pro-Castro/anti-Castro) was assigned to the writer, participants ignored the situational pressures and attributed pro-Castro attitudes to the writer when the speech represented such attitudes. We must see subject's interaction with the company's product holistically taking into consideration all the elements that might influence the motivation to acquire service/product from company, or increased cohesion within company employees. *Confirmation bias* - The tendency to search for or interpret information in a way that confirms one's preconceptions. In addition, individuals may discredit information that does not support their views [25]. The confirmation bias is related to the concept of cognitive dissonance. Whereby, individuals "may reduce inconsistency by searching for information which re-confirms their views" [26]. *Hindsight bias* - Sometimes called the "I-knew-it-all-along" effect, is the inclination to see past events as being predictable. *Framing* - Using a too-narrow approach and description of the situation or issue. Framing involves the social construction of social phenomena by mass media sources, political or social movements, political leaders, and so on. It is an influence over how people organize, perceive, and communicate about reality[27]. It can be positive or negative - depending on the audience and what kind of information is being presented [28]. People use subjective filters to make sense of the world, the choices they then make are influenced by their creation of a frame. Cultural bias is the related phenomenon of interpreting and judging phenomena by standards inherent to one's own culture. *Anchoring* - a psychological heuristic that describes the propensity to rely on the first piece of information encountered when making decisions [29]. According to this heuristic, individuals begin with an implicitly suggested reference point (the "anchor") and make adjustments to it to reach their estimate [30]. *Halo effect* - is when an observer's overall impression of a person, organization, brand, or product influences their feelings about that entity's character or properties [31]. The halo effect is a specific type of confirmation bias, wherein positive sentiments in one area cause questionable or impartial characteristics to be seen positively. The halo effect works in negative directions, sometimes known as the horns effect. So that, if the observer likes one aspect of something, they will have a positive predisposition toward everything about it. If the observer dislikes one aspect of

something, they will have a negative predisposition toward everything about it. A person's appearance has been found to produce a halo effect[32]. The halo effect is also present in the field of brand marketing, affecting perception of companies and non-governmental organizations (NGOs).

*Belief bias* - When one's evaluation of the logical strength of an argument is biased by their belief in the truth or falsity of the conclusion. *Self-serving bias* - The tendency to claim more responsibility for successes than failures. It may also manifest itself as a tendency for people to evaluate ambiguous information in a way beneficial to their interests. It is the propensity to credit accomplishment to our own capacities and endeavours, yet attribute failure to outside factors,[33] to dismiss the legitimacy of negative criticism, concentrate on positive qualities and accomplishments yet disregard flaws and failures. Studies have demonstrated that this bias can affect behaviour in the workplace,[34] in interpersonal relationships,[35] playing sports, and in consumer decisions [36], *Ikea Effect* - In 1957 a classic study originally designed by Aiken identified that rats and starlings had a higher "personal" preference for food which they had expended effort to obtain [37]. This particular cognitive bias is obviously also deeply wired into human makeup. We have the tendency to value the things we have worked on more, than the equivalent thing that we have not. This was verified experimentally in a study by behavioural economist, Dan Ariely. Some college students were paid \$5 to assemble an "Ikea box" (from which - obviously this cognitive bias gets its name). After they had completed it, they were asked how much they would pay to take the box home with them. This was compared with an already assembled box. Students were willing to pay more for the boxes they had assembled themselves. In addition to test this with a non-utilitarian item, students were then paid \$5 to fold an origami object. Again the students were happy to pay well above the norm for their own origami object, pricing it the same as those folded by origami experts. The direct managerial implication from this knowledge, however, stems from results. It was detected by numerous replicated situations, that the final test was whether completing the process of building was important in the valuation of the object. It was shown that not being allowed to complete the project resulted in lower valuations of the object. The implication for product management is clear. When we complete a product or grant a service to our customers, an irrational attachment and valuation of that product/service is created. Smart manager will always work with this knowledge, allowing his/her subordinates to finish their tasks before starting new activities and encourage customers to take their time for decision making. *Sunk Cost Fallacy* can be sometimes referred to as "dysfunctional commitment"[38]. Whether it's the organizational, managerial, or economical crisis, a poorly performing stock in your portfolio or a bad relationship, they all fall prey to the same bias. It may come into play when we decide whether to spend additional energy on an existing program (activity) or to invest in a new one. Such danger became particularly pronounced when "pivoting" entered the domain. Each

decision to invest in a new feature, new manpower or project on an existing company/organizational processes should be evaluated against all the available alternatives. This would include investing in a completely new product, hiring new staff and evaluating their chances of success compared to investing in the existing product, or impact on already productive departments, salesrooms or facilities.

*Bandwagon Effect* This is really more of a cluster of inter-social bias - in a homogenous group the tendency will be to generate very similar ideas and be more accepting of those ideas can become dominant over short time. This in turn is in its anthropologic nature a self-reinforcing tendency. Ideas which run counter to the group will usually not be raised openly [39]. This also includes "Not Invented Here" or "Not sold here" syndrome. In this the pattern of group think manifests as the automatic refusal of any technology not built/sold by the team. This has huge effect of devaluing potential competitors for the product, or relying only on in-house tools when managers try to re-think their wholesale/retail strategy, cut expenses, downsize, or when company try to develop a e-shop interface, new software or app, as well as when developing high quality product online (rather than using available open source tools).

## 1.6 Scientific method as a way of controlling cognitive biases

What can we do about the impact of cognitive bias? Hopefully we as a specie have a powerful tool we've developed -the scientific method. Science in the real world relies on the falsifiability of theory. If something is false, it can be shown by observation or experiment. What is particularly exciting is that increasingly in the managerial practice keeps using hypotheses and creating tests to falsify that hypothesis is gaining ground. Let's take a look at how practices can help counteract some of these cognitive biases. *Usability testing*, the practice of getting new employees to accomplish a goal with your company software and after observation collecting their notions on the process they used, as well as other qualitative metrics giving you a powerful mechanism for improving your company working environment and systems. *Control group performance* - This practice is usually performed by measuring the difference in behaviour between a control group and some variant of the company valuable to help us make decisions about product direction. By gathering quantitative metrics on behaviour we have some proof about direction rather than relying on arguments based on emotion and guess-work. *Cheap prototyping and visualization* - One of the most useful things that managerial approach facilitated is its use of cheap prototypes and virtualisation. Several experts can run huge amount of visual information throughout online channel, which is surely today's the most awesome way to get potential customers engaged to interact, purchase and discovering things about company and the product/service it offers. But perhaps the biggest benefit of using both cheap prototyping and visualization instead of real products help greatly to avoid the sunk cost fallacy. You can't be unduly influenced by sunk cost, if you haven't

spent any significant money or energy on the product/service idea. Many successful people think this is a powerful way to embrace failure and quickly learn and iterate over ideas.

## 2. Conclusion

In answering each of these questions, you must look closely at how each may be woven into the recommendation that has been offered and separate them from its value. If a recommendation doesn't stand up to scrutiny on its own merits, free of cognitive bias, it should be discarded. Only by filtering out the cognitive biases that are sure to arise while decisions are being made can you be confident that, at the end of the day, the best decision for you and your company was made based on the best available information.

## References

- [1] Haselton, M. G., Nettle, D., & Andrews, P. W. *The evolution of cognitive bias*, In Buss, D. M. (Ed.), *The Handbook of Evolutionary Psychology*: Hoboken, NJ, US: John Wiley & Sons Inc., p. 724–746, 2005
- [2] Bless, H., Fiedler, K., Strack, F. *Social cognition: How individuals construct social reality*, Hove and New York: Psychology Press, p. 2, 2004
- [3] <https://www.boundless.com/management/textbooks/boundless-management-textbook/decision-making-10/barriers-to-decision-making-80/cognitive-biases-as-a-barrier-to-decision-making-384-6858/>
- [4] Kahneman, D. Tversky, A., *Subjective probability: A judgment of representativeness*, *Cognitive Psychology*, 3 (3): p. 430–454, 1972
- [5] Baron, J., *Thinking and Deciding* New York, NY: Cambridge University Press, 2007
- [6] Ariely, D., *Predictably Irrational: The Hidden Forces That Shape Our Decisions*, New York, NY: HarperCollins, 2008
- [7] Haselton, M. G., Nettle, D., Andrews, P. W., *The evolution of cognitive bias*, In D. M. Buss (Ed.), *The Handbook of Evolutionary Psychology*: Hoboken, NJ, US: John Wiley & Sons Inc, p. 724–746, 2005
- [8] Bless, H., Fiedler, K., Strack, F., *Social cognition: How individuals construct social reality*, Hove and New York: Psychology Press, 2004
- [9] Morewedge, C. K., Kahneman, D. *Associative processes in intuitive judgment*, *Trends in Cognitive Sciences*, 14 (10): p. 435–440, 2010
- [10] Hilbert, M., *Toward a synthesis of cognitive biases: How noisy information processing can bias human decision making*, *Psychological Bulletin*, 138, p.211–237, 2012
- [11] Kahneman, D., Slovic, P., Tversky, A., *Judgment under uncertainty: Heuristics and biases*, Cambridge University Press, 1982
- [12] Kahneman, D., Tversky, A. *On the reality of cognitive illusions*, *Psychological Review*, 103, p. 582–591, 1996
- [13] Simon, H. A., *A behavioural model of rational choice*, *The Quarterly Journal of Economics* 69: p. 99–118, 1955
- [14] Pfister, H. R. Böhm, G., *The multiplicity of emotions: A framework of emotional functions in decision making*, *Judgment and Decision Making*, 3: p. 5–17, 2008
- [15] Wang, X. T., Simons, F. Brédart, S. *Social cues and verbal framing in risky choice*. *Journal of Behavioral Decision Making*, 14, 2001
- [16] Kahneman, D.; Shane F. *Representativeness Revisited: Attribute Substitution in Intuitive Judgment*. In Thomas Gilovich, Dale Griffin, Daniel Kahneman. *Heuristics and Biases: The Psychology of Intuitive Judgment*, Cambridge: Cambridge University Press, p. 51–52, 2002
- [17] Tversky, A., Kahneman, D. *Judgement under uncertainty*, *Heuristics and biases Sciences*, 185: p. 1124–1131, 1974
- [18] Tversky, A., Kahneman, D., *Extensional versus intuitive reasoning: The conjunction fallacy in probability judgement*. *Psychological Review*, 90: p. 293–315, 1983
- [19] Gigerenzer, G., *Bounded and Rational*. In Stainton, R. *J. Contemporary Debates in Cognitive Science*. Blackwell, p. 129, 2006
- [20] Schacter, D. L., *The Seven Sins of Memory: Insights From Psychology and Cognitive Neuroscience*. *American Psychologist*, 54 (3): p. 182–203, 1999
- [21] Hoorens, V., *Self-enhancement and Superiority Biases in Social Comparison*. In Stroebe, W. and Hewstone, *European Review of Social Psychology*, 4. Wiley, 1993
- [22] Jensen A. R., Rohwer W. D., *The Stroop color-word test: a review*, *Acta psychologica*, 25 (1): p. 36–93, 1966
- [23] MacLeod C. M. *Half a century of research on the Stroop effect: an integrative review*. *Psychological Bulletin*, 109 (2): p. 163–203, 1991
- [24] Jones, E. E., & Harris, V. A *The attribution of attitudes*, *Journal of Experimental Social Psychology*, 3: p. 1–24, 1967
- [25] Mahoney, M. J., *Publication prejudices: An experimental study of confirmatory bias in the peer review system*. *Cognitive Therapy and Research*, 1 (2): p.161–175, 1977
- [26] Jermias, J., *Cognitive dissonance and resistance to change: The influence of commitment confirmation and feedback on judgement usefulness of accounting systems*. *Accounting, Organizations and Society*, 2001
- [27] Druckman, J. N., *The Implications of Framing Effects for Citizen Competence*. *Political Behaviour*, 23 (3): p. 225–256, 2001
- [28] Goffman, E., *Frame analysis: An essay on the organization of experience*. Cambridge, MA: Harvard University Press, 1974
- [29] <http://www.sciencedaily.com/terms/anchoring.htm>
- [30] Tversky, A.; Kahneman, D. *Judgment under Uncertainty: Heuristics and Biases*. *Science* 185: p. 1124–1131, 1974
- [31] Long-Crowell, E., *The Halo Effect: Definition, Advantages & Disadvantages*. *Psychology* p. 104
- [32] Wade, T., DiMaria, C., *Weight Halo Effects: Individual Differences in Perceived Life Success as a Function of Women's Race and Weight*. *Sex Roles* 48 (9/10): p. 461, 2003

- [33] Campbell, W. K., Sedikides, C. *Self-threat magnifies the self-serving bias: A meta-analytic integration*. Review of General Psychology, 3, p. 23-43, 1999
- [34] Pal, G. C. *Is there a universal self-serving attribution bias?*. Psychological Studies, 52 (1): p. 85-89, 2007
- [35] Campbell, W. Keith, *Among friends?* British Journal of Social Psychology, 39 (2): p. 229-239, 2000
- [36] Moon, Y., *Don't Blame the Computer: When Self-Disclosure Moderates the Self-Serving Bias*. Journal of Consumer Psychology, 13 (1): p.125-137, 2003
- [37]<http://www.hbs.edu/faculty/Publication%20Files/11-091.pdf>
- [38] <https://www.unboxedconsulting.com/blog/cognitive-bias-product-management-and-you>
- [39] <http://ww2.cfo.com/forecasting/2014/05/10-cognitive-biases-can-trip-finance/>

## COMPANIES IN 21TH CENTURY - BASED ON KNOWLEDGE?

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**Abstract:** *The 21st century is also designated as the century of technology. People are using technology for information mining more and more frequently. However, people cannot decide purely on the basis of bare data which is why it is necessary to connect the information into knowledge. This articles discusses about need to use the knowledge in enterprise on 21st century.*

**Keywords:** *innovation, knowledge, 21.st century*

### 1. Introduction

The 21st century is also designated as the century of technology. People are using technology for information mining more and more frequently. However, people cannot decide purely on the basis of bare data which is why it is necessary to connect the information into knowledge. Technological changes will adapt the functioning of the whole society.

The changes are described following:

- Knowledge society: 19th and 20th century were predominantly periods of industrial society which was developing due to progress achieved by industrial revolution. At the turn of the 2nd and 3rd century a so-called post-industrial society started forming. In this society a new knowledge or digital economy as well as knowledge and information society become the theme. Its development on the global level is accompanied by megatrends such as: [6]
- Increasing usage of information and communication technology contributing to increasing the information basis of individual market entities,
- Global market: international economic integration growing into establishment of global economy connected with global competition and global market,
- Changing nature of the market and its organisation: the market often loses its real aspect and changes into virtual market. We are talking about electronic markets which are much more efficient at setting the price levels than the standard markets of the past,
- Fast pace: the hectic pace of life and increasingly intense technological and social progress connected with occurrence of new, previously unknown problems etc.
- Renaissance of morals: In the past, predominantly decreasing the production of costs was stressed. The focus today is moving to transaction costs, i.e. costs in the society which do not contribute to her fortune. This phenomenon influences also the nature of economy policy and stressed the influence of informal rules. The principles of public life will lead to unselfishness, integrity (with civil servants not being pressured by institutions or individuals), objectivity, transparency and honesty.

Change of prosperity factors: Another significant phenomenon of 21st century connected also with the end of 20th century is the change in perception of input factors. Information and human factor are in the forefront. [10]

### 2. Information and human factor

In order to be successful, businesses equally have to adapt to the changes:

- Flexibility and fast adaptability at work: The world of work is changing at an ever increasing pace so employers actively seek out employees who can adapt to changing circumstances and environments, and embrace new ideas, who are enterprising, resourceful and adaptable. [1]
- New technology: new technologies connect the world and accelerate spreading of information. The employees are able to connect to the Internet anytime and anywhere. The Internet provides many possibilities from looking up new information through direct marketing to online conferences connecting colleagues from various parts of the world.
- Team-based activities with more social collaboration and peer-to-peer learning: Teamwork and team learning are very important, because the team is able to achieve a synergic effect, meaning the combination of skills, attitudes, characters and ideas of individual members can get far greater effect than a mere sum of their performances. Teamwork is also characterized by seeking and applying unconventional approaches and innovative forms of work and collaboration in a team where team members know the strengths of their colleagues and accept and use their special features. According to Senge for team learning and all social collaboration is very important to learn the art of dialogue and discussion. Thanks to this art (art of dialogue and discussion) new knowledge, skills and innovations are created. [3]
- Less corporate-sponsored training: Workplace learning will be increasingly experience-based and relationship-based. Knowledge will come from everywhere and companies will not be able to control or standardize it. Corporate-sponsored training will

become less important and knowledge assessment or certifications will become more important. [3]

- Not „how“ you acquire knowledge, but if you can „prove“ your expertise: Companies will not care how their employees acquire knowledge or obtain a certain skill or ability, but they will only care how their employees can prove their expertise.
- Creation of knowledge sharing culture and lifelong learning: Employees should begin their workplace learning on their first day at work and never stop. Management will not command what employees need to do to be successful in their job, employees must be proactive. But management has to create environment where information and knowledge are easy to find and use known as knowledge culture.

Strategic management is focusing with increasing frequency on management of strategic changes within the process of strategy implementation and with decreasing frequency on formulation of strategies itself, more often the dispute between management theory and praxis is stressed – pragmatism of thought is in the forefront. It means resigning on theory and replacing it by methodology. Instead of asking ‘what’ and ‘why’ focus is put on ‘how’. In the area of management theory so-called comparative management focusing on study and analysis of management in diverse environments is developing. This type of management searches for reasons why businesses achieve different results in different countries as well as analyses environment factors and how they influence managerial functions and business activities altogether. [7]

### 3. Management in the knowledge society

The main reason for changes?

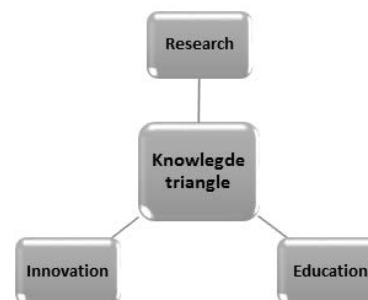
Development of ICT caused changes in functioning of society as well as businesses. ICT are also developing though. ICTs have also been undergoing change in a way that the notions of Information, Communication and Technology are no longer sufficient. While these elements have instigated change, the use of them has also incited change in a way that the notions of Innovation, Collaboration and Transformation have become keys to the application of ICTs. Therefore, the underlying fundamental understanding of ICT is paving the way and laying down the infrastructure to the “New ICT”. Previously, ICTs were the changes that justified new infrastructure investment, while it appears that in the future, ICTs will be the infrastructure required for innovation, collaboration, transformation and change.

*Table 1 Components of old and new ICT [5]*

<i>Old ICT</i>	<i>New ICT</i>
Information	Innovation
Communication	Collaboration
Technology	Transformation

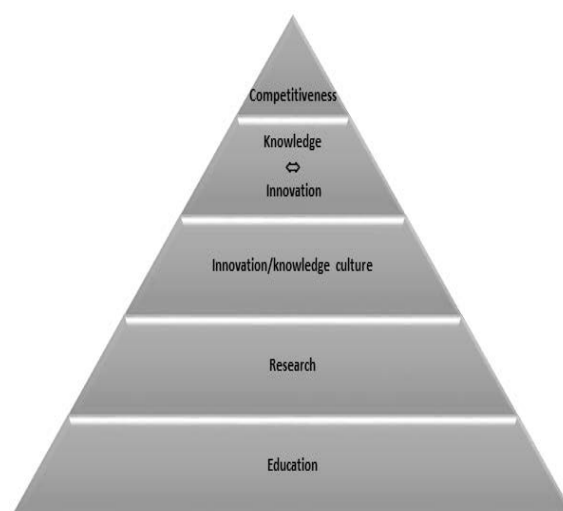
Information is not sufficient in order to succeed on the market anymore. It must be replaced with knowledge based on which innovations are created. To create knowledge the knowledge triangle must be completed. The

knowledge triangle, consisting of education, research and innovation, is paramount in supporting the development of jobs and growth. [5]



*Figure 1 knowledge triangle*

Correct adaptation of knowledge triangle into functioning of a business might create a competitive advantage.



*Figure 2 Model of creation innovations, knowledge and performance*

Education does not only comprise learning at schools. Education must become a part of a business's everyday life and the employees must be able to find information. Sources of information include universities, suppliers, competition, state and public.

Research is a way how information, obtained from education, use in real-business live. Research can also produce new information that are not readily accessible to competitors.

Motivated employees have a higher tendency to be willing to share their competence and knowledge with the organization. The organization thus owns large potential to achieve profit and increase competitiveness on the market. Motivated employees use their potential and transform it into activity in the organisation. In this manner conditions for innovative activities of employees and whole company are created. [9] A culture which helps motivate employees needs to be created. It is also important to give them space



for self-actualization so that they can see the results of their work and abide by moral principles.

The primary goals of knowledge creation are: better decision making, faster response to key issues, increasing profitability, improving productivity, creating new/additional business opportunities, reducing costs, sharing best practice, increasing market share, increasing share price, and better staff attraction/retention. It says by one word - innovation. On the other hand, the results of the innovation management of the firm create new explicit knowledge on products and technologies and also lead to the accumulation of tacit knowledge. [4]

Companies start the process of creation of knowledge and innovations after fulfilling these steps. (Fig. 2) Innovator effort are very close in relation to efficiency in knowledge creation. Knowledge is an essential strategic resource and knowledge is closely related to innovation management. Cycle of creation of innovations from knowledge and vice-versa is the basis of companies' competitiveness.

#### 4. Conclusions

The European Union is equally aware of the importance of knowledge and supports its production via Europe 2020 strategy. Knowledge is stressed in three priorities set by the EU:

- Intelligent growth; creation of an economy based on knowledge,
- Sustainable growth; supporting a more ecological and more competitive economy which uses resources more efficiently,
- Inclusive growth – supporting an economy with high employment rate ensuring social and territorial cohesion. [3]

These priorities express the nature of knowledge society and changes that must be implemented so that the individuals are successful on the labor market and businesses achieve higher level of competitiveness.

One of the problems of our time is stability of labor. If employees are worried about their position in the company, they are not willing to share their knowledge because they consider it their competitive advantage, loss of which may result to loss of the job.

Companies of today often lack moral values. The employees feel like they do not need to make effort because another, 'chosen' employee benefits from their efforts. Bribery and nepotism prevent creating an environment suitable for spreading knowledge.

Companies do not realize that knowledge management needs to become a part of the business as a whole. It cannot function on its own but must be considered already when determining the vision, philosophy and mission of the business. It also needs to be a part of each further step in the functioning of a company. We need to realize that knowledge is situated within people, i. e. in the heads of the employees. Therefore conditions must be created for employees to be willing and able to share their knowledge and gain new knowledge by comparing theirs with the knowledge of the others.

#### Acknowledgements

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#### References

- [1] Adaptability and flexibility. Available on the internet: <http://www.kent.ac.uk/careers/sk/adaptability.htm>
- [2] Bureš, V.: Znalostný manažment a proces jeho zavádzaní. Praha: Grada, 2007. ISBN 978-80-247-1978-8
- [3] Dearborn, J. Redefining workplace learning for the 21st century. Available online: <http://www.forbes.com/sites/sap/2013/10/16/redefining-workplace-learning-for-the-21st-century/>
- [4] Drucker, P. F., Innovation and Entrepreneurship. Harper & Row, 2007. ISBN: 9780750685085
- [5] Kesim, M. Creativity and innovation in learning: The changing roles of ICT. Turk-ish Online Journal of Distance Education-TOJDE July 2009 ISSN 1302-6488 Volume: 10 Number: 3 Article 4
- [6] Lisý, J. a kol.: Ekonomía v novej ekonomike. Bratislava: Iura Edition, 2005. ISBN 80-8078-063-3
- [7] Majtán, M. A KOL.: Manažment. Bratislava: Sprint v.fra, 2007. ISBN 97-88089-0857-29.
- [8] Mikáčová, L. Specifics of management in the global economy and related actual terms, Available on the internet: [http://of.euba.sk/merkur\\_2012\\_cd/prispevky/Mik%C3%A1%C4%8Dov%C3%A1\\_Lenka.pdf](http://of.euba.sk/merkur_2012_cd/prispevky/Mik%C3%A1%C4%8Dov%C3%A1_Lenka.pdf)
- [9] Strenitzarová, M. Diagnostika a manažment procesov v riadení ľudských zdrojov. Žilina: Žilinská univerzita v Žiline. 2006. 80-8070-579-8
- [10] Zemanovičová, L.: Kľúčovou prioritou v 21. storočí bude pružnosť reakcie na zmeny prostredia. Available on the internet: <http://www.etrend.sk/trend-archiv/rok-/cislo-Febru%C3%A1r/kľucovou-prioritou-v-21-storoci-bude-pruznost-reakcie-na-zmeny-prostredia.html>

## IMPLEMENTATION OF BUSINESS INTELLIGENCE SUCCESS FACTORS MODEL AND INFORMATION-COMMUNICATION TECHNOLOGY IN SLOVAK ENTERPRISES

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**Abstract:** Introduction of information and communication technologies is essential for decision-making. New trends are in every sector. Effective tool to facilitate the decision making process is Business Intelligence. Business Intelligence provides comprehensive reports and documents for management. Business intelligence has several functionalities. Its efficient use is conditioned by several factors. The first condition for success of implementing Business Intelligence is to define of all relevant factors affecting on this tool. This paper discusses issue of these factors. Analysis of success factors in this paper based on the original model, which is mentioned in several literatures. The aim of this paper is to establish a new implementing Business Intelligence factors model in condition of the Slovak companies. This new model is based on the original model and a questionnaire survey in Slovak industry enterprises, financial institutions and other enterprises.

**Keywords:** Business Intelligence, model, successful factors

### 1. Introduction

Any communication should present the principal and integrating tool at managing whichever company, firm or institution, and also should serve for connecting people and their harmonising, quite obviously for the purpose of attaining desired objectives. With the Slovak republic accessing the European Union, the Slovak companies entered a more global, challenging and, especially, the most competitive environment, and if they intend to succeed within it they must be fully involved in the wide open space of the European educational mega-space and, at a time, must also catch up with the trends underway in implementing of communication systems often by following the pattern established by experienced Western partners. We are fully aware that in the recent years often encountered is the belief that the key to success in any competitive environment is to become as efficient in utilisation of abilities, knowledge, and creativity embedded into the own built communication systems as possible. Contrary to the past post-communist countries, seen and felt in the developed countries both much sooner and more intensively was a vast aggregate of important technical, technological, entrepreneurial, social, and economical forces that got reflected in changes in education that had and are still having indispensable effect on any managerial mind-set that has, unfortunately, developed under pronounced dependency on the political and social life, and that was based as on its political and social events, so on the immediate environment within which were the managers deemed to live, act, perform and, mainly, to communicate. Over time, the increasing globalisation and growing

competition gave birth to a new philosophy and corporate communications management. Born has been a new phenomenon of acquiring wealth based on the information and deployed communication systems, which begin increasingly, influence the development of each institution [1]. That any company could be adopting the most appropriate effective strategic decisions it is a must that it was exhaustively aware of its both internal and external environment, i.e. that it knew possible limitation of its strategic decisions. Based on this way formulated limitations, obvious for efficient adopting of possible strategic decisions is the primary role of continuous investigation and assessment of internal and external environments and controlled use of information and knowledge to their utmost, effective utilisation in their communication systems. And this is only possible solely if implemented, built and by practice proven as effective is a complex intelligence and information system.

Business Intelligence (BI) is a set of plans, concepts and specific methods designed to improve decision-making in an organization with use of supporting systems based on generally known commercial facts, and is superior to the intelligence process in the business segment and the original concept of the EIS, as monitored, collected and analysed are data on the business environment as a whole, not just those reflecting customers, markets and competitors. The BI concept is used when contemplating various modern management tools, analysis, collection and evaluation of large amounts of data, their storage, management and knowledge mining, and their need arises mainly from the demand for more efficient use of

existing large information potential of organizations to support their management in terms of tougher and increasing competition. Recently and unfortunately, only very seldom are organizations utilising this potential. Any and all data stored within a standard ERP and in the type CRM and SCM applications can be used to a great advantage at improving decision-making within a company.

The BI software tools provide full information that cover a longer period of time, for example in the form of clear tables and graphs that show the proper but also undesired trends and correlations of various phenomena in the organization. Working with the data in a similar way needs not only that senior management officers from whom are the company owners and stockholders required accurate and most up to date reports and analyses of economies but also that lower management level officers worked with appropriately aggregated information. The BI represent a set of processes, applications and technologies designed to effectively and efficiently support control and management activities in the company. They support analytical and planning activities of companies and are based on the principle of multidimensional views of the company data. BI applications include analytical and planning functions of majority of the company management domains, i.e. marketing, purchases, production, sales, financial management, controlling, human resources management, property administration and many other; at a time, they are, from the point of their position in the ISP, the apex of decision-making pyramid and present a kind of superstructure over fully integrated systems of type ERP including also CRM and SCM, which can be found on a lower level of the organization managing.

## 2. Problem statement

Every BI project should provide clearly identified effects. Achieving these final effects, and thus the overall level of success of BI projects into practice, identify success factors. What is the success factor and what is the point? For a more precise definition of content essence of success factors we can use the work of Pour [2,3,4]. Success factor represents the knowledge and application of best approaches and experiences in managing BI that will lead to achieving the objectives of BI, as well as to achieving the desired economic and non-economic effects. Similarly, Novotný et al. [3] define the essence of the concept of success factor, where by success factor they mean the set of properties or parameters of the solutions, or application of the best approaches and experiences that will lead to achieving defined objectives. Success factors identified by several authors as Novotný – Pour – Slánský, Atre, Eckerson, Loshin, Howson, Hwang, Turban, Panta, Škanta, Adelman – Schrader and more. Based on the above-mentioned sources it was created baseline model of factors affecting successful implementation and use of BI. The starting point in identifying the key success factors for BI

was a study of numerous contributions, publications, independent studies and surveys, as well as our knowledge and experience in this field. In addition, we have consulted and discussed this topic with several experts in the theory and practice of business, who are dealing with this issue. In particular, we have examined common characteristics of organizations that succeed in implementing and using BI, implying the difference between success and failure. We have identified and confirmed some of the most common BI key success factors, which are necessary for successful implementation and use of BI. Based on the results of the examination we have identified seven key success factors of implementation and use of BI in enterprises (Figure 1). Proper implementation and effective use of BI in the managing companies determines the number of success factors of differing importance and intensity of action. The most significant of these factors are referred to as critical or key success factors of BI. Knowledge targeted monitoring and management of key success factors of BI accelerates the process of implementation of these systems [2]. BI also enables more efficient use of them in support of decision-making processes in the company, which ultimately facilitate the achievement of the expected final effect – benefits.



Figure 1: Key success factors for the implementation and use of BI in corporate governance

Basic BI success factors are very general. Each market is specific. Therefore, success factors must be analyzed and verified in every market. In the next section of this paper describes the steps of analyze and validation of factors, and methods of work.

## 3. Methodology of research and research sample

### 3.1 Methodology of research

The first step is to identify the expected success factors. This can be based on the large amount of resources that are devoted to this issue. Our original BI success factors model is based on several studies carried out by Gartner Group and other authors. A number of studies and search from other sources are published in other publications that we devote on these issues. Gartner Group has analyzed the

market mainly in the US and globally in developed countries. Slovak market has a number of specifics. First, it is necessary to realize that the Slovak market is small. On the other hand, it is closely related to the other EU member states, which blurs the boundaries between them. The second step was to identify dependent and independent variables and establish hypotheses. Based on the model of key success factors of BI that have been defined the dependent variable and seven independent variables. The dependent variable is the overall success of the implementation and use of Business Intelligence in managing companies in Slovakia, which means the correct implementation and effective use of these systems in supporting decision-making processes in the enterprise. This will achieve the desired effects.

Independent variables are the success factors of BI that can be classified into two main groups:

- personnel and organizational: strong sponsor, close cooperation, enterprise-wide solution scope, right team of qualified and experienced Business Intelligence workers and open corporate culture
- technological factors: the quality of the source data, flexible architecture and BI tools

From the specifics Slovak market were compiled of expected success factors that should be analyzed in the Slovak market. Subsequently, data were obtained through a questionnaire survey. A very important part of the research was data analysis and evaluation. This was done with the help of statistical software such as SSP statistic and others.

### 3.2 Research sample

Available set of business subjects that meet the above selection criteria was created through direct addressing software companies – providers of BI solutions in the domestic market. Based on this group of companies it was subsequently randomized defined research sample. Choice of subjects in the survey sample was not limited by other criteria such as industry or occupation of the enterprise, region or company size etc. It can be concluded that the fundamental requirement of ensuring representativeness of the survey sample was complied with. The distribution of samples of research in the performed economic activities to the classification used SK NACE.

### 4. Interpretation of results and discussion

Correlation analysis was carried out in the form of correlation matrix, prepared for all variables of the parent model. To express the degree of correlation dependence between variables in the correlation matrix was used so-called The Pearson correlation coefficient pairwise. The correlation matrix contains 28 possible correlation relationships of the 28 correlation coefficients for all pairs of variables of interest.

Using a two-sided t - test within T - distribution of the test statistic tests were performed statistical significance correlation coefficients. The results are presented in Table 2. Table contains a correlation matrix with the calculated value of the correlation coefficient r of the pairs of variables significance p information on the number of

values n, of which the calculation carried out. As we expected, all seven independent variables correlated with the dependent variable (TPD) positive, with the highest degree of correlation with the dependent variable, depending achieve independent variable (atomizing) with a value of  $p < 0.001$ , which represents a highly statistically highly significant relationship. Statistically highly significant correlation variable (TPD) was observed by the variables (StSp), (QSD), (RTW) and (OCC). In accordance with the defined main goals of the work were subsequently calculated and verified in terms of statistical significance also tested the correlation coefficients that characterize the strength of correlation between the dependent variable (TPD) and other defined variables.

*Table 2 The results of tests of statistical significance correlation coefficients of other variables of interest*

Variable		TPD	Variable		TPD
SucFac1	r p	0,449 0,001**	SucFac 9	r p	0,291 0,033*
SucFac 2	r p	0,067 0,632	SucFac 10	r p	-0,103 0,458
SucFac 3	r p	0,019 0,894	SucFac 11	r p	-0,161 0,244
SucFac 4	r p	-0,053 0,703	SucFac 12	r p	-0,153 0,270
SucFac 5	r p	0,399 0,003**	SucFac 13	r p	0,385 0,004**
SucFac 6	r p	0,492 0,000***	SucFac 14	r p	-0,244 0,075
SucFac 7	r p	0,086 0,534	SucFac 15	r p	-0,095 0,494
SucFac 8	r p	-0,059 0,669	SucFac 16	r p	0,031 0,824

\*\*\* $p < 0,001$ , \*\* $p < 0,01$ , \* $p < 0,05$ ; n = 54

(Source: the output of SPSS Statistics)

Indication of other variables of interest:

(SucFac 1) - BI supports the project by all the managers

(SucFac 2) - communication and information exchange

(SucFac 3) - establishment of a Steering Committee (competence center) for the BI

(SucFac 4) - adequate funding for BI project

(SucFac 5) - vision, strategy, clear definition of objectives for BI

(SucFac 6) - BI integration strategy with the overall business strategy

(SucFac 7) - develop a comprehensive implementation plan BI

(SucFac 8) - training and education of future users solutions before starting BI project

(SucFac 9) - continued support of active use of BI tools BI for the duration of the project

(SucFac 10) - select a quality provider, providing external support

(SucFac 11) - identification information and system requirements BI

(SucFac 12) - state and source level ISI

(SucFac 13) - user segmentation solutions and identification of specific technology needs of individual user groups

(SucFac 14) - BI system reliability

(SucFac 15) - BI system response time to user requests

(SucFac 16) - continuous improvement of BI technologies (data and tools)

If there is significant correlation dependence, it makes sense to look regression line. Based on the results of correlation analysis presented in Table 2 and Table 3 were selected ten independent variables for which we have demonstrated a statistically significant correlation ( $p < 0.05$ ) with the dependent variable - the overall success of

the introduction and use of BI in the management of enterprises in Slovakia (TPD).

- Independent of the parent model:

(StSp) – existence and active involvement of a strong sponsor to BI project

(QSD) – the quality of the source data

(EWSS) – enterprise-wide solution scope

(RTW) – right team of qualified and experienced

Business Intelligence workers

(OCC) – open corporate culture

- Other independent variables studied:

(SucFac 1) - BI support the project by all the managers

SucFac 5) - vision, strategy, clear definition of objectives for BI

(SucFac 6) - BI integration strategy with the overall business strategy

(SucFac 9) - Continued support of active use of BI tools BI for the duration of the project

(SucFac 13) - user segmentation solutions and identification of specific technology needs of individual user groups



Figure 2: The newly established model of key success factors of Business Intelligence  
(Source: own processing)

A detailed analysis of the links between variables was performed by the method of regression analysis. A form of dependence between variables was expressed by regression function - model in the shape of the linear regression line. Since it was studied the influence of several variables used was the method of multiple linear regressions. The starting model considered key success factors of BI has been modified by the new BI success factors that have been in business practice identified and validated by relevant analyses as key factors, i.e. factors of particular importance for the proper implementation and effective use of BI solutions. Results of the research are directed to the formulation of one of the conclusions, and that enterprises of different sizes operating in different sectors today through successful implementation and use of technology and BI tools achieve significant positive

effects – benefits. Confirmation of hypotheses and interdependence of the extension of the original model (Figure 2.).

## 6. Conclusions

ICT in general and BI is undoubtedly a very important tool for decision making. Its implementation is also very important process for overall efficient use of this tool. Therefore, to identify the key factors is one of the basic tasks. Our suggested model takes into account the specific conditions of the Slovak market. Of course, every business must also take into account other factors related to its special position in the market, the activity carried out by and others. On the other hand, this model describes the statistically significant factors that any entity operating in Slovakia should respect and take into account.

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The paper presents the results of the project

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## References

- [1] J. Jablonský, *Operační výzkum: kvantitativní modely pro ekonomické rozhodování*. Praha: Professional Publishing, 2002, 323 s. ISBN 8086419231.
- [2] O. Novotný, and J. Pour and D. Slánský, *Business Intelligence – jak využít bohatství ve vašich datech*. Praha: Grada Publishing, 2005. ISBN 80-247-1094-3.
- [3] J. Pour, *Faktory úspěšnosti Business Intelligence – užití a řešení*. Systémová Integrace. ISSN 1210-9479, 2005, no. 1, pp. 377 - 388.
- [4] J. Pour, *Co lze očekávat od Business Intelligence?* Systémová integrace. ISSN 1336-5916, 2006, No.1, pp. 47 - 58.

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## TREND IN THE ABSORPTION OF THE EU FUNDS THROUGH THE EUROPEAN SOCIAL FUND. THE CASE OF SLOVAKIA

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**Abstract:** Absorption of EU funds is a strategic objective of Cohesion Policy and regional development in Slovakia. One of its important instrument is the European Social Fund. From 2014, it operates under a common framework and pursue complementary policy objectives. It is one of the main sources of investment at EU level to help Member States to restore and increase growth and ensure a job rich recovery while ensuring sustainable development, in line with the Europe 2020 objectives. This paper presents the actual situation of implementation of the European Social Fund in Slovakia through the programming period 2007 – 2015 (n+2).

**Keywords:** European Social Fund, absorption of EU funds, EU Regional Policy

### 1. Introduction

In October 2015, Slovakia has still more than 20 % of the total seven-year allocation to be used from the programming period 2007 - 2013. Slovakia has not run out of 2.617 billion euros from EU funds. Of the total 11.62 billion euros allocated to Slovakia for the years 2007 to 2013, this represents 22.5 %. There is fortunately the rule n + 2, which means that money from the budget by 2013 must be used up before the end of 2015 [6].

The highest spending among the 14 operational programs (OPs) have OP Employment and Social Inclusion (87.01%), Regional OP (85.74%), OP Healthcare (84.61%) and INTERACT II (84.39%). Followed by the OP Information Society (83.91%), transport (83.07%), Bratislava regional programme (81.47%). Around 70-80% rate achieved OP Education (79.13%), technical assistance (75.45%), and Research and development (72.87%). The lowest spending commitment for 2007-2013 recorded OP Environment (64.48%) and OP Competitiveness and Economic Growth (58.11%) [6].

### 2. European Social Fund

The aim of this paper is to analyze the success of projects under the most successful fund – the European Social Fund in Slovakia within individual regions promoting social inclusion of disadvantaged groups aiming at reducing unequal opportunity in the labor market. The given analysis has been adapted to the time period of the programming period 2007 - 2015 (n + 2) [7].

The ESF is one of the five European Structural and Investment Funds (ESIF). From 2014, these operate under a common framework and pursue complementary policy objectives. They are the main source of investment at EU level to help Member States to restore and increase growth and ensure a job rich recovery while ensuring sustainable development, in line with the Europe 2020 objectives [4].

The main objectives of the European Social Fund:

*Getting people into jobs:* the ESF supports organisations around the EU to put in place projects aimed at training people and helping them get work [5].

*Social inclusion:* employment is the most effective way of giving people independence, financial security and a sense of belonging. The ESF will continue to finance many thousands of projects that help people in difficulty and those from disadvantaged groups to get skills and jobs and have the same opportunities as others do [5].

*Better education:* Across the EU the ESF is financing initiatives to improve education and training and ensure young people complete their education and get the skills.

In our analysis, we used the available statistical information from the source of the National Strategic Reference Framework ([www.nsrr.sk](http://www.nsrr.sk)) and press releases of the Ministry of Finance ([www.finance.gov.sk](http://www.finance.gov.sk)). In terms of time, research was dated between 1.1.2007 - 31.12.2014.

In terms of the financial framework for the ESF allocation of funds for the period 2007 - 2015 for individual operational programs supported by the ESF are shown in the Table 1.

*Table 1 Financial allocations 2007 - 2013 operational programs (SF and CF) in EUR*

<i>Operational programmes</i>	<i>Financial allocation (EUR)</i>
OP Education	542 728 760 €
OP Employment & Social inclusion	941 301 578 €
Total	1 484 030 338 €

*Source: own processing based on [www.nsrr.sk](http://www.nsrr.sk)*

### 2. Results

Achieving the highest possible efficiency in the use of ESF for the development of education and employment in the Slovak regions is a priority and one of the main objectives of the Commission, national governments and the regions themselves [12].

Slovakia is characterized by structural changes, large social disparities. It is lagging behind the EU average GDP per capita. It is particularly necessary to use allocations resources of the Structural Funds in order to maximize their impact on achieving the target problems and to approach the EU average [11].

When analyzing the ESF projects, we primarily monitor the financial amount of funds allocated (see Fig. 1). It is expenditure declared, indicating the actual execution of non-repayable funds (NFP). Our comparison is involving all applicants – i.e. municipalities, public and private sector.

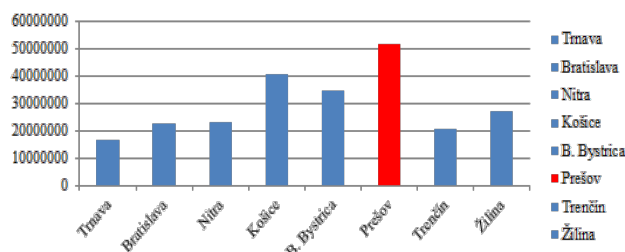


Figure 1: ESF - Funding in EUR, according to regions

Source: own processing based on [www.nsrr.sk](http://www.nsrr.sk)

Based on Fig. 1, it can be concluded that the Prešov region has currently the highest level of funding. We see also that the relatively successful in the amount of spending is the Košice region, considerable success can be observed also in the region with high unemployment - Banskobystrický region. In fact, these results are in line with the established strategy - direction of ESF funding for the most disadvantaged regions of Slovakia.

Analysis of EU funds from the ESF must be considered from a different perspective too - through the number of submitted projects, where we find which regions are the most proactive in developing projects with a social aspect. The following Fig. 2 shows a huge effort of regions with high unemployment submitting a large number of projects. The most diligent region with the largest number of projects is the Prešov Region (1659 projects) [6].

This fact directly refutes the Eurosceptic argument about passive regions of Eastern Slovakia. But not all of these projects were well prepared and presented, a lot of them failed, not meeting the administrative criteria and quality requirements.

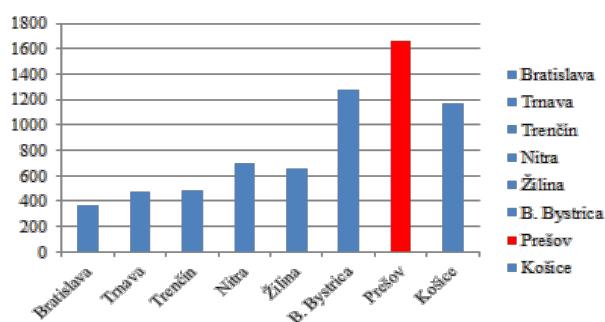


Figure 2: Total number of submitted projects Source: own processing based on [www.nsrr.sk](http://www.nsrr.sk)

If we want to evaluate the success of the projects, the results are almost opposites with the previous ones. We found that there is no correlation between the submitted and successful projects.

The Fig. 3 shows percentage of the projects submitted for individual regions (the ratio of submitted and approved projects). The most successful is Bratislava (the capital, the most developed region), with almost 45% success, while the rest of regions is lagging behind.

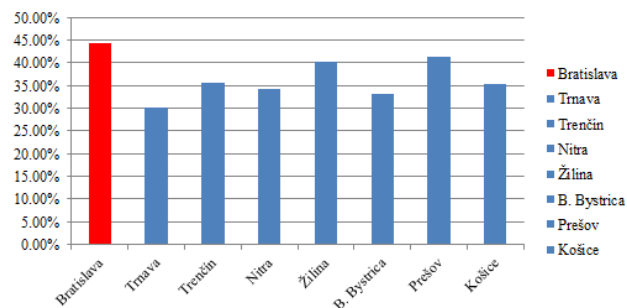


Figure 3: The success rate of submitted projects Source: own processing based on [www.nsrr.sk](http://www.nsrr.sk)

Bratislava is a very significant "lead" to other regions which oscillate with a success rate of 30% - 40%, suggesting room for improvement in the quality of submitted projects with the possibility of cooperation with the Bratislava region as an example of good practice.

The Prešov region, which had most of the projects submitted has only 41% success ratio. In this example, we can find one of the causes of poor spending. The region may be "active" and make a large number of projects, but their success (quality, relevance, expertise) is low because of lack of qualified personnel with relevant knowledge and skills. The possibility of intensifying inter-regional cooperation would help the success rate to increase significantly.

It is important to examine the structure and look for the causes of rejected applications. However, there is the possibility that projects can be finalized, and accompanied by the necessary requirements and ready for resubmission if the calls are open again.

If we focus on finding the causes of failure, the Fig. 4 follows a certain analogy between the geographical position of the region and project failure. Regions of western Slovakia have a lower number of rejected projects while regions in central and eastern Slovakia have higher failure. It seems that the submitted projects in western Slovakia have the right know-how to be successful projects.

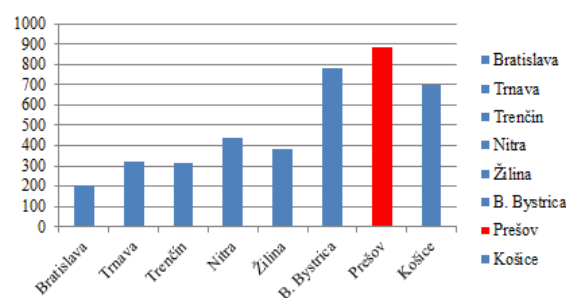


Figure 4: Rejected projects. Source: own processing based on [www.nsrr.sk](http://www.nsrr.sk)



Given the relatively high number of rejected cases, there is need for better training of beneficiaries on how to prepare the file or how to prepare the application for funding.

The main causes include:

1. lack of documentation required in the guide: missing files, no documents - acts of ownership, lack of evaluation study of environmental impact, lack of certificate of accreditation for provided social services, etc.
  2. The documents are incorrect or incomplete - submitted documentation does not meet the standard formats of the applicant Guide, lack of chapters from the feasibility studies, presented certificates or opinions are outdated, lack of annexes to submitted documents, etc.
  3. Simultaneous, it is important to point out the large number of cases withdrawn by the beneficiaries, even during the administrative conformity assessment, main reason being represented by observing the lack of documents or finding incomplete documents in the file. [4].
- The positive news is that, according to a new amendment of the assistance provided from the European Union, unsuccessful applicants have the right to know why their projects were rejected [13].

### 3. Future of the European Social Fund

Regarding the future of the ESF fund - from 2014, its role is even much more reinforced:

A critical mass of human capital investment will be ensured through a minimum guaranteed share of the ESF within the cohesion policy funding in each Member State. Together with the 3 billion € special allocation for the Youth Employment Initiative, this means that more than 80 billion € will be invested in Europe's people over the next 7 years; [3]

Allocating at least 20% of the Fund to social inclusion will mean that people in difficulties and those from disadvantaged groups will get more support to have the same opportunities as others to integrate into society; Promoting equality between women and men and equal opportunities for all without any discrimination will be integrated in all actions and also supported through specific initiatives; [4]

A greater emphasis is placed on combating youth unemployment. The Youth Employment Initiative will help young people not in employment, education or training in regions experiencing youth unemployment rates above 25%. At least €6.4 billion will come in support of Member States' efforts to put their Youth guarantee implementation plans in practice;

Greater support will be provided to social innovation, i.e. testing and scaling up innovative solutions to address social, employment and education needs; [5]

The ESF will be implemented in close cooperation between public authorities, social partners and bodies representing the civil society at national, regional and local levels throughout the whole programme cycle; [14]

The European Social Fund will be at the forefront of innovative managing rules to simplify implementation of projects. The Commission is helping Member States to simplify ESF implementation in order to focus more on the results and make ESF easier and safer for the beneficiaries.

### 4. Conclusion

Regional disparities in Slovakia in the accessibility are actually the highest among EU countries.

The accessibility indicators for Centre and East Slovakia are of very low value. On the other hand, the capital, Bratislava, benefits from the well-developed infrastructure and proximity of Vienna. It is likely that the support from the ESF projects could improve the labour market situation in Slovakia [5].

Based on our findings, it is important to find possible solutions, proposals and measures to achieve that other regions outside of Western Slovakia have sufficient knowledge and skills to prepare social projects with all the necessary information.

The EU Funds are actually one of the most important instruments to tackle the main development challenges for Slovakia and to implement the Europe 2020 strategy.

Slovakia has the opportunity to show its great potential to draw EU funds successfully, and particularly in areas that are strategically important for Slovakia - primarily reduce long-term unemployment and regional disparities.

### References

- [1] EUROBAROMETER, *Diskriminácia v Európskej únii 2012. Výsledky za Slovenskú republiku*.
- [2] European Commission, *Boj proti rozdielom v odmeňovaní žien a mužov v Európskej únii*, Luxemburg, Úrad pre vydávanie publikácií Európskej únie, 2014.
- [3] European Commission, *Country Report Slovakia 2015*, Brussels, 2015, p. 10-12
- [4] European Commission, *Stratégia 2020, Stratégia rastu EÚ*.
- [5] EUROPEAN COMMISSION. European Social Fund. Available at: <http://ec.europa.eu/esf/main.jsp?catId=62&langId=en>
- [6] MINISTERSTVO FINANCIÍ SR. Čerpanie štrukturálnych fondov, Kohézneho fondu a Európskeho fondu pre rybné hospodárstvo k 30.09.2015.
- [7] Ministerstvo práce, sociálnych vecí a rodiny, *Systém koordinácie implementácie horizontálnej priority Rovnosť príležitostí pre programové obdobie 2007 – 2013, Verzia 3.0*, Bratislava, MPSVR SR, 2008.
- [8] Pawera, R. and Štefancová, V, Manažment rovnosti príležitostí starších ľudí na pracovnom trhu Slovenskej republiky. IN *Stratégie sociálnej politiky v kontexte zvyšovania sociálneho statusu seniorov*. Trnava, 2013, pp. 81-94.
- [9] Pawera, R. and Štefancová, V, Rovnosť príležitostí Rómov na trhu práce Slovenskej republiky. IN *Horizonty podnikateľského prostredia II*, Bratislava, Univerzita Komenského v Bratislave, 2013.
- [10] Rada Európy, *Gender Mainstreaming: Conceptual Framework, Methodology and Presentation of Good Practices*, Štrasburg, Rada Európy, 1998.
- [11] Stachová, P. and Šuplata, M. Ekonomická dimenzia regionálnej politiky v podmienkach Slovenskej republiky. IN *Medzinárodné vzťahy 2013. AKTUÁLNE OTÁZKY SVETOVEJ EKONOMIKY A POLITIKY*, Smolenice, Ekonomická univerzita v Bratislave, 2013.

- [12] VOJTECH, F. (2012). *Sociálna politika štátu v oblasti príspevkov pre ťažko zdravotne postihnutých členov rodiny*. In Bočáková. *Perspektívy súčasnej rodiny*. Sládkovičovo: Vysoká škola v Sládkovičove, 2012. ISBN 978-80-89267-85-9.
- [13] Zákon č. 71/2012 Z. z. z 3. februára 2012, ktorým sa mení a dopĺňa zákon č. 528/2008 Z. z. O pomoci a podpore poskytovanej z fondov Európskeho spoločenstva v znení neskorších predpisov.
- [14] LIVIA BOTT DOMONKOS, *Projects of cross-border cooperation of EU and their impact on the business environment and region in Southern Slovakia*. Horizonty podnikateľského prostredia III. International Scientific Conference. Bratislava: december 2014.

## IMPLEMENTATION OF EUROPEAN UNION POLICIES CONCERNING GRANTS RECEIVED IN THE POLISH ECONOMY

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**Abstract:** *The article concerns the implementation of European Union policy in Poland, but because of the extensive subject that is proposed, the studied area is restricted to the analysis of the obtained grants in the Polish economy. In order to systematize the information, considerations have been divided into two parts, the first of which - theoretically applies to discuss the procedure for awarding grants from European Union funds. The second part of the study is an analysis of collected and selected statistical data describing the tested matter. The article examines four selected indicators on the implementation of European Union policy in the Polish economy, taking into account the current territorial division. The aim of the thesis is, therefore, to examine the level of implementation of the European Union policy on obtained grants in total and broken down into sixteen Polish provinces.*

**Keywords:** *grants, the policy of the European Union, Poland*

### 1. Introduction

Poland since its accession to the European Union passed a very long and often difficult way to finally come closer a little bit, in terms of economic development, to the best European economies. For this purpose an indispensable proved to be a constant influx of structural funds under the EU cohesion policy. Poland, in the current programming period, is the biggest beneficiary of European Union funds - not just of cohesion (as it was in the perspective 2007-2014), but also others [1].

Regional funds support the Polish regions and cities, thereby stimulating economic growth and improving the quality of life through, among others, strategic investments. In contrast, regional policy itself is a form of solidarity, as the support goes to the most needy areas.

EU regional policy has four priorities [2]:

- a) research and innovation;
- b) information and communication technologies;
- c) the increased competitiveness of the SME sector;
- d) transition to a low carbon economy.

Discussing the cohesion policy, the budget of which for 2007-2013 was €347 billion, it should be noted that this is, at the European Union level, the biggest source of funding for investments in economic growth and employment. According to the foundation, the cohesion policy is intended to enable all regions to compete effectively in the internal market [3]. Both national operational programs as well as regional ones are financed by the cohesion policy budget, among others, through paying grants.

#### 1.1 The procedure for awarding grants from European Union funds

The process of obtaining grants from the European Union is lengthy and often complicated. However, taking into consideration that this is non-refundable support for enterprises, it is worth benefiting from this solution and

going that often not easy way leading to success (creation / development) of the own business.

The procedure for grant from European Union funds consists of nine steps [4]:

1. Step: **Unconventional idea and an analysis of the possibilities of receiving a grant.** The basis for applying for a grant is to create an appropriate and clear idea of own business, which bring something new and will help others [5]. It should also be borne in mind that European Union subsidies are granted to specific actions that allow to achieve the intended goals, and before preparing the grant application, you must select an appropriate program from which the particular project is likely to win a grant.

2. Step: **Preparation and submission of complete application documentation.** Preparation of application documentation is one of the most important parts of the process of applying for a grant, which results in a request with documentation such as financial analysis, feasibility study, business plan. It is necessary to prepare application documents and to collect the number of important annexes to the application form (including registration and financial documents, permits, approvals, offers for the purchase of equipment, cost estimates and construction projects, etc.).

3. Step: **Evaluation of the application for funding.** The proper preparation of application documents and submission them within due time do not guarantee the grant, because the application is examined in detail and only after a positive assessment EU funds may be granted. This stage is divided into the formal and substantive evaluation.

- **Formal evaluation;** First of all, application for the grant is subjected to formal evaluation, in which it will be verified with respect to mandatory formal criteria.
- **Substantive evaluation;** Following a positive formal assessment, the application is assessed essentially (technically and economically). At this stage a substantive content of the Project is checked and the

extent, to which it pursues the objectives stated by the program from which EU funds are to be acquired, is also verified.

4. Step: **The signing of the grant agreement.** This is a key moment because it means that the funds were reserved and after successful completion of the investment they will be paid, according to agreement.

5. Step: **Implementation of the investment.** An applicant may commence the investment on the day following the submission of the application for funding, (then, however, it is not certain yet, whether the submitted project will receive a grant and then they make the investment at their own risk), or they may wait to sign the grant agreement. Implementation of the investment must be consistent with the assumptions presented in the grant application. Deviations from the contract and changes require the approval of a grant-awarding institution.

6. Step: **Settlement of the awarded grant** (preparation of an application for payment). Grant is paid mainly in the form of a refund, after submitting an application for payment, together with the documents certifying the incurred costs and with all the permits to operate successfully. The described request is verified and after the acceptance it becomes the basis for settlement of the project and paying out the grant.

7. Step: **Control;** This is the last step towards the actual receipt of the grant. Control - site inspection is conducted after a positive assessment of the application for the final payment. However, after giving positive after-control information, the disbursement of EU funds is made.

8. Step: **Receipt of EU grants.** It is the most important and the most awaited moment for the Beneficiary i.e. paying the subsidy into the account.

9. Step: **Reporting and sustainability of the project.** It is also mandatory to report on the implementation of the Project and to allow to carry out the inspection by the Authority that pays out the grant, throughout the whole period of duration of the Project. It is also important to remember about the provisions of the contract requiring the Beneficiary to preserve the stability of the Project (period depending on the Program). This means that targets and indicators declared in the application for funding must be maintained throughout this whole period.

## 2. Statistical analysis of the implementation of EU policy in Poland

While carrying out the analysis of implementation of EU policy in Poland, there was a special focus on the already completed settlement period. For the analysis of statistical data four indicators were chosen. The first one is the number of applications that have successfully passed a formal verification process in Poland in the programming period 2007-2014 (Table 1).

According to data published by the Central Statistical Office, it should be noted that at the end of 2014, after the formal verification, over 300 thousand applications were registered. The largest group were the proposals for the Human Capital Operational Program - (HC OP approx. 184 thousand.), in second place in this respect were projects from the Regional Operational Programs - R OP

(more than 63 thousand), while third place described the Innovative Economy Operational Program - IE OP (nearly 47.5 thousand applications). In contrast, the smallest number of requests was from the Technical Assistance Operational Program - TA OP and the Development of Eastern Poland Operational Program - DEP OP, 437 and 455 respectively.

In the territorial profile, an undeniable leader in the number of proposals that have successfully passed the formal evaluation was Mazovia Province (over 40 thousand), then Silesia Province (approx. 32 thousand) and Wielkopolska Province (approximately 23 thousand applications). Two provinces were in the opposite situation (they did not report even 10 thousand properly submitted applications), and that is Lubuskie Province - 9.2 thousand and Opole Province 8.6 thousand applications.

Analyzing the results of Mazovia Province in terms of the number of correct proposals with respect to the six operational programs implemented in the years 2007-2014, it should be noted that once again the most popular was HC OP (which received approx. 22.4 thousand applications), and OP TA appears to have the least interest - only 225 applications.

*Table 1 Number of applications after the formal verification in total and by operational programs in the 2007-2013 financial perspective [6]*

Territorial unit	Number of applications after the formal verification						
	In total	I&E OP	IE OP	HC OP	TA OP	DE P OP	R OP
	As of 31 December 2014						
	pcs.						
<b>POLAND</b>	<b>300238</b>	<b>4395</b>	<b>47476</b>	<b>184030</b>	<b>437</b>	<b>455</b>	<b>63445</b>
Lodz	21895	200	2451	15123	7	0	4148
Mazovia	40160	436	10940	22395	225	0	6147
Malopolska	20717	327	5200	10714	7	0	4480
Silesia	32351	358	4253	18402	7	0	9324
Lublin	20701	244	1446	13356	7	108	5567
Podkarpackie	19228	192	2636	12673	8	94	3628
Podlasie	11693	186	885	8001	7	59	2560
Swietokrzyskie	12034	95	1009	8885	8	53	2025
Lubuskie	9242	137	940	6390	7	0	1773
Wielkopolskie	22699	315	5338	12703	7	0	4400
West Pomerania	13335	280	1214	8757	7	0	3077
Lower Silesia	19053	295	3763	11423	8	0	3568
Opole	8568	132	828	5774	7	0	1827
Kujawy-Pomerania	14880	243	1889	9187	8	0	3552
Pomerania	16081	313	2877	9226	7	0	3655
Warmia-Masuria	14603	199	899	9814	7	35	3714

\* Summaries for the Programs and In Total should not be generated because signed agreements for co-financing for projects realized in more than one community (district, province) are recognized by the CSO as "1"

for each community (district, province), and so the number of signed contracts for cofinancing for the Program and In Total will be overrated.

It should be noted that applications are assessed in detail in the Regional Financing Institutions. Statistics show that formal defects account for a small percentage of rejected applications, far more applications do not pass a substantive assessment. However, the formal assessment is to check the content of the proposal and its consistency with the objectives of the program under which it was applied. Only those proposals, that realize the objectives of the particular program and contribute to the development of the specified area, can pass to the next stage. Another part is an evaluation of the project's realization - the Commission assesses whether the applicant can meet the requirements set in the business plan.

Another component of the analysis is to examine the number of signed contracts for co-financing by the operational programs in Poland and the territorial division (Tab. 2 - in this statement, data describing the number of applications that passed the verification of the merits was collected).

*Table 2 Number of signed contracts for co-financing in total and by operational programs in the 2007-2013 financial perspective [6]*

Signing an agreement for co-financing by the Operational Programs							
Territorial unit	In total	I&E OP	IE OP	HC OP	TA OP	DE P OP	R OP
	As of 31 December 2014						
	pcs.						
<b>POLAND</b>	<b>104527</b>	<b>2998</b>	<b>18053</b>	<b>47527</b>	<b>426</b>	<b>311</b>	<b>35212</b>
Lodz	8528	208	966	4517	7	0	2400
Mazovia	19003	464	4299	8978	220	0	2089
Malopolska	10171	376	2042	4701	7	0	2924
Silesia	14570	371	1891	6479	7	0	4961
Lublin	10072	231	751	4951	7	138	3127
Podkarpacie	8654	282	1339	3776	8	143	2543
Podlasie	5825	242	358	3770	7	91	1238
Swietokrzyskie	6133	102	493	3753	8	52	1289
Lubuskie	3860	153	519	2061	7	0	985
Wielkopolska	11371	342	2592	5536	7	0	2211
West Pomerania	6075	478	622	3238	7	0	1711
Lower Silesia	8880	350	1316	4356	7	0	2177
Opole	4029	129	423	1961	7	0	1198
Kujawy-Pomerania	10011	250	932	4863	8	0	2240
Pomerania	8452	373	1352	4437	7	0	1699
Warmia-Masuria	8043	224	281	4366	14	61	2420

In the previous programming period, a total of more than 104.5 thousand grant agreements were signed, a large share of which again involved HC OP - 47.5 thousand contracts, while another 35 thousand came from sixteen R

OPs. Then, the result of more than 18 thousand projects came in IE OP. However, in cross-section of the entire country the fewest contracts referred to the DEP OP, as in the provinces participating in the program 311 contracts were signed, TA OP which received 426 signed grant agreements did slightly better.

Taking into account the territorial division of Poland, it should be noted that the province with the largest number of signed contracts again turned out to be Mazovia Province - just over 19 thousand, then Silesia Province - 14.6 thousand and Wielkopolska Province with more than 11 thousand agreements. The lowest number of contracts were signed in the Lubuskie Province - almost 4 thousand and in Opole Province - a little over 4 thousand.

In the Mazovia Province among all the signed agreements, HC OP was the pioneer (almost 9 thousand), then with the result of half the size was IE OP (4.3 thousand). While only 220 signed agreements related to TA OP were reported.

Comparing these two indicators it should be noted that the number of contracts for co-financing, against the number of requests after the formal verification, significantly decreased, as there was a decrease of 195,711 items, which translates into a 65% decline. This is due to the fact that first of all the proposed applications did not meet the substantive criteria [7]. The reasons for rejecting the application at the stage of substantive evaluation were mainly: the lack of required descriptions, the lack of or insufficient justification for expenses, an inconsistency in the information considered in individual points of the proposal. Furthermore, the proposal must necessarily contain strictly required information essential to evaluate it. When presented information is inconsistent, laconic, when it is presented in the way that does not allow to evaluate any of the criteria or an Applicant refers to unrealistic and not justifiable assumptions - the application is rejected at the stage of substantive assessment [8].

The third indicator used in the analysis is the total value of signed contracts for co-financing in Poland in the previous financial perspective - Tab. 3. The total value of these contracts amounts to a trifle PLN 285.5 billion (this amount is only a subsidy from the EU budget). The highest value of signed contracts belonged to individuals applying for a grant in the Mazovia Province - a total of PLN 42.5 billion, then the Silesia Province - PLN 25.5 billion, Malopolska Province - PLN 19.6 billion, and Lower Silesia Province - PLN 19.5 billion. However, in the provinces such as Opole, Lubuskie, Podlasie and Swietokrzyskie the lowest values of signed contracts for funding from the EU were registered. The worst in this group was Opole Province where the total value of signed contracts amounted to PLN 5.6 billion.

The last analyzed indicator is the total value of completed projects. The following table shows the value of co-financing from the EU completed projects funds. In Poland at the end of 2014 this value was more than PLN 92.7 billion. Again, investors from the Mazovia Province received the highest score in total funding, ie. PLN 9.6 billion, in second place, with just a slightly worse result, was Lower Silesia Province - PLN 8.5 billion, while third

place is undeniably described by Podkarpackie Province where the value of EU completed projects funding was PLN 6.9 billion. Next came the following: Silesia Province, Warmia-Masuria Province and Wielkopolska Province. The lowest total value of completed projects were noted by beneficiaries of the Lubuskie Province - approx. PLN 2.1 billion, Opole Province - PLN 2.6 billion, Podlasie Province - PLN 3.1 billion, West Pomerania Province - PLN 3.3 billion and Kujawy-Pomerania - PLN 3.6 billion.

*Table 3 The total value of signed contracts for funding and the total value of completed projects co-financed from EU funds in the 2007-2013 financial perspective [6]*

Territorial unit	The total value of signed contracts for funding	The total value of completed projects
	Co-financing from EU funds	
	As of 31 December 2014	
	Total in PLN billion	
<b>POLAND</b>	<b>285,5</b>	<b>92,7</b>
Lodz	18,1	4,5
Mazovia	42,5	9,6
Malopolska	19,6	6,3
Silesia	25,5	6,8
Lublin	15,4	5,9
Podkarpackie	18,5	6,9
Podlasie	8,5	3,1
Swietokrzyskie	9,1	4,4
Lubuskie	6,8	2,1
Wielkopolska	18,1	6,5
West Pomerania	11,6	3,3
Lower Silesia	19,5	8,5
Opole	5,6	2,6
Kujawy-Pomerania	11,4	3,6
Pomerania	17,5	4,4
Warmia-Masuria	13,5	6,6

Examining the last two indicators (ie. the total value of signed contracts for funding - more than PLN 285 billion and the total value of completed projects - approx. PLN 92.7 billion) it should be noted that the value of the latter one is roughly 1/3 smaller in comparison to a total value of signed contracts. It can therefore be seen that the difference between these two values is approximately PLN 193 million, which at the same time translates to 32.5% reduction in value of completed projects, against a backdrop of signed contracts for funding. This situation is due to the fact that some of the contracts fail in the final stages of the grant. It can be affected by incorrect implementation of the project, which is incompatible with the objectives outlined in the proposal for a grant, or inappropriate preparation of a request for payment, or finally by giving a negative audit opinion.

### 3. Conclusions

Summing up, the process of obtaining grants from the European Union budget is time consuming and often also very complex. However, being aware of the fact that it is non-refundable assistance, it is worth, after all, deciding on this solution to consequently achieve the business success. It must therefore be borne in mind that without the help from the EU, many Polish but also European entrepreneurs could not start their own business due to a lack or too low level of their own funds. In addition, having solely and exclusively equity - insufficient capital, will prevent the dynamic and effective development of the company. It is worth noting that in Poland in the previous financial perspective (as of the end of 2014) 104 527 grant agreements were signed (most of HC OP - more than 47.5 thousand, while the fewest, because only a little more than 300, concerned the DEP OP). It should be noted that the total value of signed contracts for financing amounted to PLN 285.5 billion, while in fact the total value of completed projects amounted to PLN 92.7 billion.

### References

- [1] Ministerstwo Skarbu Państwa (Ministry of the Treasury), <http://inwestor.msp.gov.pl/si/polska-gospodarka/analiza-makroekonomicz/29011,Analiza-makroekonomiczna-polskiej-gospodarki.html> [access 29/03/15].
- [2] Unia Europejska (European Union), [http://europa.eu/pol/reg/index\\_pl.htm](http://europa.eu/pol/reg/index_pl.htm) [access 29/03/15].
- [3] Eurostat, [http://ec.europa.eu/regional\\_policy/sources/docgener/informat/country2009/pl\\_pl.pdf](http://ec.europa.eu/regional_policy/sources/docgener/informat/country2009/pl_pl.pdf) [access 29/03/15].
- [4] Europejskie Programy Pomocowe (European Aid Programs), [http://www.europo.pl/pl/49556/0/ABC\\_DOTACJI.html](http://www.europo.pl/pl/49556/0/ABC_DOTACJI.html) [access 04/04/15].
- [5] Unia Europejska Nieoficjalny Serwis Informacyjny (The European Union Unofficial Information Service), <http://www.uniaeuropa.info.pl/jak-starac-sie-o-dofinansowanie-z-unii-europejskiej> [access 05/04/15].
- [6] Bank Danych Lokalnych (Local Data Bank), <http://stat.gov.pl/bdl> [access 04/04/15].
- [7] Necessary to fulfil current criteria were described in the criteria guide available at: <http://poig.parp.gov.pl/files/74/108/208/404/8666.pdf> [access 04/04/15].
- [8] Procedura ubiegania się o dotację (The procedure of applying for a grant), [http://www.maculewicz.pl/files/Publikacje/Ula/Procedura\\_ubiegania\\_sie\\_o\\_dotacje.pdf](http://www.maculewicz.pl/files/Publikacje/Ula/Procedura_ubiegania_sie_o_dotacje.pdf) [access 04/04/15].

## THE ROLE OF ADAPTION MANAGEMENT IN PROFILE ORIENTED MARKETING FOR SUSTAINABLE REGIONAL ECONOMIC AND SOCIAL DEVELOPMENT

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**Abstract:** *Cities are the carriers and pioneers of socio-economic change and diverse development trends. In times to come, cities and regions definitely need clearly structured and consistent development plans. In this context demands in reference to the planning and usage of urban living space of cities and regions are increasing and require the use of new profiling systems. The main purpose of this paper is to provide an empirical evidence on the importance of the adaption management and profile oriented marketing systems for a clearly structured future and profile oriented urban development concept/system for the new demands of public/city planer in order to provide a high sustainable, competitive and innovative developmental quality for their inhabitants to live and work in. This future oriented development, create a challenging situation for the diverse districts. With the help of systematic, dynamic development processes the goal can be achieved. Firstly you have to figure out, how you can connect and implement profile oriented marketing and adaption management. Therefore you have to clear the question, is adaption management important to profile oriented marketing and development systems? The Answer is: Yes, it is! Adaptive management is a valuable tool and significantly correlated with sustainable marketing development processes. In this context, we also bear in mind that today innovation, diversity and networked thinking, are significant factors. Therefore the planer/organizations serves as a role model for the inhabitants and needs to be adapted to the new usage and specially needs at every step. The new profiling system offers a methodical basis and adaption management provides the soil.*

**Keywords:** *adaption management, planning process, sustainable development, profile-oriented marketing*

### 1. Introduction

The demographic change shows a significant, unambiguous direction. Over the coming years cities substantially continue with strong growth. On the other side, it is likely that many peripheral and structurally weak regions are currently standing at a watershed in terms of their regional orientation and in particular are affected by struggle with massive declining population levels and an increasing number of elderly people. (Kern, 2015) However, in this connection, we must also bear in mind that today innovation, diversity and networked thinking, are significant and even more important aspects in a sustainable urban and competitiveness regional development and go hand in hand. Moreover, the basis of an efficient communication strategy, focus in particular on developing long-term, innovative and interlinked thinking. According to current reports of the United Nations, half of the world's population is living in cities and it is expected that this number increase to two thirds of the world's population by 2050.

There has been an increasing process of merging cities and their surrounding regions into a metropolitan figure and a distinct separation and hierachization of spaces has become difficult. Therefore cities are expanding to regions (Zibell, 2003, p. 23), creating a homogenous entity of space regarding geographic, economic or political criteria. Thus, cities are subject to constant change and diverse development trends (Ramsauer, 2012, p.2). Therefore, the importance of urban living space is constantly increasing, as cities are the housing-, work-, and life-centers of most people. In this context demands in reference to the usage, planning and design of urban places, spaces and cities are

increasing (Welch Guerra, 2010, p. 5) thus require an innovative thinking manager, planer, leader and the use of new profiling systems.

Space however, has in the past few decades been redefined by sociologists (Schroer, 2006, p. 9). Urban living space has long been viewed as the setting of social and economical developments. However, urban living space can be viewed as more than that. Current theorists argue that people are constantly reconstructing space in their daily actions. Urban space is no longer the setting but becomes an integral part of social and economic processes and is characterized by suburbanization and structural change and requires to understand city planning as a dynamic development process. (Löw, 2008, p. 51). According to Heinrichs (1999, p. 9), there is a growing mutual competition between cities and regions, much like between companies. Profile oriented marketing (Kellner, 2007) has demonstrated successful in distinguishing goods and services from those of competitors, because the profile, incorporating the values of an organization gives the product an emotional fingerprint.

The aim of this paper is to understand, how profile oriented marketing can be implemented to increase the attractiveness of the urban living space of cities and regions. In the case of urban living space this role is taken by innovation, diversity and culture. Therefore, the doctoral thesis will be particularly concerned with the question, is profile oriented marketing a suitable tool to increase the attractivity of cities or regions to individuals/citizens or organisations/companies and thereby enhance the developmental quality.

In times to come, cities, communities and regions definitely need clearly structured and consistent development plans in order to provide a secure social and economic environment for their inhabitants to work and live in. Therefore it is the task of public manager, city- and communal planer and those who took on responsibility to make sure that short-, middle- and long-term requirements of the citizens are met as best as possible, so that a high, sustainable, innovative, urban development quality can be achieved (Kellner, 2006, p. 223).

The themes and content of adaption management and sustainable urban and regional development cannot easily be separated from each other, as they are often both overlapping and interrelated. Thus, it appears to be important to address the question from a management perspective of the role of adaption management in profile oriented marketing for sustainable, innovative economic and social development on the one hand and from a marketing perspective on the other hand. Therefore, this paper contains two sections, dealing with the questions how the environment needs and changes to be organized and how the managers/planers needs to act, respectively, to promote innovation and diversity for a high sustainable development quality. A third section addresses, how these two perspectives can be integrated.

### 1.1 Adaption management issues

It is important to translate and describe the term and aspects of adaptive management in an easily, clearly and comprehensible way to put it in practice, to ensure that becomes reality and are systematically integrated into daily actions that are oriented towards the specific needs and the new usage and planning. Adaptive management was introduced in the 1970s, by a group of ecologists and can be viewed as „a structured and systematic process for continually improving decisions, management policies, and practices by learning from the outcomes of decisions previously taken.“ (Intaver Institute, 2014)

This definition basically translates into „learning by doing“. Adaptive management is now used for all kinds of projects outside the field of ecology. The key to adaptive project management is to manage projects based on learning from actual project performance and to learn via the use of quantitative methods. Therefore, adaptive management includes the following elements (National Research Council, 2004, Figure 1):

- The formulation of management objectives, which are regularly visited and revised.
- A model of the system being managed.
- A range of management choices.
- Responsive power structures.
- Monitoring and evaluation of outcomes.
- A mechanism(s) for incorporating learning into future decisions.

The goal of adaptive management is to determine the best management strategy through experimentation. Thereby, adaptive management aims to enhance knowledge and reduce uncertainties from natural variability, incomplete data (National Research Council, 2004) or social and

economic changes. Furthermore, adaptive management aims at a timely response to such changes, i.e. flexibility in decisions.

Passive and active approaches to adaption management can be distinguished (National Research Council, 2004).

Passive adaptive management selects one management approach from the range of possibilities and implements based on existing information and understanding. The outcomes of management actions are monitored, and subsequent decisions are adjusted accordingly.

Active adaptive management reviews information before implementing management approaches. Management options are chosen based upon evaluations of a range of competing, alternative system models.

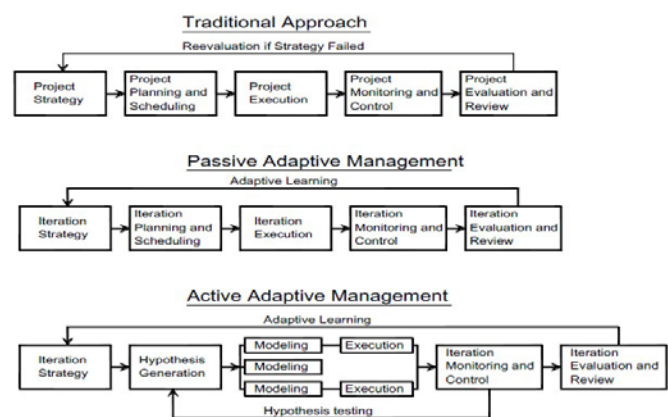


Figure 1: Adaptive Management Process (Intaver Institute, 2014)

### 1.2 The role of adaption management in profile oriented marketing for sustainable regional economic and social development

Cities or regions are constantly subject to social and economic change, reshaped by the daily actions of their inhabitants and resident organizations. Therefore uncertainties can be expected to be high and management processes have to be highly flexible. Thus, adaption management measures could be valuable to the aim of increasing the attractiveness of cities, regions and enhance the sustainable social and economic development quality via profile oriented marketing. The paradigm shift in the understanding of urban living space mirrors current paradigm shifts in marketing. Where the brand itself was in the center of marketing strategies until recently, new marketing models focus their efforts on people. Marketing strategies need to be monitored, evaluated and updated accordingly.

**Profile Oriented Marketing** can be understood as “the expression of a comprehensive philosophy and concept of planning and action, by which – based on systematically gathered information – all activities of an organization are consequently directed towards the current and future market requirements, with the aim to meet the markets needs and achieve individual goals.” (Weis, 2012, p. 23 translated)



A **profile** is a bundle of individual, as unique as possible characteristics of a communality. These characteristics include the quality statement (*mission*), the aspired state (*vision*), a clear and valid mind-set (*principles*) and the appearance (*corporate identity*) of the organization.

By defining its aspired state, the profile gives an organization a clear direction of development, a perspective to work future oriented. Therefore, the profile is the pivotal point of marketing actions, as outlined in the Profiling-Structure Modell by Kellner (2007, p. 60 shown in Figure 2).

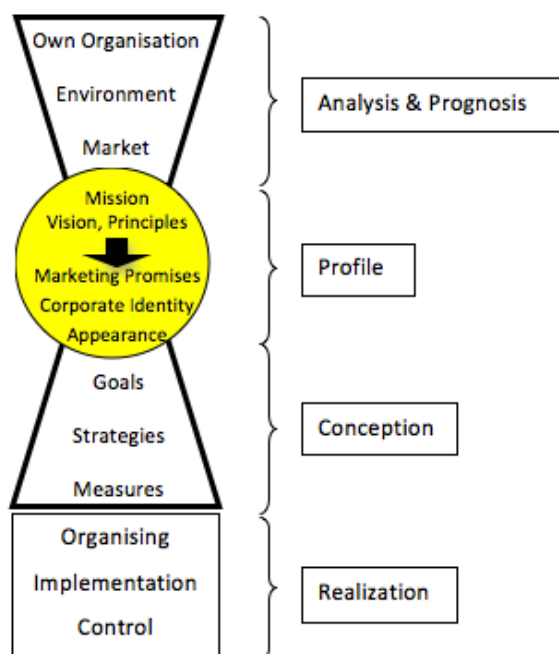


Figure 2: Profiling-Structure-Model (Kellner, 2007, p. 60)

The profile is in itself a result of constant analysis and prognosis of the own organization (city), the environment, the competitors and a prognosis of future market development. Once the profile is established clear goals can be defined and strategies and measures to achieve these goals can be developed, which can then be realized by a strict organization and control mechanisms at each implementation step. In that respect, profile-oriented marketing implements measures of adaption management. It is however a challenge to bridge the gap between providing a clear perspective and keeping values constant and recognizable, as intended by the profile, on the one hand, and constantly updating and flexibly changing marketing strategies on the other hand.

### 1.3 Improvement of Adaptive Capacity

**Adaptive capacity** is the capacity of a system to adapt to environmental changes.

In ecological systems, diversity is the catch phrase for factors generally associated with increased adaptive capacity (Gunderson & Holling, 2001).

Adaptive capacity of regions is influenced by economic development and technology, but also by social factors (Klein and Smith, 2003; Brooks and Adger 2005; Tompkins, 2005; Berkhout, 2006). With respect to climate change or natural catastrophies, adaptive capacity has been related to community organizations and social networking (e.g. Tompkins, 2005; Robledo, 2004).

In social systems, adaptive capacity is determined by (Gunderson & Holling, 2001):

- The storage of knowledge in order to learn from experience.
- flexibility and creativity of decisions.
- Responsive power structures.

## 2. Conclusion

In summary adaption management is a valuable tool to be integrated in marketing approaches for sustainable regional and economic development. Profile oriented marketing appears to be the option of choice too increase attractiveness of cities or regions and can give important impulses. It may be helpful to assess the adaptive capacity of a city or a region in case of social or economic change. This capacity may even be integrated into the profile as part of the marketing strategy: ***We are attractive, because we are adaptive.***

## References

- [1] Berkhout, F., Hertin, J. & Gann, D.M. (2006). *Learning to adapt: organisational adaptation to climate change impacts*. *Climatic Change*, 78, pp.135-156.
- [2] Brooks, N. & Adger, E.N. (2005). *Assessing and enhancing adaptive capacity*. *Adaptation Policy Frameworks for Climate Change*, B. Lim, E. Spanger Siegfried, I. Burton, E.L. Malone and S. Huq, Eds. Cambridge University Press, New York, pp 165-182.
- [3] Gunderson, L.H. & Holling, C.S. (2001). *Panarchy: Understanding Transformations in Human and Natural Systems*. Island Press, Washington.
- [4] Heinrichs, W. (1999). *Kulturmanagement. Eine praxisorientierte Einführung*, Darmstadt 2.nd Edition: Primus-Verlag, p. 9
- [5] Intaver Institute (2014). *Workshop Adaptive Project Management*. Riga, June 2014
- [6] Kellner, K. (2006). *Entwicklungsqualität in Kommunen steigern. Profilierung als systematisch gesteuerter Planungs- und Durchsetzungsprozess*, in: *Mitteilungen der Österreichischen Geographischen Gesellschaft*, 148. Jg.
- [7] Kellner, K. (2007). *Kommunale Profilierung – Ein neuer Ansatz für das Consulting in der Angewandten Sozial- und Wirtschaftsgeographie*. Augsburg: Geographica Augustana. p. 60
- [8] Klein, R.J.T. & Smith, J.B. (2003). *Enhancing the capacity of developing countries to adapt to climate change: a policy relevant research agenda*. *Climate Change, Adaptive Capacity and Development*, J.B. Smith, R.J.T. Klein and S. Huq, Eds., Imperial College Press, London, pp.317-334
- [9] Löw, M. & Steets, S. & Stöetzer, S. (2008). *Einführung in die Stadt und Raumsoziologie*, 2<sup>nd</sup> Edition. Ulm: Verlag Barbara Budrich, p.51

- 
- [10] National Research Council (2004). *Adaptive Management for Water Resources Project Planning*. Washington, DC: The National Academies Press
- [11] Ramsauer, P., (2012) *Stadt der Zukunft – Ideen, Konzepte, Chancen*, In/pact Media Verlag, Berlin, p. 2
- [12] Robledo, C., Fischler, M. & Patino, A. (2004). *Increasing the resilience of hillside communities in Bolivia* Mt. Res. Dev., 24, pp. 14-18
- [13] Schroer, M. (2006). *Räume, Orte, Grenzen. Auf dem Weg zu einer Soziologie des Raums*. Frankfurt/M.: Suhrkamp, p. 9
- [14] Tompkins, E. (2005). *Planning for climate change in small islands: insights from national hurricane preparedness in the Cayman Islands*. Global Environ. Chang., 15, pp. 139-149.
- [15] Weis, H.C. (2012). *Marketing*. Herne: Kiehl, p. 23
- [16] Welch Guerra, M. (2010). *"Städtebau" und „Stadtplanung“ in Intraurban. Stadt erfinden, erproben, erneuern*. In: Sulzer, J. (Hrsg.) Berlin, p. 5
- [17] Zibell, B. (2003). *Zur Zukunft des Raumes: Perspektiven für Stadt - Region - Kultur - Landschaft (Stadt und Region ALS Handlungsfeld)*. Peter Lang Publishing, p. 23

## COUNTERVAILING MARKET POWER ANALYSIS: AN ASSESSMENT OF MONOPOLISATION TENDENCIES IN MODERN BUSINESS ENVIRONMENT

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**Abstract:** *The research “Countervailing market power analysis: an assessment of monopolisation tendencies in modern business environment” provides a multi – perspective description of the nature, the occurrence sources, the development procedure and the internal conjuncture specifics of the present day monopolisation process as well as providing an example of modern econometrical method application within a unified framework of market competition analysis for the purpose of conducting a quantitative competition evaluation on an industry – level, resulting in applicable outcomes, suited for both private and public actors in terms of investment/business activity strategic analysis for the former and policy/regulatory action planning for the latter. The main scope of the aforementioned research is devoted to developing and further enhancement of monopolistic tendencies’ detecting and quantitative analysis practices, while simultaneously considering the broader context of market power phenomenon, its specifics, influence and effects.*

**Keywords:** *monopolisation, market power, competition level analysis*

### 1. Introduction

With the vast development of the modern business practices and the advent of the globalized trade system, numerous formerly unquestioned and unchallenged visions of the economy functioning paradigms, market mechanisms and conformity of natural laws had already been and still find themselves in a stage of productive transformation, re-evaluated and positively – critical analysis from various scholarly as well as practice perspectives.

Without prejudice to acknowledging certain areas of economic analysis, such as the demand – supply based market equilibrium or the law of diminishing returns, as indubitably empirical, a certain area of market functioning is indeed being addressed diversely by various scholars, professionals and interest group representatives due to the structural controversy, imbedded in the very essence of the relevant phenomenon. The issue in point is the process of monopolization, taking place in an open market economy and seemingly contradicting with both the economic reasoning for competition – bases resource utilization, product distribution as well as means of production allocation, and the core benefit to society, brought by consumer choice possibilities, namely, need satisfaction in the context of market functioning efficiency.

As it had been previously argued by numerous scholars, while the presence of the full monopoly undoubtedly bring unrecoverable (deadweight) losses to the society, the process of monopolization is a natural state of affairs, based on both resource limitations and enterprise struggle for profitability, with the mentioned tendencies becoming excessively persistent and particularly visible in time of economic downslide and external shock occurrences [5][10]. The first deviation from the situation of competition, sufficient in terms of intensity and efficiency, is the obtaining of a dominant market position, which is recognized by the European Union Competition Law as

not an infringement per se, but rather as a potentially risky situation of possible future negative market trend development. As defined in the Article 102 of the Treaty on the Functioning of the European Union, “any abuse by one or more undertakings of a dominant position within the common market or in a substantial part of it shall be prohibited as incompatible with the common market insofar as it may affect trade between Member States” [15]. Therefore, it may be concluded that monopolization tendencies are a potentially negative development, forever, in certain situation, such state of affair may be “the least of two evils” in regards to the only other economically efficient option being public body interference or even nationalization, the latter being highly uncompliant with the current developments in the European single market [4]. The question arises in defining the limits of monopolization process remaining an economically natural and mostly tolerable, in terms of market functioning efficiency, development, adjusted by the consideration of the present stage of business cycle evolutionary maturity and the correspondently generated economic shocks, both internal and external, and defining a boundary, which, if crossed, leads the industry down the path of excessive market power concentration and counterproductive entrepreneurial practices, creating a sufficient basis for public competition monitoring bodies to interfere with the goal of deterring further escalation of unfavorable monopolization process [13].

The objective of the current research is, while taking into consideration the persistent modern day economic challenges and the previously described problematic, to conduct a full – scale study on the nature of monopolization process, the role of market power concentration in monopolization tendencies’ progressive evolution and define the degree of external factor influence in acceleration the mentioned occurrences’, contextualized within the existing business cycle theories, with the use of

analytical, comparatively – economical, coherently – logical and economic index analysis methodologies.

## 2. Theoretical background of the conducted research

Monopoly (from Greek *μovo* (mono) – one and *πωλέω* (poleo) – to sell) is a unique advantage situation in any state, industry, organization or branch that allows acquiring benefits from such position. In terms of economic evaluation, a monopoly is defined as a special market situation, ensuring a higher level of profitability on the behalf of price growth and production cost cutting with the use of the so-called monopoly position advantages [12]. It may be stated that a position of full monopoly is the exact opposite of a perfect competition scenario and therefore the conduct of competition in the former case would contradict the relevant process in the latter. The main problematic at this point may be defined as reality risks assessment in comparison with those of strictly hypothetically – theoretical origins: an enterprise, if its actions are left unchecked by the authorized competition situation monitoring public bodies, may firstly reach for a dominant position in the market and, if successful, push for a full economic monopoly through the abuse of its leader status generated advantages, while the situation of perfect competition is a descriptive model, used for empirical research conduction [1].

Therefore, the process of monopolization may be described as a tendency or push towards obtaining a *de facto* full monopoly status by consolidating market power on behalf of the existing competitors and accumulating a necessary amount of the mentioned market power to gain a dominant position in the market in order to create internal barriers for potential new competitor entry blocking. Such process, while generally being lengthy and, in a sense, incremental, commonly occurs under normal economic conditions in contrast to industry – level shock occurrence scenario, in which case the process of monopolization may accelerate and conduct in a rather swift pace.

Through a qualitative analysis of the relevant scientific literature, it may be concluded that the existing empirically – theoretical framework provides a solid basis for development of a quantitative analysis of competition structural composition in various heterogeneous product relevant markets and the establishment of a conceptual methodology for the previously mentioned evaluation conduction seems empirically possible. In line with the mentioned logic, a quantitative analysis of the researched problematic shall require both an empirical model, capable of detecting monopolistic tendencies under normal economic conditions or, simply put, a situation of consistent yet commensurate economic growth, and a specialized input data leveraging derivative algorithm, which, when applied, will reflect the current business cycle imposed market correction in the context of nominal competition conjuncture effective reconfiguration.

## 3. Concept of the developed monopolization process evaluation methodology

An important development in the context of the conducted analysis may be expressed in the form of previously

defined factor mutual economic influence and the causality of the relevant process. Considering both prices and market capacity structural compositions, it is imperative to acknowledge that, while focusing on supplier's market power, the most logical perception of the situation would be achieved through the prism of demand – side analysis. If, as argued Christopher and Shughart II [14] an enterprises' market power is proportionate to its size, the measurement of that very aspect shall deliver a precise answer to the addressed question of monopolistic tendency dependence on disproportionate market influence concentration in certain supplier clusters, thus leading to the need of defining an enterprises' size in an analyzed relevant market.

Individual supply amount is critically affected by the existing or potential demand amount, with both of the mentioned fundamental economic factors being equalized or, econometrically speaking, mutually balances by the common denominator of competitive price. Therefore, it may be concluded that the effective size of an enterprise, measured by its presence in a market, is determined by the symbiosis of its individual supply amount and the corresponding sale price. Taking the next step forward, it may be deduced that the individual supply amount multiplied by the relevant existing sale price would equal the turnover of the mentioned enterprise over a defined timeframe. Consequentially, it may be concluded that, if an industry level market power distribution analysis is being conducted or the required perspective dictates an evaluation, only focusing on a certain product type or non – supplementary market structures, the turnover of the supply – constituting enterprises shall deliver the required accurate and objective results [2].

It is important to note that, in terms of harmonizing the used quantitative data, it would be advisable to use the net turnover parameter as the main input element of econometric modeling due to the nature of the mentioned information and the unification of value added tax, excise and other duty rates within the context of a relevant market that is usually the existing state of affairs in most if not all of the modern developed economies. In quantitative terms, dividend the net turnover of an enterprise by the total market consumption capacity, defined as the sum of all involved supplier individual turnover, expressed in per cent measurements, constitutes an adequate method of individual market share calculation. As a side note, the European Commission takes a similar approach to the problem of enterprise individual market share definition [7]. As argued by various authors [3][8] including Chamberlin [6] and Robinson [9], in a situation of perfect competition no enterprise possesses any market power at all, therefore, by applying the same logic as done previously, it may be concluded that the market shares in the mentioned situation should be evenly distributed between the involved suppliers, thus constituting a mutually proportionate involvement in the aggregate supply amount creation. If an enterprise increases its individual supply amount in order to maximize its profit, the marginal revenue sealing, determined by the constantly fixed, industry level unified price will quickly set a

maximum financially profitable individual supply amount, which, *ceteris paribus*, shall be common for all the involved suppliers. Therefore, a situation of perfect competition not only constitutes a completely equal market share distribution, it simultaneously creates a situation of equivalence between the aggregate quantitative measurement of common average market shares and the cumulative individual market power interactional output. Consequentially, for the purpose of further conduction of the current research, the theorem of perfect competition as a structural market conjuncture type creating a situation of non – existent individual market power, based of equal market share distribution, deriving from objective economic limitations to individual supply amount profitable delivering, shall be perceived as having been rationally proven in the above described empirical causality rationalizing experiment, conducted with full accordance to Austrian economic school's tradition [11]. Therefore, in case of imperfect or, as defined by Chamberlin [6], monopolistic competition, which is the

source of monopolization process development and monopolistic tendency emergence, market power is distributed unevenly between the suppliers, active in a relevant market, and the trend of exercising the available influence derives precisely from the ability to either neglect or predetermine the retaliation actions of the effective competitors, which consequentially leads to monopolistic tendency strengthening and potential dominant position establishing.

Following such logic, the ratio of cumulative individual market power distribution in case of the existing monopolistic competition to the equivalent value in situation of perfect competition would objectively and rationally reflect on the current state of monopolistic tendency development and, if a dynamic trend is analyzed, enable the calculation of such occurrence future emergence probability. The mentioned concept may be graphically interpreted as a deviation interval, reflected in Figure 1:

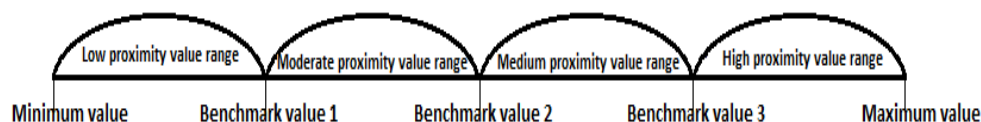


Figure 1: Empirical concept of market power distribution reflecting indicators

As it may be seen from figure 1, the cumulative distribution of market power is reflected in terms of the relevant values' proximity to the conditionality of perfect competition situation, thus establishing an experimental reference framework, enabling the analytical definition of the assessed market to shift from the field of theoretical description to the area of applicable characterizing and practical quantitative analysis of the detected peculiarities.

#### 4. The quantitative structure and functioning principles of the developed methodology

In order to incorporate an indicator, reflecting the role and magnitude of individual market power distribution between suppliers, involved in economic activities on a relevant market level, into the econometrical structure of the developed methodology, while taking into account the previously established theoretical and conceptual basis, an understanding of cumulative market power amount and its disproportionate allocation within a market must be reformatted to suit the declared purpose.

The number of enterprises in the relevant industry, their net turnover amounts and the corresponding divergence from the state of perfect competition may be branded as the necessary contributors to the composition of the relevant indicator. Assuming, that in a situation of perfect competition all no market actor, engaged in economic activity on the supply – side of the existing consumption equilibrium, has any market power vis – a – vis its direct competitors, the individual market shares must be equal for all of the mentioned supplier in terms of their

percentage proportion of the cumulative market consumption maximum level. Therefore, the relative market share of a supply, operating in a conjuncture of perfect competition, is inversely proportionate to the number of suppliers, involved in economic activities with a fixed common sale price and no entrance or exit barriers to be found.

As it had been previously described in detail, an indicator of market power concentration distribution is based on measuring the state of de facto market condition being divergent to those of a perfect competition situation in the context of enterprise mutual interconnectedness in the context of supply – side of the general market equilibrium. Therefore, an element of individual market power mutual compensation arises, meaning that competing entities, both exercising their respective market influence with profit maximization goal, simultaneously engage each other in a struggle for and of market power, with the results of the mentioned competition collision being determined by the difference in employed market power. While presuming that each enterprise is rationally motivated to exploit their maximum market power on a largest possible scale and that every enterprise in a competitive environment theoretically engages every other opponent with the synergetic effect of market power being a holistic economic phenomenon, the aggregated disproportionality of market power distribution in a relevant market may be determined as the opposite of simultaneous individual market power cumulative mutual compensation, to be

more precise, its excessive amount, which is not being cancelled out by a pro rata competitors influence.

Therefore, mutual cumulative individual market power compensation may be reflected by what for the purpose of the current research shall further referred to as the mutual compensation index, which may be calculated in the quantitative fashion, described in Formula 1:

$$MCI = \frac{MSH_1}{MSH_e} * \frac{MSH_2}{MSH_e} * \frac{MSH_3}{MSH_e} * \dots * \frac{MSH_n}{MSH_e} = \prod_{i=1}^n \left[ \frac{MSH_i}{MSH_e} \right] \quad (1.)$$

where:

$MSH_i$  – *de facto* individual market share of a supplier, %;

$MSH_e$  – nominal individual market share of a supplier if

the relevant market is in a state of perfect competition, %;

MCI – mutual compensation index, % or natural values.

The introduced mutual compensation index, as any other economic parameter, delivers quantitative outputs that fall under a certain numerical threshold, enabling the according interpretation of the acquired results on a conceptually – qualitative level. In order to understand the meaning and significant of the detected market power distribution conjuncture signals, the output value ranges and their corresponding readings are summarized in Table 1:

*Table 1 Mutual compensation index explained: quantitative value ranges and their respective interpretation*

Value range	[0]	(0;0.25]	(0.25;0.47]	(0.47;0.63]	(0.63;1]
Level of individual marker power mutual compensation	Absent	Insufficient	Fractionally sufficient	Sufficient	Fully sufficient
Economic characteristics	<i>De facto</i> full monopoly	Dominant market position or oligopoly	Cross – niche competition	Differentiated monopolistic competition	Classic monopolistic competition
Competitive situation	Absence of efficient competition	Uncompetitive environment	Fractionally competitive environment	Competitive environment	Sustainable competitive environment

As it may be seen from Table 1, the mutual compensation index reflects both the specifics of analyzed relevant market's conjuncture structuring and the state of competition within the mentioned economic unit, thus enabling a multi – scale assessment of business processes from a dual, private and public actor, perspective, the former comprising of market entry attractiveness and the required penetration effort evaluation, while the latter focusing on the health of the existing competition environment in the context of regulatory intervention necessity in – line with the established competition policy enforcement.

## 5. Conclusions

Taking into account the conduct, results and findings of the previously described research, the following may be concluded:

- Monopolization process is most likely to develop in situations of disproportionate individual market power distribution between suppliers, conduction economic activities within a defined relevant market;
- Monopolization process origins may be traced to the disproportionate distribution of individual market power within a defined relevant market, while being closely related to the overall interaction intensity between niche – targeting supplier groups;
- Monopolization development trend and their magnitude may be evaluated through analysis of individual market power mutual compensation effect in the context of the aforementioned niche – level competition;
- Applying harmonized quantitative analytical methods and their qualitative interpretation algorithms in the context of synergetic econometric modelling proved and efficient methodological approach of monopolization tendency detection, evaluation and internal dynamics understanding enhancement.

It would be scientifically rational to further enhance the developed methodology by incorporating external macroeconomic factor influence into its econometrical structure, while concentrating on the effects of business cycle volatility and process of consequent maturing in order to objectively define the possible effects globalized economic activity may have on regional competition development.

## References

- [1] Dmitrijs Skoruks, *Procedia - Social and Behavioral Sciences*, Vol. 110, No. 1, pp. 202-214, 2014.
- [2] Egbert Dierker, Birgit Grodal, *Economic Theory*, Vol. 7, No. 1, pp. 139-160, 1996.
- [3] Massimiliano Vatrio, *European Competition Journal*, Vol. 6, No. 3, pp. 689-707, 2010.
- [4] Maurice Stucke, *Oxford Journal of Antitrust Enforcement*, Vol. 1, No. 1, pp. 162-197, 2013.
- [5] Paul Samuelson, *Review of Economic Statistics*, Vol. 21, No. 1, pp. 75-78, 1939.
- [6] Edward Chamberlin, *On the Origin of Oligopoly: Reediting*, Cambridge, Cambridge University Press, 2010, pp. 113-149.
- [7] European Commission, Commission Notice on the definition of relevant market for the purposes of Community competition law, Brussels, Official Journal of the European Communities, 1997. Pp. 5 – 13.
- [8] Irving Fisher, *The Nature of Capital and Income*, London, Macmillan, 2012, pp. 173-198.
- [9] Joan Robinson, *The Economics of Imperfect Competition: 1969-2012 Anthology Edition*, London, Macmillan, 2012, pp. 189-211.
- [10] John Maynard Keynes, *The General Theory of Money, Interest and Employment*, London, Macmillan, 2011, pp. 289-315.
- [11] Joseph Schumpeter, *History of Economic Analysis*, London, George Allen & Unwin, 1954, pp. 657-721.

- 
- [12] Milton Friedman, *Capitalism and freedom*, Chicago, The University of Chicago Press, 1962, p. 208.
- [13] Directorate for Financial, Fiscal and Enterprise Affairs, *Glossary of Industrial Organisation Economics and Competition Law*, Paris, Organisation for Economic Cooperation and Development (OECD), 1993, p. 57. <http://www.oecd.org/regreform/sectors/2376087.pdf>.
- [14] Lawrence White, *Market Power: How Does It Arise? How Is It Measured?* New York: New York University, Leonard N. Stern School of Business, Department of Economics, Working papers, EC-12-06, 2012. [http://web-docs.stern.nyu.edu/old\\_web/economics/docs/workingpapers/2012/White\\_MarketPowerRiseandMeasure.pdf](http://web-docs.stern.nyu.edu/old_web/economics/docs/workingpapers/2012/White_MarketPowerRiseandMeasure.pdf).
- [15] Treaty on the Functioning of the European Union (TFEU) [Consolidated version], Rome, 1958, pp. 88 – 89. <http://eur-lex.europa.eu/legalcontent/EN/TXT/PDF/?uri=CELEX:12012E/TXT&from=EN>

## DEVELOPMENT OF PERIPHERAL REGIONS IN FINLAND AND SWEDEN

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**Abstract:** *The rapid growth of the global economy has created new conditions in peripheral regions in old industrialized nations. The article discusses how governments of Finland and Sweden deal with development of peripheral regions taking into consideration substantial differences between them and central regions. The northern part of Sweden and Finland need to face challenges in their distant location from the core areas, high population loss resulting from negative net migration and lack of main actors of innovations in regions. The dismantling of trade barriers, the accessibility of new markets for production, and faster and cheaper modes of communication and have combined to change the conditions for development. However these peripheral regions of these two Scandinavian countries seem to be less peripheral than others in Europe. The main reason of this situation is rooted in national innovation policies, which allow less - favoured regions to faster and effective implementation of new solutions in improving competitiveness and economic growth. Based on qualitative analysis (a research method) investigation shows that the most important activities to brighten perspective of development are focused on tight cooperation with key actors in innovation process and resources like high - tech enterprises, institutes of higher education and R&D institutes. Moreover important role play local self-governments in each region which stimulate establishing cooperation with other municipalities creating common projects.*

**Keywords:** *regional development, peripherality, innovation policy*

### 1. Introduction

Regional development is the most important economic objective of European Union. It is noticeable especially in sharing European Union funds, where almost one third of them are committed to aligning the standards of living in each region in Europe. However, among all the regions of European Community, regional policy is the most focused on peripheral regions due to the risk of poverty and unfavorable conditions for development.

In the social and economics sciences there are many definitions of peripherality but there might be distinguished two major. First group of definitions defines peripheral regions as areas remote from economic centers and difficult to access in terms of communication [1]. The second take into consideration economical aspects and the basic criterion for determining the peripherality is the low level of economic development, primarily measured by GDP below 75% of the EU average per capita (in purchasing power parity). Nevertheless in the case of Finland and Sweden peripherality is largely seen as synonymous with low population density, low economic diversification and demographic decline [2]. Anyway it seems to be that these two countries handle the problem of peripheral region quite well. Concept of welfare state is based on the idea that all citizens, regardless of their sex, age or the region where they live, are equally entitled to the same rights and opportunities [3]. Thanks to following those rules, Sweden and Finland which are perceived as welfare states countries make laws under which they implement innovations and new solutions, which allow to better development of the weakest regions. The present studies investigates also, based on case studies, how they managed the problems of location from the core areas,

high population loss resulting from negative net migration and lack of main actors of innovations in regions.

### 2. Peripheral regions of Finland and Sweden

Finland and Sweden are Scandinavian countries located in the Northern Europe. The surface area of Sweden is 449 964 km<sup>2</sup> and Finland surface area is 338 424 km<sup>2</sup>. Due to large distance between the northern and southern parts of each country there are differences in population density. For example, in the most southern NUTS2 region in Sweden, Sydsverige, the population density is around 100 inhabitants per km<sup>2</sup>, while in the northern NUTS2, Övre Norrland, is only 3,3 inhabitants per km<sup>2</sup>. Similar situation is in Finland where in Helsinki Uusimaa (capital of Finland) there is 173,3 inhabitants per km<sup>2</sup> and in Lappland there is only 2 per km<sup>2</sup>. Sparsely populated regions represent about 50% of whole surface areas in each describing country.





Figure 1. Northern periphery regions in Finland and Sweden

It is very often suggested that changes in the number of population can be seen as an indicator of regional development. A community that is experiencing large - scale loss of its inhabitants is usually not in good shape economically [4]. Moreover the number of relevant actors like innovative enterprises, experts and institutes of higher education, is low. However the economic development of Northern European countries was characterized by a specific system of the centre - periphery relations. The 18th - 19th century's industrial revolution triggered the development of this model [4]. That is the reason why peripheral regions in Finland and Sweden are economically more developed.

Table 1. Statistics of research areas in Finland and Sweden  
Source: Eurostat

Country	Finland	Sweden
Region	Pohjois and Itä - Suomi	Övre Norrland
Land area (km <sup>2</sup> ) (2015)	227 148	164 077
Population (2014)	1 300 846	510 548
Population density (people per km <sup>2</sup> ) (2014)	6,4	3,4
GDP per capita (€) (2013)	22 500	30 800
Unemployment rate (%) (2013)	9,9	7,4
R&D expenditure (euro per inhabitant)	1 026 (2013)	962 (2012)

Table 2. Statistics of research areas in Sweden  
Source: Eurostat

Country	Sweden	
Region	Mellersta Norrland	Norra Mellansverige
Land area (km <sup>2</sup> ) (2015)	76 709	309 934
Population (2014)	368 617	826 000

Population density (people per km <sup>2</sup> ) (2014)	5,2	6,0
GDP per capita (€) (2013)	29 400	26 000
Unemployment rate (%) (2013)	7,4	8,6
R&D expenditure (euro per inhabitant)	320 (2012)	535 (2012)

Since January 1st 2012 the regions known as Pohjois-Suomi and Itä-Suomi have been combined at the NUTS2 level, thus covering both eastern and northern parts of Finland. Pohjois- and Itä-Suomi region covers seven regional authority NUTS 3 areas (Etelä-Savo, Kainuu, Keski-Pohjanmaa, Pohjois-Karjala, Pohjois-Pohjanmaa, Pohjois-Savo, and Lappi). The region accounts for 67% of the national territory compared with only 24% (1 300 846) of the country's total population. The region consists of large rural areas lagging behind in innovation activities but it also hosts several cities with high level of economic activity as well as high rate of innovation (such as Oulu, Joensuu and Kuopio). Despite many successful industries, Pohjois- and Itä-Suomi can be considered a lagging region. Regional GDP per capita reached 22 500€, which is 81% of the Finnish average, the lowest of the four NUTS2 regions in Finland as well as 92% of the EU average (Eurostat, 2013). Unemployment in Pohjois- and Itä-Suomi is below average by European standards: the unemployment rate of 9,9 % in 2012 was below the EU27 average (10,5%) but clearly above the national average (7,7%). A year later the figure was 9,9% (2013). Significant sub-regional differences can be detected regarding unemployment, ranging from as low as 4.9% (Keski-Pohjanmaa) to 11,7% (Pohjois-Karjala). The economic downturn as well as structural change has affected unemployment in Finland and Pohjois ja Itä-Suomi has suffered more of the structural change than the other regions. Itä-Suomi long relied on forestry, which has experienced challenges with profitability whereas Pohjois-Suomi has struggled with the swift change of the ICT sector. On the other hand tourism, stone and mining as well as retail industries have become increasingly important sources of jobs as well as income for the region [5].

The NUTS 2 region Övre Norrland (Upper Norrland) in Sweden consists of two relatively independent NUTS 3 regions, Norrbotten and Västerbotten. In 2014, Övre Norrland had a total of about 510 548 inhabitants. The largest municipalities were Umeå, Luleå and Skellefteå, ranging between 117 000 and 72 000 inhabitants. The percentage of inhabitants born abroad was well below the national average. The region covers about 40% of Sweden and is one of the most sparsely populated areas of the EU. The average level of unemployment in 2013 was slightly below the average national level in Västerbotten (8,4%) and slightly above in Norrbotten (8,7%). Average gross domestic product (GDP) during the period 2005-2010 was 16 900€, or about 4.9% of the national total and in 2013 it was 30 800€. In Övre Norrland, there are two large universities, Luleå University of Technology and Umeå University. Key sectors of the region are forestry, mining, ICT and biotechnology. The services sector is less

developed. The region is well endowed with natural resources, and the percentage of gross value added (GVA) from minerals, forestry and energy is well above the national average. A large share of the regional production is exported [6].

The NUTS 2 region Mellersta Norrland (Central Norrland or Mid Sweden) consists of two relatively independent NUTS 3 regions, i.e. the county of Västernorrland and the county of Jämtland. In 2014, Mellersta Norrland had a total of 368 617 inhabitants, about 242 000 in the county of Västernorrland and 126 617 in the county of Jämtland. The largest municipalities are Sundsvall, Östersund and Örnsköldsvik with all together 57 percent of the region's population. However, there are important regional differences. Population is concentrated to the coastal areas, and in the inland area around the municipality of Östersund. The average gross domestic product (GDP) over the period 2005-2010 was 11,900€, or about 3,7% of the national total and in 2013 achieved the level of 29 400€. The region is well endowed with natural resources. Forests cover about 67% of the area and the percentage of gross value added (GVA) from agriculture, forestry and energy is well above the national average. Heavy process industries are dominating the economy, directly and indirectly, especially in Västernorrland. In Central Norrland the main university is the Mid Sweden University, with the local campuses in Härnösand, Sundsvall and Östersund. Key sectors for the region are forestry, process industries, tourism, business services, and ICT. There are established cluster initiatives in these areas [7].

The NUTS 2 region Norra Mellansverige (North Central Sweden) consists of three independent NUTS 3 regions of relatively equal size: Värmland, Dalarna and Gävleborg. In December 2013, North Central Sweden has a total of approximately 826 000 inhabitants. The largest municipalities are Gävle, Karlstad and Falun, ranging between 96,000 and 56,000 inhabitants. The percentage of inhabitants born abroad is below the national average. Unemployment in 2013 (8,6%) is slightly above the national average and average gross domestic product (GDP) during the period 2005-2010 was 25 100€, or about 7,4% of the national total and raised in 2013 to 26 000€. The region is well endowed with national resources. It is dominated by traditional capital intensive sectors, such as steel and engineering, and pulp and paper, which accounts for a large share of Swedish exports. Other important sectors are machinery, transport vehicles, food processing, ICT and tourism. In North Central Sweden, an important resource for regional innovation is Karlstad University that engages in close cooperation with the regional business community. The innovation system is formed around cluster initiatives, collaborations with regional higher education institutions and innovation platforms, e.g. the Packaging Arena, the Paper Province (pulp and paper) and Triple Steelix (steel and engineering), Destination Dalarna (tourism) and Fiber Optics Valley (ICT) [8].

### 3. Tools of regional development in Finland and Sweden

Europe 2020 strategy stimulates a new kind of growth (smart, sustainable and inclusive) by increasing the powers and strengthening education throughout life, fostering research and innovation, the use of smart grids and smart digital economy, modernization of industry, to promote a more efficient use of energy and resources. These aims are strictly connected with regions because changes start there start from scratch. In Finland and Sweden there are two main tools used in regional development: networks and zones. In regional development network, actors cooperate with partners who have appropriate resources needed in cooperation. For example in Eastern Finland set up network of wood energy supported by Forestry Centres. Their work rely on supervising national forestry acts and executing other task but also on the other hand they provide general counsel to forest owners about the management and use of their forests. If companies engaged in heat production based on the use of chips would like to establish of biomass based energy plants thanks to Forestry Centers they have the most immediate and frequent contact with the forest owners of their regions, which gives them up-to-date and deep knowledge of their situation and needs. In this way, forestry centers support local action and regional development and are regularly invited to join as partners in research and development projects related to forest energy by other organizations [9]. In contrast, in zones, the actors commit to the development of a mutually accepted territory where actors also share common development challenges [10]. It means that they are geographic areas in which a governmental authority offers incentives, different from the host country's regular policies, to companies operating in the region. Given the nature of these incentives, designated zones are often said to function as "growth poles" for the region, or even beyond [11]. In Sweden there is 4 special zones in Finland 2. The "hardware" of special economic zones—fully serviced sites with purpose-built facilities for sale or lease—is aimed at enhancing the competitive-ness of manufacturers and service providers. It is also intended to realize agglomeration benefits from concentrating industries in one geographical area. These benefits include efficiencies in government supervision of enterprises, provision of off-site infrastructure, improved environmental controls, and increased supply and subcontracting relationships among industries, among others. This "infrastructure rationale" is one of the most important driving forces behind zone development in infrastructure-poor regions. But there is also different example of special zones - environmental zones. In Sweden To enter the Environmental Zone, the driver must be able to show a document that verifies which emission standard (Euro class) the engine fulfilled at the time of type approval or registration. However, if the information could be found in the Swedish road traffic registry, no additional document is needed. If the engine has been adopted to fulfill a higher Euro class, the driver must be able to show documents that validate that the engine is in compliance with the indicated Euro class [12].

Very important role plays also knowledge - based development. In this respect the role of universities has increasingly gained attention because universities are important producer of the most fundamental resource of the modern economy - knowledge [13].

#### 4. Conclusions

Increasing globalization and much stronger competition between countries has brought an increased interest in the region as a place to expand socio-economic contacts, including the ability to deepen contacts among local communities, promotion of the region, acquiring foreign investors, as well as the using experience of international organizations in regional cooperation for accelerating development processes in the area. It seems to be the most important for peripheral regions which wrestle with low population density, low economic diversification and demographic decline. Finland and Sweden are great examples of countries which thank to their innovation attitude to the regional development overcome most of these challenges and ensure much better level of live than in other less - favoured regions in Europe. The main tools which they use are networking and special zones what reveal strong engagement of local governments and local municipalities. Due to peripheral regions make progress each year by year and are often called "competitive periphery".

#### References

- [1] Grosse T.G., *Wybrane koncepcje teoretyczne i doświadczenia praktyczne dotyczące rozwoju regionów peryferyjnych*, Studia Regionalne i Lokalne, Vol. 27, No.1, pp. 27-49, 2007
- [2] Davies S., Michie R., *Peripheral Regions: A marginal Concern?*, Proceedings of 32nd meeting of the EoRPA Regional Policy Research Consortium, pp.1-20, Loch Lomondside, October, 2011
- [3] Suorsa, K., *Regionality, innovation policy and peripheral regions in Finland, Sweden and Norway*, Fennia 185: 1, pp. 15–29, Helsinki, 2007
- [4] Efimova E. G., Kuznetsova N.P., *Economic development of ultra - small peripheral regions (case of Aland and Faroe Islands)*, Ekonomika, Vol. 91, No. 3, pp. 7-22, 2012
- [5] [http://ec.europa.eu/regional\\_policy](http://ec.europa.eu/regional_policy) (access data 20.10.2015)
- [6] [http://ec.europa.eu/regional\\_policy](http://ec.europa.eu/regional_policy) (access data 20.10.2015)
- [7] [http://ec.europa.eu/regional\\_policy](http://ec.europa.eu/regional_policy) (access data 20.10.2015)
- [8] [http://ec.europa.eu/regional\\_policy](http://ec.europa.eu/regional_policy) (access data 20.10.2015)
- [9] Németh S., *Wood Energy and a 'Networked Periphery' in Eastern Finland*, ISEE Conference of Advancing Sustainability in a Time of Crisis, Oldenburg / Bremen, 2010
- [10] Molainen H., *A review on new tools of regional development - what are they and why studying them matters?*, Nordia Geographical Publication, Vol. 37, No. 6, pp. 5-14, 2008
- [11] <https://www.wbginvestmentclimate.org> (access data 20.10.2015)
- [12] <https://www.dieselnet.com/standards/se/zones.php> (access data 20.10.2015)
- [13] Makkonen T., *Peripheral university region and knowledge - based development: the case of Joensuu*, International Journal of Knowledge-Based Development, Vol. 3, No. 3, 216-233, 2012

# FORECASTING CORRECTNESS OF INCURRING CREDIT WITH THE AID OF E.I. ALTMAN'S, J. GAJDKA'S AND D. STOS'S DISCRIMINANT ANALYSIS MODELS ON THE EXAMPLE OF 200 STUDIED COMPANIES FROM OPOLE AND ŁÓDZKIE PROVINCES

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**Abstract:** the credit risk related to issuing credit for a company is mostly the result of too high amount of the incurred credit, wrong prediction of future periods and repayment of the incurred liability. In order to minimize risk, as part of information about a credited company, there should be technical and economical information enabling to conduct "collective evaluation of the company's activity" with the use of E.I. Altman's, J. Gajdka's and D. Stos's models. Both models were used in the group of the studied companies of Opole and Łódzkie provinces. The research showed that incurred credit contributed to improvement of the financial liquidity in both groups. However, credits of greater worth led to the lessened increase of net profit and contributed to the small decrease of companies showing net loss. On the other hand, the group of companies, in which credits of lower worth were incurred, could decrease the number of companies suffering from net loss.

**Keywords:** company, financial liquidity, credit, discriminant analysis, net profit

## 1. Introduction

Using the J. Gajdka's and D. Stos's model in practice, it should be noted that the model proves to be perfect for Polish conditions because it reflects the realities of the Polish market, and demonstrates correctness of incurred credit of studied companies. The E.I. Altman's model was also used in research because the research results had to be compared in terms of a difference from the Polish market because this ratio was created for the American market and its needs.

200 micro, small and medium-sized companies were studied in the research, including 100 companies from the Opole province and 100 companies from the Łódzkie province. Such a big group of the studied companies was used to indicate correctness of the company's decision on incurring credit. The goal was to indicate that the company, which did not have the financial liquidity, or was operating on the border of its maintenance, could improve or regain the financial liquidity after incurring credit [5, 6, 7, 10]. However, the amount of properly incurred credit and the period of its duration were additionally taken into account because they had significant influence on the company's financial liquidity. Used models also enabled to indicate that the incurred credit influenced development of the subject's running a business positively, and even contributed to improve its financial condition. Nevertheless, it had to be incurred in a proper amount and for a proper period.

## 2. J. Gajdka's, D. Stos's and E.I. Altman's discriminant models

The J. Gajdka's and D. Stos's model reflects the best research results because it was developed in Poland, where Polish companies underwent discriminant analysis. The J. Gajdka's, D. Stos's and E.I. Altman's models are comparable, but were developed for different economic

realities. When both models were compared, differences between them were indicated [8, 11].

The E.I. Altman's model has been used for dozens of years. It may distort a picture and a result of the research because it was used as early as in the 1970s. The credit risk related to issuing credit for investments is mostly the result of the credited company's wrong prediction of its realization [2, 4], and as it can also be noticed in the conducted research, the wrong credit amount, either too low, or too high, and the time period, for which it was incurred. The E.I. Altman's model enables to forecast the course of economic events happening in the company within subsequent two years of its operation. The "Z" value, calculated on the basis of 5 economic and financial ratios, is the basis of this model [3, 10]:

Table 1 E.I. Altman's guidelines for the company's classification (Source: E. I. Altman)

The "Z" ratio's value	The chance of the company's bankruptcy
$Z \leq 1.8$	Very high
$1.8 < Z < 3$	Indefinite, but significant
$Z \geq 3$	Low

$$Z = 1.2 x_1 + 1.4 x_2 + 3.3 x_3 + 0.6 x_4 + 0.999 x_5$$

where:

X1 - working capital / assets in total

X2 - net income / assets in total

X3 - EBIT / assets in total

X4 - net market value of the company/liabilities in total

X5 - trade (net sale) / assets in total

In Poland, D. Zarzecki undertook verification of discriminant analysis's models in 2003. The result of the analysis of these models conducted by D. Zarzecki shows that the J. Gajdek's and D. Stos's model brings the best research results [8, 11]:

$$Z = 0,7732059 - 0,0856425 \times X_1 + 0,0007747 \times X_2 + 0,9220985 \times X_3 + 0,6535995 \times X_4 - 0,594687 \times X_5$$

where:

- X1 – revenues from the sale/assets in total,  
 X2 – (short-term liabilities/cost of production sold) x 360,  
 X3 – net profit/assets in total,  
 X4 – gross profit from the sale/net revenues,  
 X5 – liabilities in total/assets in total.

In this model, the cut-off point is 0.45, which means that a studied company is not endangered with bankruptcy, if the above value is reached. This cut-off point is different from the one given by E.I. Altman, but it is related to the used ratios, which are different in particular models.

Used models are very useful in assessment of the companies' crediting and are often used in practice [1, 3, 8]. Nonetheless, conducted analyses are not attempts to estimate specific worth of credit and the period for which the company should go in debt, but the credit's maximum worth and period. It may lead to issuing credit to a company, which may not be able to repay it in future.

### 3. The use of E.I. Altman's, J. Gajdka's and D. Stos's discriminant analysis models in order to indicate correctness of a decision on incurring credit on the example of 200 studied companies from Opole and Łódzkie provinces

In the Opole province, companies were studied with a comparison of the net profit in following years: a year prior to issuing credit, in the year of issuing credit and two years after issuing credit. The net income (division into following groups: from PLN 0 to PLN 100,000, from PLN 100,100 to PLN 200,000, from PLN 200,100 to PLN 500,000, and from PLN 501,000 to 1,000,000) and net loss were taken into account. The goal of such an analysis was to study range and opportunities of the obtained credit's amount in relation to the net profit and owned capital. The net profit, or net loss, indicated whether credit contributed to maintenance and improvement of the companies' financial liquidity, or it led to their bankruptcy.

*Table 2 Profit or loss of studied companies of the Opole province examined (100 examined companies, own development based on 100 studied companies of the Opole province.)*

Year	Profit 0-100,000	Profit 100,100 – 200,000	Profit 200,100 – 500,000	Profit 500,100 – 1,000,000	Net loss
2010	28	33	15	4	20
2011	33	35	11	3	18
2012	35	37	10	3	15
2013	38	42	10	3	7
2014	37	41	12	5	5
2015	35	43	11	6	5

In 2010-2015, in the Opole province, companies of lower net profit (from PLN 0 to PLN 100,000 and from PLN 100,100 to PLN 200,000) were the most numerous there were 80 such companies. In the Łódzkie province, ranges

between PLN 0 and PLN 100,000, and between PLN 100,100 and PLN 200,000 were dominant – there were 67 such companies. It should be noted that the studied companies tended to maintain net profit.

*Table 3 Profit or loss of studied companies of the Łódzkie province examined (100 examined companies, Source: own development based on 100 studied companies of the Łódzkie province)*

Year	Profit 0-100,000	Profit 100,100 – 200,000	Profit 200,100 – 500,000	Profit 500,100 – 1,000,000	Loss
2010	35	30	15	2	18
2011	34	33	13	2	18
2012	30	32	15	3	20
2013	31	31	16	3	19
2014	31	33	16	4	16
2015	33	33	17	3	14

Moreover, incurring credit even led to decrease of the number of companies, in which the loss occurred – from 20 to 5 in the Opole province, and from 18 to 14 in the Łódzkie province. It proves that the decision on incurring credit, which contributed to improvement of the financial liquidity, was correct. These data were summarized in tables 2 and 3.

In tables 4 and 5, the average net profit, average long-term and current assets, average worth of issued credit, and average loss of the companies that do not have the financial liquidity were presented.

In the table 4, it should be noted that the average value of issued credit amounts to PLN 251,425. It is the working capital facility, revolving in subsequent years, and issued in 2011. The value of credit constitutes c. 1/3 of average values of current assets that is c. 33%. It is the evidence that credit, which is c. 30% of current assets, causes maintenance of the financial liquidity, and does not cause financial destabilization.

While analysing the table 5, it should be noted that the average value of issued credit amounts to PLN 295,452. It is the working capital facility, revolving in subsequent years, and issued in 2011 as well. However, in case of companies of the Łódzkie province, its worth in relation to current assets is c. 6/10, so it is 65% of the credit's worth in relation to current assets. In this case, it can be seen clearly that companies maintain the financial liquidity harder with such debts. Moreover, the group of companies suffering loss reduced only from 18 to 14 in the year of incurring credit. As late as in 2012-2015, the group decreased to 14 companies. But in the Opole province, the number of companies suffering loss decreased four times – from 20 to 5 with 30% relation of incurred credit to current assets, while in the Łódzkie province, the number of such companies decreased from 18 to 14 with c. 65% relation of incurred credit to current assets.

In conclusion, too heavy burden with debt and relying on foreign capital (over 65% of the current assets' value) leads to disturbance of the company's financial liquidity because the company is not able to pay such debt and use obtained funds properly and sensibly. Only these companies where

foreign capital is 30% of current assets will use them sensibly and in accordance with their financial opportunities.

*Table 4 Average net profit in relation to value of long-term and current assets of studied companies of the Opole province in PLN thousands(own development based on 100 studied companies of the Opole province)*

Year	Average Net profit	Average value of Long-term assets	Average value of Current assets	Average value of assets in total	Average value of the issued credit	Average Loss
Before issuing credit						
2010	199,875 (80 companies)	450,456	658,475	1,108,931	X	225,154 (20 companies)
The year of issuing credit						
2011	205,895 (82 companies)	552,326	798,459	1,350,785	251,425	289,478 (18 companies)
After issuing credit						
2012	245,425 (85 companies)	582,954	821,258	1,404,212	X	198,487 (15 companies)
2013	263,125 (93 companies)	623,745	836,547	1,460,292	X	125,158 (7 companies)
2014	266,254 (95 companies)	639,532	840,128	1,479,660	X	134,578 (5 companies)
2015	295,365 (95 companies)	644,588	855,655	1,500,243	X	134,578 (5 companies)

*Table 5 Average net profit in relation to value of long-term and current assets of studied companies of the Łódzkie province in PLN thousands(own development based on 100 studied companies of the Łódzkie province)*

Year	Average Net profit	Average value of Long-term assets	Average value of Current assets	Average value of assets in total	Average value of the issued credit	Average Loss
Before issuing credit						
2010	180,273 (82 companies)	420,589	444,631	865,220	X	265,741 (18 companies)
The year of issuing credit						
2011	191,372 (82 companies)	440,456	450,654	891,110	295,452	266,895 (18 companies)
After issuing credit						
2012	201,985 (80 companies)	480,563	460,891	941,454	X	274,563 (20 companies)
2013	210,372 (81 companies)	490,478	479,324	969,802	X	286,451 (19 companies)
2014	234,091 (84 companies)	499,587	482,362	981,949	X	275,364 (16 companies)
2015	239,385 (86 companies)	501,564	490,698	992,262	X	268,478 (14 companies)

The credit risk taken by a bank due to granting funds was minimal in case of companies with less credit. It is demonstrated by another calculations and use of E.I. Altman's, J. Gajdka's and D. Stos's methods. Nevertheless, granting funds constituting c. 50% of the company's current assets was too dangerous both for the bank and the company.

Analysing course of economical events since the moment preceding issuing credit [9] and subsequent years of the activity's duration, five selected ratios corresponding to particular models were used. The cut-off points for two chosen discriminant analysis models were obtained.

On the example of the studied companies of the Opole province, the Altman's model shows significant improvement of the ratio in 2011 (3.45), when companies incurred credit, in relation to 2010 (3.12). Improvement of the selected companies' financial condition proves the above. In subsequent years, this value is the same, and in 2015, increases to 4.17.

The J. Gajdka's and D. Stos's model also indicates values above the cut-off point from 0.79 to 1.06 in 2010-2015. Only in companies suffering from loss the cut-off's ratio tends to deteriorate with the use of both methods, which proves that even properly selected credit does not improve the companies' financial liquidity. The values described above present research included in the table 6.

In turn, in the table 7, E.I. Altman's, J. Gajdka's and D. Stos's models were also used during research of companies of the Łódzkie province. The above research shows that companies, which maintained the financial liquidity with incurring credit, improved their financial condition, but their cut-off point's ratio are different from ones noted in the Opole province.

In the E.I. Altman's model, improvement can be seen in 2010-2015 – ratio's value increased from 3.00 to 3.80. Whereas in the J. Gajdka's and D. Stos's model, the ratio's values increased from 0.60 to 0.86. It means that credit's worth constituting 65% of the current assests' worth is too

heavy burden, and prevents from significant improvement of the financial liquidity. Moreover, it does not show the ratio similar to the one obtained in research in the Opole province.

Furthermore, the cut-off points' values of the companies showing net loss in the Łódzkie province do not show

significant improvement of the financial liquidity, but they slightly vary in 2010-2015. In the E.I. Altman's method, they vary from 1.20 to 1.52, and in the J. Gajdka's and D. Stos's method – from 0.29 to 0.38.

*Table 6 The use of E.I. Altman's, J. Gajdka's and D. Stos's discriminant analysis models on the example of 100 studied companies from the Opole province (own development on the basis of data of 100 selected from the Opole province)*

<i>E.I. Altman's model</i>	2010	2011	2012	2013	2014	2015
The number of companies showing profit	80	82	85	93	95	95
The average "Z" ratio for companies	3.12	3.45	3.32	4.11	4.15	4.17
Absence of risk, values close to and above 3.0	low	absence	absence	absence	absence	absence
The number of companies showing loss	20	18	15	7	5	5
The average "Z" ratio for companies	1.98	2.36	1.95	1.72	1.80	1.83
Absence of risk, values close to and above 3.0	high	medium	high	high	high	high
The J. Gajdka and D. Stos's model	2010	2011	2012	2013	2014	2015
The number of companies showing profit	80	82	85	93	95	95
The average "Z" ratio for companies	0.79	0.93	0.88	1.02	1.05	1.06
Absence of risk, values close to and above 0.45	absence	absence	absence	absence	absence	absence
The number of companies showing loss	20	18	15	7	5	5
The average "Z" ratio for companies	0.31	0.39	0.37	0.34	0.33	0.35
Absence of risk, values close to and above 0.45	high	medium	high	high	high	high

*Table 7 The use of E.I. Altman's, J. Gajdka's and D. Stos's discriminant analysis models on the example of 100 studied companies from the Łódzkie province (own development on the basis of data of 100 selected from the Łódzkie province)*

<i>E.I. Altman's model</i>	2010	2011	2012	2013	2014	2015
The number of companies showing profit	82	82	80	81	84	86
The average "Z" ratio for companies	3.00	3.15	3.20	3.25	3.70	3.80
Absence of risk, values close to and above 3.0	absence	absence	absence	absence	absence	absence
The number of companies showing loss	18	18	20	19	16	14
The average "Z" ratio for companies	1.20	1.25	1.35	1.40	1.50	1.52
Absence of risk, values close to and above 3.0	high	high	high	high	high	high
The J. Gajdka's and D. Stos's model	2010	2011	2012	2013	2014	2015
The number of companies showing profit	82	82	80	81	84	86
The average "Z" ratio for companies	0.60	0.63	0.70	0.74	0.76	0.86
Absence of risk, values close to and above 0.45	absence	absence	absence	absence	absence	absence
The number of companies showing loss	18	18	20	19	16	14
The average "Z" ratio for companies	0.29	0.30	0.32	0.31	0.35	0.38
Absence of risk, values close to and above 0.45	High	high	high	medium	medium	medium

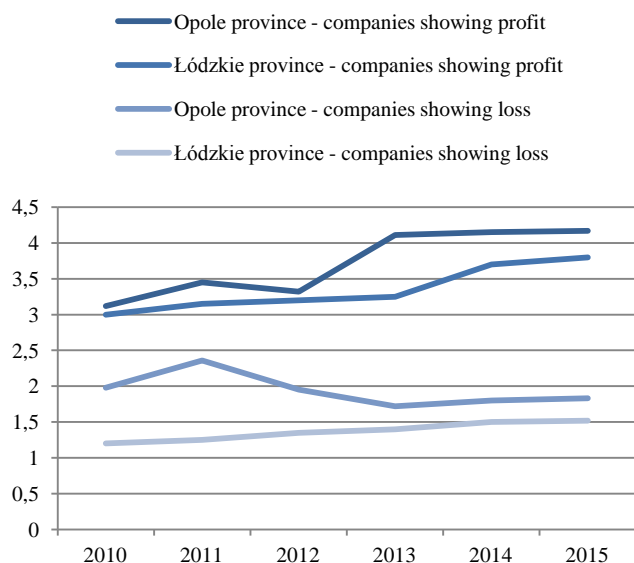


Figure 1: The use of E.I. Altman's model in the analysis of 200 companies of Opole and Łódzkie provinces showing profit and loss in 2010-2015 (own development on the basis of data of selected companies from Opole and Łódzkie provinces).

It evidences that greater worth of credit could not ensure companies satisfactory improvement of the financial liquidity, but worsened their situation.

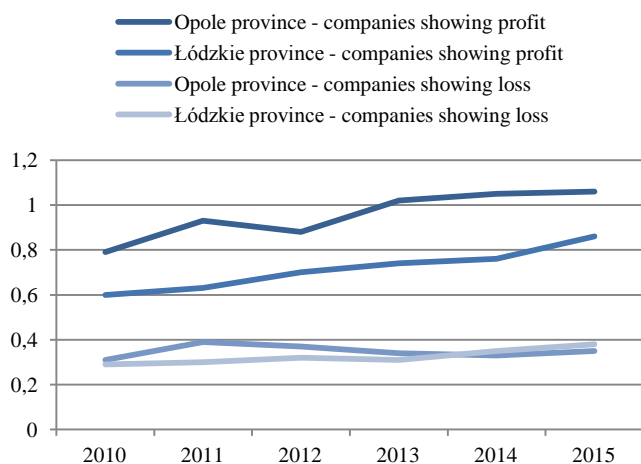


Figure 2: The use of the J. Gajdka's and D. Stos's model in the analysis of 200 companies of Opole and Łódzkie provinces showing profit and loss in 2010-2015 (own development on the basis of data of selected companies from Opole and Łódzkie provinces)

Analysing net profit of the companies, it can be noted that issued credit influenced their development positively. There, its huge influence on the companies' net income can be seen. Thanks to opportunity to incur credit, companies could develop dynamically and as they planned in their assumptions with credit constituting 30% of the current assets' worth. Only credit constituting 65% of the current

assets' worth did not cause major changes in many companies and did not lead to improvement of the financial liquidity of the greater number of companies showing net loss.

The sensibly selected credit resulted in the greater increase of net profit and contributed to the increase of net income and profit, without which the company could not develop and reach significant results.

#### 4. Conclusion

It should be emphasised that contracted credit in studied companies contributed to improvement of the financial liquidity. However, it was mostly in case of companies, whose credits were c. 30% of the current assets' worth. Furthermore, in case of companies of the Łódzkie province, whose credits were 65% of the current assets' worth, the financial liquidity was not improved as much as in case of lower credits incurred by the studied companies of the Opole province. Nevertheless, credits enabled companies to settle current liabilities, which is proven by lessened number of companies suffering from net loss because such a phenomenon occurred in the group of 100 studied companies in 2010-2015. Therefore, companies maintained good financial condition after issuing credit. It should be stated clearly that the decision on incurring credit was, indeed, correct. But it should be borne in mind that the amount of incurred credit must not exceed specific worth preventing from repaying incurred credit and settling liabilities, which could lead to the company's inability to debt service. That is why c. 30% of the company's current assets' value, resulting from research of the companies, is the optimal amount.

The period, for which credit was incurred, is highly significant, but the studied companies contracted the working capital facility for one year with the possibility to renew it in subsequent years, which did not affect research and cause its distortion.

The companies that had unevenly balanced liquidity or needed additional financial resources for the functioning on the market, and that took up a credit above the value exceeding 65% of the external funds in relation to their current assets, did not maintain the liquidity, and only 4 companies improved it in relation to 14 companies that were at risk of bankruptcy, which was reported in the Łódzkie Voivodeship. While the number of companies in Opole Voivodeship, which improved their liquidity, is 15, that is several times more than in Łódzkie Voivodeship, but the improvement occurred thanks to a taken credit, however the debt amounted only to 30% of the external funds in relation to their current assets. Therefore, there must be a firm answer that the credits that are incurred in the form of cash and account for more than 65% of the external funds in respect of current assets will not have a good impact on the financial condition of the studied companies, since such a capital obligation and interest liability constitutes a major burden for the company, which must within next months, after a credit was incurred, pay it back to the bank.



## References

- [1] Antonowicz P., „Własności wskaźnika rentowności sprzedaży brutto oraz produktywności majątku w prognozowaniu i ocenie zagrożenia upadłością przedsiębiorstw”, w: "Czas na pieniądz. Zarządzanie Finansami. Mierzenie wyników przedsiębiorstw i ocena efektywności inwestycji", Zeszyty Naukowe Uniwersytetu Szczecińskiego nr 760, Finanse, Rynki Finansowe, Ubezpieczenia nr 59, 2013, pp. 11-20.
- [2] Czekaj J., „Rynki, instrumenty i instytucje finansowe”. Praca zbiorowa pod redakcją J. Czekaj, Warszawa, PWN, 2008, pp. 10-17.
- [3] Czerwiński S., Spiak J. Nietupski T., “Calculation parametres de la regulation dans l’entreprises agricole”. Nimes, CIOSTA, 1980, pp. 44 - 55.
- [4] Dowgiałło Z., „Upadłość małych i średnich przedsiębiorstw w świetle badań”, Szczecin, „Firma i rynek” Zachodniopomorska Szkoła Biznesu Szczecin 2002 nr 2/3, pp. 122 - 124.
- [5] Gabrusiewicz W., „Analiza finansowa przedsiębiorstwa, teoria i zastosowanie”, PWE, Warszawa, 2014, pp. 245-261
- [6] Jaworski, W. L., „Bankowość”. Praca zbiorowa pod redakcją W.L. Jaworskiego i Z. Zawadzkiej, Warszawa, Poltext 2001, pp. 638-641.
- [7] Nowak E., „Analiza sprawozdań finansowych”, PWE, Warszawa, 2014, pp. 185-194.
- [8] Parvi R., (2015) „Forecasting correctness of incurring credit with the aid of E.I. Altman’s, J. Gajdka’s and D. Stos’s discriminant analysis models on the example of 200 studied companies from Opole and Podkarpackie provinces”, Czech Technical University in Prague, pp. 141-149.
- [9] Pomykańska B., Pomykański P., „Analiza finansowa przedsiębiorstwa”, Warszawa, PWN, 2007, pp. 178-189.
- [10] Rutkowski A., „Zarządzanie finansami”, PWE, Warszawa, 2007, pp. 420-429.
- [11] Zarzecki D., „Analiza dyskryminacyjna jako metoda oceny zagrożenia bankructwem”. W: Zarządzanie finansami. Mierzenie wyników i wycena przedsiębiorstw. Szczecin, Uniwersytet Szczeciński 2003, pp. 173-181.

## ANALYSIS OF THE CHEMICAL SECTOR IN POLAND ON THE EXAMPLE OF CHEMICAL INDUSTRY COMPANIES QUOTED ON THE STOCK EXCHANGE

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**Abstract:** *this paper examines share price of the companies listed on the WIG-CHEMIA and their fair value between 2006-2015. Data from 2006 to 2015 were collected from the Stooq.pl (Polish portal of shares). Two hypotheses are tested: (1) value of the shares based on the market price; (2) value of the shares as the fair value of shares.*

**Keywords:** *chemistry, fair value of the shares, company, market value of the shares*

### 1. Introduction

In Poland, the chemical sector begins to develop rapidly, and forecasts projected for the next years starting from 2015 define clearly the rate of growth of this sector. In 2015, there will be further acquisitions and mergers that will result in the strengthening of the chemical sector. In recent years, the Grupa Azoty [the Azoty Group], the greatest company, has been founded. It is a brand that represents Poland in the global markets. The main areas of activity of the Group are the production of mineral fertilisers, caprolactam, construction materials, and other highly processed chemicals. The Grupa Azoty is the largest supplier of ammoniac and phosphoric acid, as well as the one of the largest producers of compound and nitrogen fertilisers in Europe [9].

### 2. Fair value of listed companies

Share price of the companies listed on the Stock Exchange should reflect also their fair value. The fair value can be defined in several ways. In view of the foregoing, the fair value is a value used repeatedly in accounting, and thus in Article 28 (6) of the Accounting Act of 29.09.1994 as "the amount for which a given asset component could be exchanged, and the liability could be paid on market transaction terms between interested and well-informed, unrelated parties.

In view of whether the price of shares that are quoted on the stock exchange corresponds to their fair value, should be found in the value alone, since, after all, the values may be diverse, like the value of a similar company, producing similar goods and operating in the same industry, will also be diverse for various reasons.

The subject of trade covers minority shares, and the main market participants are retail investors or minority institutional investors, thus the price of shares should reflect the fair value characterizing the liquid minority interest.

The value presented in this way seems righteous, which is confirmed by the premium paid by the investors who announce calls for subscription for shares and plan in this way the purchase of the controlling interest. Then the premium reflects the difference between the level of liquid minority interest and the level of controlling interest.

Sometimes the level takes into account benefits resulting from synergy. An investor purchasing the controlling interest in this way receives premiums that appear after taking over control of a company, in the form of funds, business management and making a number of strategic decisions.

The fair value of the share price should be determined in accordance with the idea of capital market, namely the market participants should have equal access to data, information and all messages concerning a given company [10, 11]. However, the investors are divided into three groups:

- a) People with access to the most closely guarded information that affects the price and the business value, namely those can the company's management board or shareholders,
- b) Institutional investors with blocks of shares with simultaneous access to the company's management board,
- c) Individual investors who have access to public information.

There is one premise more to determine the fair value of share price. The investors are fond of investing in shares, namely they buy them as in the past they managed to earn on them and they feel that presently the share price is ideal and reflects their fair value and will enable them to obtain fair dividend in the future [1, 3].

Such a purchase or sale of shares can largely overestimate or underestimate the share value of a quoted company. Here the chemical industry may serve as an example, namely shares in chemical companies at the beginning of the new millennium, when shares in these companies were being purchased without any analysis in technical terms, but looking at their name and value, which was increasing overnight. In view of the foregoing, this led to excessively high business value above its fair value.

The share price should thus reflect the fair value of a company listed on the Warsaw Stock Exchange. For the value of these companies be fair, the market must make available to all investors information regarding companies listed on the Warsaw Stock Exchange [12]. The shareholders should be treated equally; therefore we cannot distinguish majority shareholders as those who

should have information unavailable for minority shareholders. First of all, shares should be liquid securities, therefore they should be in free float and have real-time transferability, namely at any moment and at any time during the office hours of the Warsaw Stock Exchange on a business day.

### 3. Analysis and valuation of the chemical sector's companies quoted on the Warsaw Stock Exchange (WSE) in Poland

The WIG-CHEMIA index, presented in Figure 1, shows that from 2007 to December of 2008, the chemical sector's companies in Poland showed a downward trend in their values. However, since the first quarter of 2009, it has been possible to notice a significant upward trend, in which the augmentation and consolidation at the level of 14,827 points on the index take place. The values reported on October 08, 2015 reflect the upward trend and confirm it. However, the market values do not reflect their fair value.

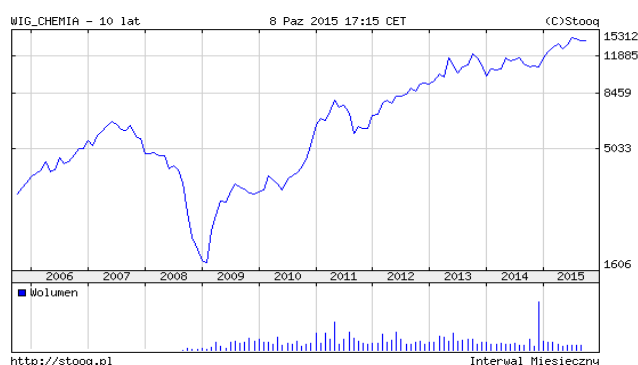


Figure 1: WIG-CHEMIA in the period from 01.2006 to 10.2015 [14].

The WIG-CHEMIA index, presented in Figure 1, shows that from 2013 to the first quarter of 2014, the chemical sector's companies in Poland showed a downward trend in their values.

However, since the first quarter of 2014 it has been possible to notice a significant upward trend. The values reported on 08.10.2015 reflect the upward trend and confirm it. However, the market values do not reflect their fair value.

In such a market, the introduction of new technologies and the beginning of a new era in chemical, and good financial conditions, the fair value should be included in the market value, however, the market value differs from it due to some other external factors on the financial market and even speculative factors in the development of the share price of the chemical companies quoted on the Warsaw Stock Exchange in Poland [3, 4].

In the chemical sector, it is possible to record one company, the value of which approached to its maximum price on 08.10.2015, and this is MERCATOR. The remaining companies did not have its maximum or even fair value, though they can show the net profit and good financial condition, and it is GRUPAAZOTY. Some companies were overvalued by even 48%. These

companies are CIECH and 15% POLICE. However, the flagship companies, such as POLICE and SYNTHOS, stay ahead (Table 1-2) [5, 6].

Table 1 The Chemical sector's companies quoted on the Warsaw Stock Exchange in Poland as of 08.10.2015 (own development based on the data of the Warsaw Stock Exchange)

Name	Average rating	rating
CIECH	3.5/5.0	BB
GRUPAAZOTY	4.0/5.0	AA+
MERCATOR	4.0/5.0	BBB
PCCROKITA	4.0/5.0	No data
POLICE	3.0/5.0	BBB
SYNTHOS	4.0/5.0	AA+

Table 2 The Chemical sector's companies quoted on the Warsaw Stock Exchange in Poland as of 08.10.2015 (own development based on the data of the Warsaw Stock Exchange)

Name	Current price PLN	Maximum price PLN from the beginning of the stock exchange quotation
CIECH	71.60	136.10
GRUPAAZOTY	88.10	91.21
MERCATOR	18.25	18.43
PCCROKITA	39.60	41.40
POLICE	24.70	28.85
SYNTHOS	3.84	4.88

Table 3-4 presents the key ratios that show the financial condition of the chemical sector's companies. Within the six examined companies, the generated profit per share was reported in 6 companies. It shows that the chemical companies prosper properly on the financial market and are able to record higher or lower profits. However, the profit was not reported in one company, and it was PCCROKITA [5, 6].

The price to the operating earnings shows the profit of the companies, and this state of affairs was reported in six stock exchange quoted company, and they were CIECH, GRUPAAZOTY, MERCATOR, PCCROKITA, POLICE and SYNTHOS. CIECH generated a positive digit ratio, and the other companies, PCCROKITA and POLICE generated a positive one-digit ratio but it is a satisfactory result.

Table 3 Technical evaluation of the Chemical sector's companies quoted on the Warsaw Stock Exchange in Poland as of 08.10.2015 (own development based on the financial data of the of the Warsaw Stock Exchange)

Name	P/OE (price/ operating earnings)	P/BV (price/ book value)
CIECH	9.19	3.32
GRUPAAZOTY	16.04	1.26
MERCATOR	10.57	2.31
PCCROKITA	No data	No data
POLICE	11.75	1.59
SYNTHOS	10.50	2.36

In contrast, analysing P/BV and P/P, it should be noted that both the price to the book value and the price to profit demonstrate that six companies operate exemplary on the market and have a value of about 1.0, and these are: CIECH, GRUPAAZOTY, MERCATOR, POLICE and SYNTHOS [5, 6].

Other companies do not significantly differ from the average values, and these are PCCROKITA.

*Table 4 Technical evaluation of the Chemical sector's companies quoted on the Warsaw Stock Exchange in Poland as of 30.06.2015 (own development based on the financial data of the Warsaw Stock Exchange)*

Name	P/P (price/profit)	Profit per share
CIECH	1.16	No data
GRUPAAZOTY	0.88	1.530
MERCATOR	0.82	0.404
PCCROKITA	No data	0.717
POLICE	0.71	0.729
SYNTHOS	1.16	0.117

Table 5-6 presents the studies concerning, among others, the net profit, depreciation, EBITDA and assets of the chemical sector's companies.

According to the obtained values, it is clear that all companies CIECH, GRUPAAZOTY, MERCATOR, PCCROKITA, POLICE and SYNTHOS showed a profit, which was confirmed by the previous ratios included in Table 2.

*Table 5 Technical evaluation of the Chemical sector's companies quoted on the Warsaw Stock Exchange in Poland as of 30.06.2015 (own development based on the financial data of the Warsaw Stock Exchange)*

Name	Net profit (net loss) in thousands PLN	Depreciation in thousands PLN
CIECH	86248	0
GRUPAAZOTY	151798	0
MERCATOR	2620	1554
PCCROKITA	14277	12103
POLICE	54680	0
SYNTHOS	154496	39540

*Table 6 Technical evaluation of the Chemical sector's companies quoted on the Warsaw Stock Exchange in Poland as of 30.06.2015 (own development based on the financial data of the companies quoted on the Warsaw Stock Exchange in Poland)*

Name	EBITDA in thousands PLN	Assets in thousands PLN
CIECH	123652	3322529
GRUPAAZOTY	172255	10199880
MERCATOR	5455	154940
PCCROKITA	30023	1213778
POLICE	64921	2043565
SYNTHOS	232610	4950572

*Table 7 The Chemical sector's companies quoted on the Warsaw Stock Exchange in Poland as of 30.06.2015 (own*

*development based on the data of the Warsaw Stock Exchange)*

Name	Book value per share in PLN
CIECH	No data
GRUPAAZOTY	62.104
MERCATOR	10.523
PCCROKITA	27.014
POLICE	14.317
SYNTHOS	1.614

According to the book value per share, it is possible to deduce that some companies are overvalued, and these are GRUPAAZOTY, MERCATOR, PCCROKITA and POLICE, and in the case of the SYNTHOS company, undervalued (Table 7).

However, it is important not to follow this opinion because the values are only the book values, and the calculation of them is purely mathematical and financial. In the case of using the economic attitude and interpretation, it would occur that the companies do not have the fair value [2, 7, 8, 11, 13, 14].

The profitability of the equity as well as the profitability of assets is shown by CIECH, GRUPAAZOTY, MERCATOR, PCCROKITA, POLICE and SYNTHOS. Therefore, according to the presented study, it is possible to observe that the flagship chemical concerns have the profitability and they are not threatened by any disturbance of the financial liquidity (Table 8).

*Table 8 The Chemical sector's companies quoted on the Warsaw Stock Exchange in Poland as of 30.06.2015 (own development based on the data of the Warsaw Stock Exchange)*

Name	ROE	ROA
CIECH	9.58	3.58
GRUPAAZOTY	5.14	3.97
MERCATOR	11.27	6.19
PCCROKITA	11.75	5.93
POLICE	7.94	4.41
SYNTHOS	88.92	34.47

Currently, the value of companies significantly deviates from the maximum value achieved a few years ago. The only one exception is GRUPAAZOTY, which achieved the maximum value in its history. Other companies have the value less than 48%, and even 5% of the maximum one (Table 9).

*Table 9 The Chemical sector's companies quoted on the Warsaw Stock Exchange in Poland as of 08.10.2015 (own development based on the data of the Warsaw Stock Exchange)*

Name	Current value	Maximum value
CIECH	71.60	136.10
GRUPAAZOTY	88.10	91.21
MERCATOR	18.25	18.43
PCCROKITA	39.60	41.40
POLICE	24.70	28.85
SYNTHOS	3.84	4.88

*Table 10 The Chemical sector's companies quoted on the Warsaw Stock Exchange in Poland as of 08.10.2015 (own development based on the data of the Warsaw Stock Exchange)*

Name	Fair value	Deviation from the fair value in PLN
CIECH	120.00	48.40
GRUPAAZOTY	91.00	2.90
MERCATOR	19.00	0.75
PCCROKITA	41.00	1.40
POLICE	26.00	1.30
SYNTHOS	4.50	0.66

However, the fair value which should be reflected by the share prices of the examined companies significantly differs from the calculated value, which was presented in Table 10. In some cases, it is even 48% of the current value. The fair value is considerable higher than the current value of the examined companies, and only similar in one company, GRUPAAZOTY.

#### 4. Conclusion

The share price of the chemical sector's companies quoted on the Warsaw Stock Exchange in Poland is significantly underestimated by the current financial situation in the world, especially when companies' values are so unstable. Indeed, the chemical companies should show higher values, at least a fair one because the Polish chemical market is developing splendidly, and it promises even faster development. Currently, both the domestic production and the export are growing very fast. Those are not only occasional transactions; the demand for chemical products is growing in various sectors, which is related to the increased production.

Last year, the chemical sector's companies reported large profits and increased turnover in comparison to the previous years. However, in some cases, they are still underestimated by investors, which results in their low stock exchange value. The example of such company is GRUPAAZOTY which, increasing its production and market dominance not only in Poland, but also in the world, should be estimated at least PLN 62.104 per share.

The fair value of the chemical sector's companies quoted on the Warsaw Stock Exchange in Poland should be reached within two years, that is up to 2017 because it is the right estimation of further fast development of the Polish chemical sector.

#### References

- [1] Borowski K., „Wyznaczanie punktów zwrotnych indeksu Wig przy pomocy wybranych metod analizy czasowej”. *Bossa.pl*, pp. 1-5.
- [2] Jajuga K., Jajuga T. „Inwestycje”. Wydawnictwo Naukowe PWN, Warszawa 1996, pp. 34-57.
- [3] Jędrzejczak M., „Estymacja wartości godziwej. Podejście symulacyjne”, Powszechne Wydawnictwo Ekonomiczne, Warszawa 2011, pp. 133-138.
- [4] Parvi R., “Share price of the companies listed on the WIG-UKRAINE and their fair value”, Share price of the

companies listed on the WIG-UKRAINE and their fair value”, Itall Ltd., 2014, pp. 179-185.

[5] Parvi R., “Investment funds and their financial effectiveness”, Goce Delchev University Macedonia & THOMSON Ltd. Slovakia, *EDIS* - Publishing Institution of the University of Zilina, 2014, pp. 262-267.

[6] Parvi R., “Share price of companies listed on WIG20 and their fair value”. *EDIS* - Publishing Institution of the University of Zilina EIIC – 3 rd Electronic International Interdisciplinary Conference 2014, pp. 169-177.

[7] Pastusiak R., “Przedsiębiorstwo na rynku kapitałowym”. Wydawnictwo CeDeWu, Warszawa 2010, pp. 34-46.

[8] Pierce R., “Stocks, Options & Spreads, Infinity Publishing” 2004, pp. 110-115.

[9] Starzyk S., „Gazeta finansowa 24” - <http://gf24.pl/wp-content/uploads/2015/01/chemia.pdf>, pp. 1

[10] Thompson B., “Stock Market Superstar”, Insomniac Press 2008, pp. 52-54.

[11] Veale S., “Stocks, Bonds, Options, Futures”, Prentice Hall Press 2001, pp. 88-125.

[12] Zieliński T., „Gazeta finansowa 24”, <http://gf24.pl/wp-content/uploads/2015/01/chemia.pdf>, pp. 2., accessed: January 25th, 2015.

[13] Bankier.pl., „Rynki, giełda, notowania GPW”, <http://www.bankier.pl/gielda/notowania/akcje>, accessed: January 27th, 2015.

[14] Stooq.pl, “WIG-CHEMIA”, [stooq.pl/q/?s=wig\\_chemia](http://stooq.pl/q/?s=wig_chemia), accessed: October 10<sup>th</sup>, 2015.

## PURSuing HAPPINESS AT WORK: THE INFLUENCE OF BUSINESS MANAGEMENT (IN A POLITICAL SPHERE) ON SUBJECTIVE WELLBEING BY TAKING CARE ON ECONOMIC FACTORS

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**Abstract:** *The pursuit of happiness is constantly gaining importance in nowadays society. Throughout history, the search for a fulfilling life used to be the chief goal for all human beings. Despite everyone is sure that happiness and contentment is desirable, no one seems to know exactly what it is or how it can be achieved. The question that arises is: What makes up a long-life contentment especially in the place of working conditions? This paper discusses the contribution of business management (in a political sphere) on the subjective happiness by taking care on economic factors. The paper gives a short overview of the term happiness and clarifies factors, that influence happiness at work. Furthermore, it should be able to elicit information up to a set of relevant issues, such as income and different circumstances with illustrating their influence on the subjective wellbeing especially in working place matters.*

**Keywords:** *happiness, workplace, business management, politics*

### 1. Introduction

Throughout history, mankind has been constantly searching for happiness. To give an example, Aristotle identified happiness as the chief and final good in his first book of the Ethics. Nowadays, the Western world is caught up in culture of happiness. According to Stearns [1], it was only in the 18<sup>th</sup> century that the values of the Enlightenment ushered in the notion that happiness was the attainment of a worthy life. In his mind, since there the pursuit of happiness has gained momentum and spread to every aspect of behavior, from religion and politics to work and parenting.

Despite everyone is sure that happiness is desirable, no one seems to know exactly what it is or how it can be achieved, especially in workplace matters. In fact, happy people work more efficiently, have more energy, are more optimistic, learn faster, are fewer sick, make fewer mistakes and make better decisions. Many studies confirm, where the employees enjoy working, those companies and organizations are more productive.

But happiness can be found where the least expect it: at work. Here, the subjective wellbeing of employees is mostly the company's financial success. In order trying to find an answer to the question what makes employees happy and content at work, numerous articles did already research on this specific topic. There are lots of approaches, but unfortunately no clear answer is found yet. It is possible that happiness stands in a relationship with specific factors. Politics and economics have always been influenced from the idea that income and consumption are closely linked with happiness. The more one earns, the more happy and carefree he should be – a basic understanding. Stearns [1] describes in his paper that some experts argue that happiness is an inborn trait, so urging a person to become happier is like insisting she or he becomes taller.

### 2. Overview

According to Diener, Sandvik & Pavot [2] is subjective wellbeing a very general concept, which has different

aspects and refers to how a person evaluates his or her life. Based on Diener et al's [2] definition, it can be summarized that work-related wellbeing illustrates the situation where an employee is 1) satisfied with his or her job and 2) experiences frequent positive emotions, such as joy and happiness, and infrequent negative emotions, such as sadness and anger.

Diener and Seligman [3] note that a widely presumed component of the good life is happiness. Unfortunately, the nature of happiness has not been defined in a uniform way yet. But happiness can be, according to Diener and Seligman [3], associated with pleasure, life satisfaction, positive emotions, a meaningful life, or a feeling of contentment, among other concepts. Furthermore, Diener [4] takes the view that subjective wellbeing consists of three components: Life satisfaction, the existence of positive excitations, and inexistence of negative excitations.

Engagement refers to psychological state in which individuals report being absorbed by and focused on what they are doing, describe Forgeard et al. [5] in their paper. Csikszentmihalyi [6] refers that high levels of engagement are characterized by the following characteristics: The individual has clear goals and is intrinsically interested in the task at hand; the task presents challenges that meet the skill level of the individual; the task provides direct and immediate feedback to the individual; the individual retains a sense of personal control over the activity; and action and awareness become merged, such that the individual becomes completely immersed in what he or she is doing. In conclusion, Csikszentmihalyi [6] defines engagement - at its high end - as "flow", or the overall feeling referred to as "being in the zone".

### 3. The correlation between income and happiness

Stutzer & Frey [7] describe in their study that people with higher income have more opportunities to attain whatever they desire. In fact, they can buy more material goods and

services. As a result, it is often taken as self-evident that higher income and consumption levels provide higher wellbeing. Furthermore, Stutzer & Frey [7] take the view that economics assumes that people always know what is best for them and make decisions accordingly.

### 3.1 Income and hierarchical needs

The belief that high income is associated with good mood is widespread but mostly illusory. According to lots of studies are people with above-average income relatively satisfied with their lives, but barely happier than others in moment-to-moment experience, tend to be more tense, and do not spend more time in particularly enjoyable activities. Moreover, the effect of income on life satisfaction seems to be transient.

Borrero et al. [8] consider that many people persist in acquiring more and more things in an often futile attempt to become happier, especially in materialist, western-world countries. Rather than feeling satisfied, as soon as a person attains material goal he or she will naturally look for a higher (more costly) goal. And this will, as a conclusion, cause dissatisfaction, not only because there always will be something more to look for, but also because of social comparison, given that there will be someone else with a higher income and profession than him or her. Furthermore, Borrero et al. [8] conclude that once the basic needs are satisfied, fulfillment of higher order-needs will become more important, which could account for diminishing returns of increasing wealth.

But in opposite, Graham [9] notes that rising aspirations, relative income differences and security gains might cause wealthy people feel insecure (e.g. unhappy) because they are worried about protecting all their possessions. This would explain why some people actually feel unhappier when they become richer.

Easterlin [10] found out in his study that income provides happiness at low levels of development, but once a certain threshold has been passed, income has little or no effect on happiness. Therefore, income is related to the level of reported happiness. In terms of salary, one study by Dan Gilbert reported that Americans who earned \$ 50,000 per year were much happier than those who earned \$ 10,000 per year, but Americans who earned \$ 5 million per year were not much happier than those who earned \$ 100,000 per year, describe Robertson & Cooper [11] in their study. Global surveys that ask people about the content of feeling with their lives as a whole are one of the best sources of information. Most of them have to rate their sense of wellbeing or happiness on a scale of 1 (not at all) to 7 (completely satisfied). Robertson & Cooper [11] figured out, that the average scores of 5.8 were reported by American Millionaires, Inuits of Northern Greenland and the Masai Tribe of Kenya, where there is a difference between different levels of luxury in their lives.

There are used to be at least two factors that have been identified as playing a part in the case above. There should be a separation between “needs” and “wants”. Robertson & Cooper [11] take the view that lots of studies confirm the fact, that this choice is important in happiness, but only up to a point, after which it becomes overwhelming and

possibly leaves people worrying that they could have chosen something better than they did. Moreover, according to Robertson & Cooper [11], “wants”- things that are nice to be able to afford - have the habit of becoming “needs” (e.g. the Internet) and satisfying needs bring less emotional wellbeing than satisfying wants.

Maslow’s hierarchy of needs [12] distinguish five basic needs: Physiological needs (food, drink, shelter, clothing), safety needs (a safe, orderly, predictable, organized world), needs for belonging and love (affectionate relations, friends, wife, children), esteem needs (strength, competence, mastery and prestige, reputation, status, recognition, dominance) and needs for self-actualization (life, wholeness, truth, goodness, justice, honesty, beauty, playfulness, freedom). Maslow [12] defines that a lower need has to be satisfied to a certain degree, before higher needs can emerge and express themselves. Furthermore, Maslow [12] describes that behavior is mainly driven by existentialist needs, any increase in material wellbeing will contribute to satisfy survival and subsistence needs and will therefore make people happier. Tey & Diener [13] found out in their study, that fulfillment of a diversity of needs - as defined by Maslow [12] - do appear to be universal and important to individual happiness.

In opposite, the two-factor theory of Herzberg [14] posits that job satisfaction is affected by two sets of factors, namely hygiene and motivation factors. According to him, hygiene factors are related to survival needs (e.g. pay, working conditions, collegiality and corporate policies). In contrast, motivation factors are related to growth needs (e.g. achievement programs, recognition awards, career advancement opportunities). The two-factor theory of Herzberg [14] argues that job satisfaction can be enhanced by developing conditions and programs at work that serve to satisfy both survival needs (e.g. safety and economic needs) and growth needs (e.g. esteem, social, self-actualization, knowledge).

## 4. Circumstances and happiness

A range of circumstances influence subjective wellbeing and happiness, such as the factors work, culture, geographical location and physical environment, life events, wealth, education and flow.

### 4.1 Work

Benz & Frey [15] illustrate in their study, that people who are self-employed, are substantially more satisfied with their work than the employed. The authors document this relationship for a large number of countries and investigate, why the self-employed are happier with their jobs. The results indicate that differences in material outcomes, like higher pay or lower number of working hours, as well as potential differences in personality cannot account for the observed job satisfaction differences. According to Benz & Frey [15], the higher job satisfaction among the self-employed can be directly attributed to the greater independence and autonomy they enjoy. Furthermore, self-employment is an important implication, because being “your own boss” means greater freedom in the work environment and is therefore an important source of happiness at work.

## 4.2 Culture

Carr [16] describes in a study that there is an association between subjective wellbeing and living in an affluent stable democracy devoid of political oppression and military conflict. Cultures in which there is social equality have higher mean levels of subjective wellbeing. Therefore is, according to Carr [16], subjective wellbeing greater in individualist cultures than in collectivist cultures. Moreover, Carr [16] notes that happiness is also associated with important features of government institutions and found out in studies that the subjective wellbeing is higher in welfare states, in countries in which public institutions run efficiently, and in which there are satisfactory relationships between the citizens and members of the bureaucracy.

## 4.3 Geographical location and physical environment

Ulrich et al. [17] take the view that people report positive feelings in geographical locations, where there is vegetation, water and panoramic views. In context of the work place, Diener et al. [18] figured out that having to commute long distances to work diminish wellbeing.

## 4.4 Life events

Brickmann, Coates & Janoff-Bulman [19] compared in their study lottery winners to patients with spinal cord injuries and presented dramatic evidence that both extremely positive and extremely negative have a relatively weak relation to happiness. In their study they found out that lottery winners were not happier than non-winners, but that the people with spinal cord injuries were significantly less happy than winners and controls. To sum up, lottery winners were not particularly happy and accident survivors not particularly sad.

Furthermore, the study of Brickmann, Coates & Janoff-Bulman [19] illustrates that human beings can and do adapt to many life events, and that those life events do not have a significant long-term effect on one's subjective wellbeing. According to them, large-scale longitudinal projects revealed that people do not adapt to drastic changes in life circumstances such as becoming disabled, divorced or unemployed.

According to Wilson, Meyers & Gilbert [20] people often overestimate the impact future events will have on their happiness, because to the extent that people have experienced similar events in the past, a reasonable strategy would be to use their memories of their past affective experiences to predict their future ones.

Lyubomirsky [21] describes different myths of happiness, namely the belief that certain adult achievements (e.g. marriage, kids, jobs, wealth) will make us forever happy and that certain adult failures or adversities will make us forever unhappy. According to Lyubomirsky [21], the first and general happiness myth is the thinking of I'll be happy when I'm rich, or when I'm married and so on. Lyubomirsky [21] is of the opinion, that the false promise is not that achieving those dreams won't make us happy. In fact, they almost certainly will. But the problem is that these achievements – even when initially perfectly satisfying – will not make us intensely happy (or for as

long) as we believe they will. As a conclusion, when our goals have been fulfilled, it does not make us happy as expected. Therefore, we feel like there must be something wrong with us. Another happiness myth of Lyubomirsky [21] is the belief that when a negative change of fortune befalls us, our reaction is often supersized and we feel like we can never be happy again and oft-times that our life is now over. But according to Lyubomirsky [21] with age, responsibilities and losses heap up and life becomes more complicated, more challenging and sometimes more confusing.

## 4.5 Wealth

Compared with poor people, wealthy people are healthier, live longer, have fewer stressful life events, are less likely to drop out of education, have fewer teenage pregnancies and are less victims of violent crime. All this results from a study of Carr [16]. Interesting in this context is the fact that for people, who enjoy their work, earning money is a pleasant activity, because in most societies wealth gives people higher social status and greater control over many aspects of their lives.

## 4.6 Education

Michalos [22] describes that the education level is positively correlated with happiness, socioeconomic status, health and longevity. Furthermore, lots of studies have analyzed educational level with measures of happiness, either using the level attained or the number of years of education received. Campbell [23] takes the view that the effect of education is weakest in the United States. In opposite, Veenhoven et al. [24] observed that education has more effect in Austria, South Korea, Mexico, the Philippines and Nigeria.

## 4.7 Flow

Csikszentmihalyi [6] found out that people are happiest when they are engaged in interesting activities that match their level of skill. He calls the state of mind that results from this matching of challenges and skill "flow" and argues that people who often experience "flow" tend to be very happy.

Harvard Business Review [25] started research over seven years to find out factors that are thriving in the workplace and in opposite, factors that enhance or inhibit it. Across several studies they surveyed or interviewed more than 1,200 white- and blue-collar employees in an array of industries, including higher education, health care, financial services, maritime, energy and manufacturing. Harvard Business Review [25] identifies two components of thriving in their study. The first is "vitality", in the sense of being alive, passionate and excited. According to the study, employees who experience vitality spark energy in themselves and others and companies generate vitality by giving people the sense that what they do on a daily basis makes a difference. The second component is "learning", the growth that comes from gaining new knowledge and skills. The study indicates that learning can bestow a technical advantage and status as an expert. Learning can also set in motion a virtuous cycle: People



who are developing their abilities are likely to believe in their potential for further growth. According to Harvard Business Review [25], the both work in concert. In fact, one without the other may even damage performance and is unlikely to be sustainable, because learning, for instance, creates momentum for a time, but without passion, it can lead to burnout.

## 5. References

- [1] Stearns, P., *The history of happiness*. Harvard Business Review, February Issue, pp. 104-110, 2012
- [2] Diener, E., Sandvik, E., & Pavot, W., *Happiness is the frequency, not the intensity, of positive versus negative affect*. In F. Strack, M. Argyle, & N. Schwarz (Eds.), *Subjective well-being: An interdisciplinary perspective*, New York, Pergamon, 1991
- [3] Diener, E., & Seligman, M.E.P., *Toward an Economy of Well-Being*, Vol. 5(1), pp. 1-31, 2004
- [4] Diener, E., *Subjective Well-Being*. Psychological Bulletin, Vol. 95, pp. 542-575, 1984
- [5] Forgeard, M.J.C., Jayawickreme, E., Kern, M.L., & Seligman, M.E.P., *Doing the Right Thing: Measuring Well-Being for Public Policy*. International Journal of Wellbeing, Vol. 1, pp. 79-106, 2011
- [6] Csikszentmihalyi, M., *Finding flow: The psychology of engagement with everyday life*, New York, Basic Books, 1996
- [7] Stutzer, A., & Frey, B., *Recent advances in the economics of individual subjective wellbeing*, Social Research: An International Quarterly, Vol. 77(2), pp. 679-714, 2010
- [8] Borrero, S., Escobar, A.B., Cortés, A.M., & Maya, L.C., *Poor and distressed, but happy: Situational and cultural moderators of the relationship between wealth and happiness*. Estudios Gerenciales, Vol. 29 (126), pp. 2-11, 2013
- [9] Graham, C., *Happiness around the world. The paradox of happy peasants and miserable millionaires*, New York, Oxford University Press, 2009
- [10] Easterlin, R., *Income and happiness: Towards a unified theory*, Economic Journal, Vol. 111, pp. 465-484, 2001
- [11] Robertson, I., & Cooper, C.L., *Well-being: Productivity and Happiness at Work*, Palgrave Macmillan, 2011
- [12] Maslow, A.H., *Toward a Psychology of Being*, Vol. 10, pp. 135-145, 1968
- [13] Tey, L., & Diener, E., *Needs of subjective well-being around the world*. Journal of Personality and Social Psychology, Vol. 101(2), pp. 354-365, 2001
- [14] Herzberg, F., *One more time: How do you motivate employees?* Harvard Business Review, Vol. 46, pp. 53-59, 1968
- [15] Benz, M., & Frey, B.S., *Being independent raises happiness at work*, Vol. 11, pp. 95-134, 2004
- [16] Carr, A., *Positive Psychology: The Science of Happiness and Human Strengths*, Taylor & Francis, 2013
- [17] Ulrich, R.S., Simons, R.F., Fiorito, E., Miles, M., & Zelson, M., *Stress recovery during exposure to natural and urban environments*. Journal of Environmental Psychology, Vol. 11(3), pp. 201-230, 1991
- [18] Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi, D.W., Oishi, S., Biswas-Diener, R., *New well-being measures: Short scales to assess flourishing and positive and negative feelings*. Social Indicators Research, Vol. 97, pp. 143-156, 2010
- [19] Brickman, P., Coates, D., Janoff-Bulman, R., *Lottery winners and Accident Victims: Is Happiness Relative?* Journal of Personality and Social Psychology, Vol. 36, pp. 917-927, 1978
- [20] Wilson, T.D., Meyers, J., & Gilbert, T.D., *"How happy was I anyway?" – A retrospective Impact Bias*. Social Cognition, Vol. 21(6), pp. 421-446, 2013
- [21] Lyubomirsky, S., *The how of happiness*, New York, Penguin, 2007
- [22] Michalos, A., *Education, happiness and wellbeing*. Social Indicators research, Vol. 4, pp. 2-3, 2008
- [23] Campbell, A., *The sense of wellbeing in America*, New York, McGraw-Hill, 1981
- [24] Veenhofen, R., et al., *Correlates of happiness; 7838 findings from 603 studies in 69 nations*. RISBO Studies in Social and Cultural Transformation, Rotterdam, Erasmus, 1994
- [25] <https://hbr.org/2012/01/creating-sustainable-performance/ar/pr>

## CURRENT AND FUTURE TRENDS AFFECTING THE WORK OF PUBLIC ADMINISTRATION AND DETERMINING THE WORKING ENVIRONMENT FOR INSTITUTIONS OF THE CENTRE OF GOVERNMENT: EUPAN WORK GROUP SURVEY RESULTS

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**Abstract:** Based on literature review and survey of the members of the EU Public Administration Network (EUPAN) this paper gives brief look on the current and future trends affecting work of public administration. It asks what are the trends affecting work of public administration and how it will affect the work of public administration. It concludes that the labour force ageing, technological development, and processes of economic and social integration in a medium-term will stimulate changes in the processes of human resource management, in inter-state and inter-personal communication and decision-making, as well as in reform planning and management, nevertheless, in a medium-term, they should be viewed not as radical changes, but instead as preparation for more substantial changes in a long-term. This requires flexible, qualitative, and effective system of public administration for the state to be able to prepare for changes caused by future challenges.

**Keywords:** Future trends, public administration, Centre of Government

### 1. Introduction

Over the past two years with increasing intensity various internal and external factors created challenges for Europe. 2014 frightened us and our minds were occupied with the Russian aggression against Ukraine. In addition, the Scottish independence referendum in the autumn of last year created concerns about the possible consequences of the break-up of Britain. Earlier this year, the euro area was shaken by renewed Greek economic crisis. The Greek crisis scarcely subsided when the flow of refugees across the borders inflamed passions across Europe. These and other events that mark various external and internal crises, require us to reassess the ability and capacity of national administrations in the perspective of evaluation of current development trends and scenario planning to be prepared for the challenges of the future.

Practitioner-based reports and several research projects emphasises importance of analysis and understanding of current development trends and implications for future public sector reform strategies as well as identifying the main global trends, assessing their implications and reviewing the resulting challenges and policy options confronting decision-makers [1,4]. Recent publications are addressing many issues relevant for public administrations all over the world [1, 9, 12] increasing the necessity to respond to the caused changes by revaluation of the role of management and capacity in management of global challenges. The following are mentioned as the most essential administration capacities or competences which are vitally necessary in the state administration in order to successfully manage the changes caused by global challenges:

- the abilities to foresee future challenges or strategic planning and forecasting;
- cooperation and coordination;
- development of the appropriate skills by attracting and retaining the best employees;

- development of the policy based on evidence: data collection and assessment;
- review of the efficiency principles by taking into account other increasing values of public services [11].

Recent studies emphasises an increased role of the centre of government (CoG) in planning, implementation and monitoring reforms in EU governments. Historically, attempts to scientifically justify the need for a CoG date back to 1930-ties in the USA with a slogan: "The President needs help!" management functions were introduced in the CoG operations: planning, organising, recruitment, coordination, reporting, budget planning [10]. These functions can serve as a point of reference, when considering modern-day CoG, although today they may have undergone modifications. Tasks of CoGs have been described in literature [7, 8, 10] which, upon summarising, can be divided into four main CoG areas of operations: general policy making monitoring, monitoring management, administration improvement, and improvement of cabinet operations. On the one hand, CoGs are political institutions with the purpose of ensuring political power. On the other hand, CoGs are also administrative institutions, whose structure normally is hierarchical and which are considered a non-political institution of the executive branch. Goetz proposes a distinction between four types of executive power: 1) political management, 2) art of governance, 3) bureaucratic management, 4) administrative art or art of management [6]. However, domination of a specific type in a given country depends on the correlation between political and administrative functions. The last type — administrative art or art of management — is based on a study of the hierarchical and functional specialisation levels of the bureaucratic government organisation. In this respect, issues of the importance of civil service, as well as of the effectiveness of government administration are considered. Administrative art exists in the ability to connect political

goals with the measures and timing necessary for achieving them, i.e. effective management is the ability to reach the set political goals with minimum expenditure and within a reasonable time period. In these circumstances the capacity of CoGs is of most importance to successfully manage the changes caused by global challenges. Therefore based on literature review and survey of employees of GC the role of this paper is to:

- 1) analyse current and future trends affecting work of public administration;
- 2) predict the most significant long term processes that will affect the work of public administration and determine the working environment for institutions of the centre of government.

## 2. Methods

To obtain information, a survey was conducted in a form of questionnaire regarding centres of government in EU Member States. Survey consisted of 34 questions. This article does not take into account all the issues constituting the substantial scope of the questionnaire. It is limited solely to the assessment of future challenges (18 statements). The prepared survey was sent via e-mail to the members of the EU Public Administration Network (EUPAN) — to representatives of public administration institutions of all EU Member States, as well as to Turkey and Norway, which are EUPAN members with an observer status and had demonstrated interest to participate in the survey. A total of 28 filled-in questionnaires were received, two of them from Turkey and Norway.

## 3. Research results

### 3.1 Literature review on current and future trends affecting work of public administration

A world of increasing complexity, uncertainty and rapid change this is how today's socio-economic development processes see authors of recent publication *Global Trends to 2030: Can the EU meet the challenges ahead?*. The authors refer to the five global trends, which will affect and change Europe in the next twenty years. These are 1) a richer and older human race characterised by an expanding global middle class and greater inequalities; 2) more vulnerable process of globalisation led by an 'economic G3'; 3) a transformative industrial and technological revolution; 4) a growing nexus of climate change, energy and competition for resources and 5) changing power, interdependence and fragile multilateralism [4]. Literature review shows that the most significant long-term processes which affect the work of public administration are the aging population, reduction of public expenditure, and development of technologies. Ageing population is manifested as an increased longevity and lower birth rate, thus the proportion of elderly people in society grows. Therefore ageing has a twofold impact on the public sector. Firstly, it calls for the necessity to develop public services for the needs of ageing society; secondly, it calls for the necessity to adapt the activities of the public sector itself, by taking into account the aging staff [14]. "Eurostat" forecasts show that the proportion of population in EU aged over 50 will keep increasing over the upcoming 50 years, with the average age increasing from 41.6 in 2012

to 47.0 in 2060. In 2060, per every person aged over 65 there will be fewer than two persons of working age (15–64 years old), whereas now this proportion is nearly four persons of working age per one person older than 65. Society ageing is expected in all continents of the world, but it will be manifested most starkly in Europe [5]. Adaptation of the public sector services to the needs of an ageing society will have a substantial impact on the public sector expenditure, because a smaller number of people of working age will have to maintain a larger number of people older than the working age, costs for pensions, health and social care and for solving housing issues will increase. A need will arise for new and improved services [14]. Data also point to significant ageing of people working in the public sector, especially in European countries. Data about OECD states suggest that the proportion of employees aged over 50 years in the public sector is by 26 % higher than on average in the economy [3]. For example, in Italy, 50 % of public sector staff are more than 50 years old; in Belgium, Germany, Iceland, and Sweden, the proportion of this age group exceeds 40 % [12]. Although the period since the 2008 financial crisis in many EU governments is characterized by substantial budget cuts with a continued focus on austerity-focused public administration, data shows that over the last 10 years, the proportion of the general government expenses from the GDP in EU Member States has increased, thus directly contributing to an increased fiscal deficit. Therefore, in a medium- and long-term, reduction of public expenses is expected [15]. Technological development plays a significant role in improving the public administration work. It is believed that "the digital era governance" as the leading direction in the development of the public sector has replaced "new public management". Within the context of technological development, there are extensive discussions of "the big data", the effective use of which would simultaneously allow building individualised services based on the needs of the specific individual, as well as would provide data necessary for developing evidence-based policy. Technological development also raises the need for a certain level of centralisation to achieve mutual compatibility and complementarity of technological processes and to reduce costs, by avoiding parallel, mutually replaceable solutions. At the same time, excessive centralisation jeopardises innovation and can lead to large-scale erroneous solutions [14]. Current and future trends in public sector reform have been emphasised also in the recent report by Dion Curry, Wieke Blijleven and Steven Van de Walle. Authors identify three positive and three negative public sector trends in Europe. Positive trends include improvements in cost and efficiency, increased transparency and openness and increased service quality. The developments that have been perceived as negative trends include a decrease citizens' trust in government, the decreasing attractiveness of the public sector as an employer and public sector motivation, and a decrease in social cohesion. As regards the future trends they conclude that the continuation of current trends, such as budget cuts, public procurement and privatisation, continued attention to performance and efficiency and further digitalization of public sector processes are expected [1].

### 3.2 Survey results

To identify the main challenges that the CoGs of European countries will have to face in a medium term, EUPAN working group members had to assess eighteen statements on a scale of 1 to 7, by evaluating the current (2014) and future (2025) situation development tendencies in matters related to tendencies of development of human resources in state administration, impact of technologies on co-operation and decision-making and external factors and challenges, which are affected by integration of economic and social processes of states. To evaluate each statement, the average values of each statement were calculated.

The evaluation suggests that within the next ten years, public administration and especially the CoG may be faced more with such tendencies of human resource management as ageing staff and reduced proportion of youth in state administration (see Table 1). It will be linked to general ageing tendencies in the labour force structure, but it will demand — especially at centres of government — that more attention is paid to the methods of human resource management and to practices in the work with elderly people. Experts expect that within the next decade, the role of human resources units of CoGs will increase in the analysis of data of development tendencies. Thus, it can be maintained that it will demand a more strategic approach and vision of labour force planning at CoG institutions for the part of these units, as the battle for the best employees and the ever increasing demands for a result-based policy will call for more emphasis on such aspects as employee ageing, differences between generations, diversity management, and their impact on work results. Expert forecasts also confirm the impact of technological development tendencies on the human resources management practice. Experts expect the impact of technological innovations on the time and place in state administration, by increasing the role of flexibility with regard to the working time and work place. It can be expected that the technological development will also promote movement towards results. It means that work management and control skills will have to be comprehensively reviewed and trust among managers and employees will have to be strengthened. It might be particularly important to make state administration into an attractive place of employment for young, able, and well-educated job-seekers. Experts expect that the appeal of state administration as a place of employment will increase in the future.

*Table 1 Evaluation of employment and human resource management tendencies in state administration*

Statement /Year	2014		2025	
	n	Means (S.D.)	n	Means (S.D.)
It is widely accepted practice to employ 65 years old and older persons in the public administration	26	2,54 (1,60)	24	3,83 (1,92)
Youth - employees younger than 24 are more represented in the public administration than seniors	25	2,92 (2,10)	24	3,13 (1,51)
It is widely accepted practice to transfer knowledge and experience from experienced employees	26	3,35 (1,19)	25	4,72 (1,24)

Employees can choose between work in the office and other location	26	2,23 (1,30)	25	4,56 (1,38)
Employees can plan their own time and work progress using new Technologies	26	2,73 (1,15)	25	4,92 (1,28)
Assessment of work in public administration according to achieved results, not spent working hours	25	3,2 (1,22)	24	4,92 (1,21)
HR units in the CoG perform regular analysis of human resource development	25	2,88 (1,09)	24	4,63 (1,05)
Public administration is an attractive employment option for young job seekers	26	4,04 (1,53)	25	4,6 (1,08)

It is expected that technological development will also trigger changes in co-operation and decision-making at national and international level alike (see Table 2). The survey data confirm that virtual communication will increasingly replace the face-to-face co-operation of employees, thus changing the way people communicate at work and in work-related matters. Experts forecast that technological development will promote decentralisation in decision-making, but will facilitate greater participation of civil society groups in the process of state administration policy planning. This means that, in the future, CoGs will have to take into consideration the challenges posed by technologies in the decision-making process, by paying particular attention to the development of a relevant infrastructure and co-operation platforms.

*Table 2 Evaluation of co-operation and decision-making*

Statement/ Year	2014		2025	
	n	Means (S.D.)	n	Means (S.D.)
Cooperation between institutions is improved due to the new Technologies	26	3,5 (0,94)	25	5,36 (1,15)
Cooperation between the employees takes place via personal contact, rather than virtual	26	4,62 (1,02)	25	3,48 (1,55)
Use of Technologies support decentralised decision making process	26	3 (1,13)	25	4,44 (1,32)
The key principle in relationship among the EU countries is cooperation and not competition	25	4,68 (1,37)	23	5,3 (1,14)
Civil society groups cooperate with the public administration during the policy planning process	25	3,12 (1,01)	22	4,95 (0,99)
Society reacts positively towards implemented public administration reforms	24	3,71 (1,04)	20	4,9 (0,91)

Survey proves that today's ever changing economic and geopolitical situation demands paying increasing attention to such factors and challenges, which affect the overall economic development of countries, the internal and external environment (see Table 3). EUPAN working group experts, forecast that the role of the EU in the global economy will slightly increase, but it will be of average importance. Experts believe that society in the ten years

period will react more positively toward implemented public administration reforms than nowadays.

*Table 3 Evaluation of external factors and challenges*

Statement /Year	2014		2025	
	n	Means (S.D.)	n	Means (S.D.)
Criminality situation is low and stable	22	4,18 (1,68)	21	4,52 (1,56)
The negative fiscal impact upon the budget has increased due to the reforms	22	3,55 (1,50)	19	3,58 (1,46)
The EU is a key player in the global economic cooperation	24	4,79 (1,06)	22	5 (1,11)
Euro is stable	23	4,39 (1,27)	19	4,89 (1,04)
Society reacts positively towards implemented public administration reforms	24	3,71 (1,04)	20	4,9 (0,91)

#### 4. Conclusions

Upon summarising the results of the survey of the EUPAN working group, as well as the evaluations of future tendencies, it can be concluded that the labour force ageing, technological development, and processes of economic and social integration in a medium-term will stimulate changes in the processes of human resource management, in inter-state and inter-personal communication and decision-making, as well as in reform planning and management, nevertheless, in a medium-term, they should be viewed not as radical changes, but instead as preparation for more substantial changes in a long-term.

It can be safely maintained that within the next decade, it will be necessary to introduce reforms, which will allow governments to prepare for changes caused by the aforementioned challenges in a long term. This means that the ability of state administration employees to analyse the current development tendencies and to forecast future challenges will have an essential role in CoGs. To achieve this, it is necessary to strengthen the role of CoGs in managing changes, organising co-operation between different generations and balancing the value institutions [15], by promoting the formation of such values in state administration and in society on the whole, which create pre-requisites for purposeful co-operation and broader initiative.

Thus, global challenges are imposing a much greater need on governments to think about and act in a long-term, to ensure coordination at an international level, as well as within the framework of public administration, and to analyse and use complex information in the decision-making process. Therefore, it can be expected that in future, a CoG will have to face various strategic challenges in the planning, implementation, and monitoring of future reforms, such as:

- constant management of fiscal restrictions and cost reduction;
- simultaneous management of several large reform programmes;
- ability to affect the choices and results of international policies;

- expecting future challenges, while preserving a long-term strategic outlook;
- ensuring public trust in the implemented reforms [2].

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#### References

- [1] Curry, D., Blijleven, W., Van de Walle, S. *Current and future trends in public sector reform: The views of trade unions and consultants in ten European countries*, COCOPS Work Package 8 – Deliverable 8.4, pp.21-25, 2014,
- [2] Department of Public Expenditure and Reform, *Performance Management and Development System 2013, Phase 2, Changes Overview of Revised System*, 2012,
- [3] EIPA, *The impact of demographic change and its challenges for the workforce in the European public sectors*, 2012
- [4] ESPAS, *Global Trends to 2030: Can the EU meet the challenges ahead?*, 2015
- [5] Eurostat, *Active ageing and solidarity between generations. A statistical portrait of the European Union*, 2012
- [6] Goetz, K., *Regierung und Verwaltung*, in: Helms, Ludger/Jun, Uwe (Hrsg.): *Politische Theorie und Regierungslehre*, Frankfurt: Campus, pp.74-96, 2004
- [7] Haddad, C., Kloutche, M., & Heneine, Y. *Center of Government: The Engine of Modern Public Institutions*, 2010
- [8] James, S., & Ben-Gera, M. A. *Comparative Analysis of Government Offices in OECD countries*. Paris: OECD Publishing, 2004
- [9] Ministry of Finance, *Governments for the future: main report*, Helsinki, Ministry of Finance, 2013,
- [10] OECD, *Co-ordination at the Centre of Government: The Functions and Organisation of the Government Office Comparative*; Analysis of OECD Countries, CEECs and Western Balkan Countries. *SIGMA Papers* 35. Paris: OECD Publishing, 2004
- [11] OECD, *OECD Government at a Glance 2009*, Paris: OECD Publishing, 2009
- [12] OECD, *The government workforce of the future: innovation in strategic workforce planning in OECD countries*, OECD Working Papers on Public Governance No.21, OECD Publishing, 2013
- [13] OECD, *Survey on the organisation and functions of the centre of government: Preliminary results*, 2013
- [14] Pollitt, C., *Future trends in European public administration and management: An outside-in perspective*. COCOPS Research Report 8.2. Rotterdam: Erasmus University Rotterdam, 2014
- [15] Report on CoG, *Report on Centres of Government in the EU Member States*, SAFECE Baltija, unpublished, pp 99-103, 2015

# FISH HARVESTING AND THE EFFICIENCY OF ITS PROCESSING ON THE EXAMPLE OF FOOD INDUSTRY COMPANIES QUOTED ON THE STOCK EXCHANGE

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**Abstract:** *this paper examines share price of the companies listed on the WIG-SPOŻYW (fish) and their fair value between 2006-2015. Data from 2006 to 2015 were collected from the Stooq.pl (Polish portal of shares). Two hypotheses are tested: (1) value of the shares based on the market price; (2) value of the shares as the fair value of shares.*

**Keywords:** *fish, fair value of the shares, company, market value of the shares.*

## 1. Introduction

Since time immemorial (probably since 10-12 thousand years BC) men have caught fish, which have constituted one of the components of a human diet. In human nutrition, several thousand species of fish, about 350 of which can be classified as industrial ones, are used. The term "fish products" means the products of all marine and freshwater animals, except for mammals and frogs (Directive 91/493/EEC), as well as many species of crustaceans (e.g. shrimps, lobsters, rock lobsters, crayfish, Antarctic krill) and shellfish (e.g. squids, oysters). In Poland, the fish products mainly of marine and freshwater fish are consumed [12].

Due to the fact that water on the globe comprises the majority of its area, while searching for a method of increasing the supply and range of food products for humans, it is important to remember about fish products. In this situation, the use of water resources of seas and oceans as well as rivers, lakes and artificial water reservoirs, which is made by fisheries, marine and inland fishing and aquaculture, is of great importance.

## 2. Aim, scope and sources of information as well as research methods

The aim of this paper was to characterise:

- resources of harvesting and the number of fish from these resources,
- volume of fish processing and manufactured fish products,
- efficiency of fish processing.

The paper was developed using the following sources of knowledge: consistent and constant scientific publications, statistical materials from the Central Statistical Office (GUS) and reports of the Agricultural and Food Economics of the National Research Institute (IERiGŻ). The collected material was developed and interpreted by using the following methods: a comparative method (comparison) in the vertical and horizontal forms [4, 10] as well as a statistical method [10]. The paper also includes the methods of financial (financial ratios) and economic analyses related to the examination of joint-stock companies. These companies were analysed and limited

only to the food sector companies (fish processing) quoted on the Warsaw Stock Exchange in Poland [5, 6, 7].

The obtained results were presented in a tabular form in connection with the language description.

## 3. Harvest fish and their use

In Poland, marine and freshwater fish are harvested. Sea fisheries, in turn, are divided into the deep-sea and the Baltic one.

Deep-sea fishing is subject to large changes in the total number in general and the number of individual species (Table 1).

*Table 1 Deep-sea fishing according to the major fish species - in tonnes (Source: Rynek Ryb, 2012 No. 17, p. 15; 2013a No. 19, p. 18; 2014 No. 21, p. 21.)*

species	Year			
	2010	2011	2012	2013
Horse mackerel	39741	20608	34534	27758
Sardinella aurita	3558	19076	8890	15899
European anchovies	865	8782	3529	61
Mackerel	2176	5887	3651	7595
sardines	1635	5313	1103	1449
Cod	2686	3771	3708	6601
Haddock	705	646	442	439
Scabbardfish	-	-	812	523
Halibut	963	169	808	-
Other	7845	4895	1651	1074
In total	60671	69147	59128	61399

In 2012, the activity of seagoing ships (3 units), in the absence of improvement of the state of the Chilean horse mackerel resource in the area of the South-East Pacific, was limited to fisheries of Mauritania and the North-East Atlantic. One of the reasons for the small deep-sea fishing is the lack of renewal of the agreements on fishing that should be concluded between the European Union and Morocco.

The quantities of fishing, provided in Table 1, are significantly smaller than in the nineties of the XX century [16].

Baltic and bay fishing. Polish marine areas (32.4 thousand km<sup>2</sup>, including the area of the territorial sea – 8628 km<sup>2</sup>) are considered to be rich in fishery resources, although

fishermen have a different opinion. However, the Baltic Sea is unique due to the fact that it is the sea characterised by a low degree of salinity and it has specific seabed configuration. Furthermore, the rivers, which carry water with a different degree of contamination of various substances, flow into the sea. All this makes the Baltic Sea a vulnerable ecosystem, and its resources must be subject to the sustainable development principles. In the Baltic Sea, mainly sprats, herrings, cods, and flatfish are caught (Table 2).

*Table 2 Deep-sea fishing according to the major fish species - in tonnes (Source: Rynek Ryb 2012 No. 14; 2013a No. 19, p. 17; 2014 No. 21, p.19.)*

species	Year			
	2010	2011	2012	2013
Sprat	58843	56490	63119	80988
Herring	24747	29881	27114	23581
Cod	12191	11862	14844	12503
Flatfish	11228	9725	10089	11867
Perch	838	814	996	952
Bream	590	651	545	617
Roach	601	618	644	994
Zander	151	135	308	404
Great sand eel	-	0	2339	1574
Other	911	593	504	552
In total	110100	120564	120502	134032

In the Baltic Sea, the volumes of the catch of sprats, cods, herrings, and Baltic salmon, which constitute about 90% of the Baltic national fishing, were limited. The fishing limits of individual fish species as well as a degree of the use of the fishing limits are changing. Therefore, the fishing limits in subsequent years were as follows (in thousands of tonnes, and the percentage of using the fishing limit is presented in brackets): 2010 – 155108 (60%), 2011 – 129137 (76%), 2012 – 110297 (95%) and 2013 – 121803 (96%). In the existing situation, the number of fishing boats engaged in fishing of different species of fish is changing, which mainly results from the viability of fishing.

The Baltic fishing in total provides in 2010 – 64,5%, 2011 – 63,6%, 2012 – 67,1% and 2013 – 68,6% of the caught sea fish. Total catches are also increasing, although with fluctuations.

#### 4. Fair value of listed companies

Share price of the companies listed on the Stock Exchange should reflect also their fair value. The fair value can be defined in several ways. In view of the foregoing, the fair value is a value used repeatedly in accounting, and thus in Article 28 (6) of the Accounting Act of 29.09.1994 as "the amount for which a given asset component could be exchanged, and the liability could be paid on market transaction terms between interested and well-informed, unrelated parties.

In view of whether the price of shares that are quoted on the stock exchange corresponds to their fair value, should be found in the value alone, since, after all, the values may be diverse, like the value of a similar company, producing

similar goods and operating in the same industry, will also be diverse for various reasons.

The subject of trade covers minority shares, and the main market participants are retail investors or minority institutional investors, thus the price of shares should reflect the fair value characterizing the liquid minority interest.

The value presented in this way seems righteous, which is confirmed by the premium paid by the investors who announce calls for subscription for shares and plan in this way the purchase of the controlling interest. Then the premium reflects the difference between the level of liquid minority interest and the level of controlling interest. Sometimes the level takes into account benefits resulting from synergy. An investor purchasing the controlling interest in this way receives premiums that appear after taking over control of a company, in the form of funds, business management and making a number of strategic decisions.

The fair value of the share price should be determined in accordance with the idea of capital market, namely the market participants should have equal access to data, information and all messages concerning a given company [10, 11]. However, the investors are divided into three groups:

- People with access to the most closely guarded information that affects the price and the business value, namely those can the company's management board or shareholders,
- Institutional investors with blocks of shares with simultaneous access to the company's management board,
- Individual investors who have access to public information.

There is one premise more to determine the fair value of share price. The investors are fond of investing in shares, namely they buy them as in the past they managed to earn on them and they feel that presently the share price is ideal and reflects their fair value and will enable them to obtain fair dividend in the future [1, 3].

Such a purchase or sale of shares can largely overestimate or underestimate the share value of a quoted company. Here the food may serve as an example, namely shares in food (fish) companies at the beginning of the new millennium, when shares in these companies were being purchased without any analysis in technical terms, but looking at their name and value, which was increasing overnight. In view of the foregoing, this led to excessively high business value above its fair value.

The share price should thus reflect the fair value of a company listed on the Warsaw Stock Exchange. For the value of these companies be fair, the market must make available to all investors information regarding companies listed on the Warsaw Stock Exchange. The shareholders should be treated equally; therefore we cannot distinguish majority shareholders as those who should have information unavailable for minority shareholders. First of all, shares should be liquid securities, therefore they should be in free float and have real-time transferability, namely

at any moment and at any time during the office hours of the Warsaw Stock Exchange on a business day.

### 5. Analysis and valuation of the food sector's companies quoted on the Warsaw Stock Exchange (WSE) in Poland

The WIG-SPOŻYW index, presented in Figure 1, shows that from 2007 to December of 2008, the food sector's companies in Poland showed a downward trend in their values. However, since the first quarter of 2009, it has been possible to notice a significant upward trend, in which the augmentation and consolidation at the level of 3,734 points on the index take place. The values reported on October 12, 2015 reflect the upward trend and confirm it. However, the market values do not reflect their fair value.

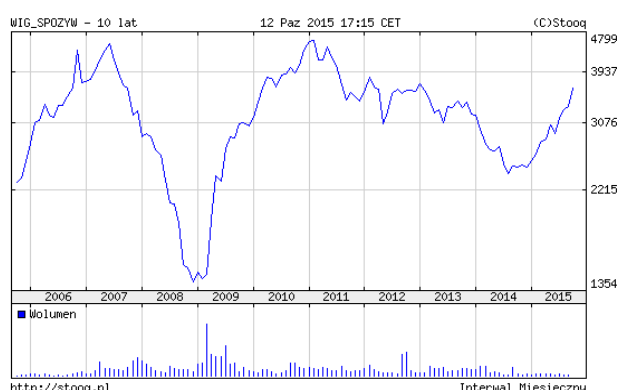


Figure 1: WIG-SPOŻYW in the period from 01.2006 to 10.2015 [15].

The WIG-SPOŻYW index, presented in Figure 1, shows that from 2011 to the first quarter of 2014, the food sector's companies in Poland showed a downward trend in their values.

However, since the second quarter of 2014 it has been possible to notice a significant upward trend. The values reported on 12.10.2015 reflect the upward trend and confirm it. However, the market values do not reflect their fair value.

In such a market, the introduction of new technologies and the beginning of a new era in food (fish), and good financial conditions, the fair value should be included in the market value, however, the market value differs from it due to some other external factors on the financial market and even speculative factors in the development of the share price of the food (fish) companies quoted on the Warsaw Stock Exchange in Poland [3, 5].

In the food (fish) sector, it is possible to record one company, the value of which approached to its good price on 12.10.2015, and this is GRAAL. The remaining companies did not have its maximum or even fair value, though they can show the net profit and good financial condition, and it is SEKO. Some companies were overvalued by even 82%. This company is WILBO. However, the flagship company, such as SEKO, stay ahead (Table 3-4) [6, 7].

Table 3 The Food (fish) sector's companies quoted on the Warsaw Stock Exchange in Poland as of 12.10.2015 (own development based on the data of the Warsaw Stock Exchange)

Name	Average rating	rating
GRAAL	3.5/5.0	BB-
SEKO	4.0/5.0	BB+
WILBO	4.0/5.0	CCC

Table 4 The Food (fish) sector's companies quoted on the Warsaw Stock Exchange in Poland as of 12.10.2015 (own development based on the data of the Warsaw Stock Exchange)

Name	Current price PLN	Maximum price PLN from the beginning of the stock exchange quotation
GRAAL	32.69	47.00
SEKO	5.30	19.06
WILBO	1.18	6.45

Table 5-6 presents the key ratios that show the financial condition of the food (fish) sector's companies. Within the three examined companies, the generated profit per share was reported in one company. It shows that the food (fish) company prosper properly on the financial market and are able to record higher or lower profits. However, the profit was not reported in one company, and it was SEKO [6, 7]. The price to the operating earnings shows the profit of the companies, and this state of affairs was reported in one stock exchange quoted company, and it was GRAAL. SEKO generated a negative digit ratio.

Table 5 Technical evaluation of the Food (fish) sector's companies quoted on the Warsaw Stock Exchange in Poland as of 12.10.2015 (own development based on the financial data of the the Warsaw Stock Exchange)

Name	P/OE (price/ operating earnings)	P/BV (price/ book value)
GRAAL	6.77	0.93
SEKO	7.72	0.66
WILBO	50.11	4.60

In contrast, analysing P/BV and P/P, it should be noted that both the price to the book value and the price to profit demonstrate that three companies operate exemplary on the market and have a value of about 1.0, and these are: GRAAL, SEKO and WILBO [6, 7].

Table 6 Technical evaluation of the Food (fish) sector's companies quoted on the Warsaw Stock Exchange in Poland as of 12.10.2015 (own development based on the financial data of the Warsaw Stock Exchange)

Name	P/P (price/ profit)	Profit per share
GRAAL	0.30	0.819
SEKO	0.26	-0.057
WILBO	0.48	No data



Table 7-8 presents the studies concerning, among others, the net profit, depreciation, EBITDA and assets of the food (fish) sector's companies.

According to the obtained values, it is clear that all companies GRAAL and SEKO showed a profit, which was confirmed by the previous ratios included in Table 2.

*Table 7 Technical evaluation of the Food (fish) sector's companies quoted on the Warsaw Stock Exchange in Poland as of 30.06.2015 (own development based on the financial data of the Warsaw Stock Exchange)*

Name	Net profit (net loss) in thousands PLN	Depreciation in thousands PLN
GRAAL	6597	3632
SEKO	-382	1242
WILBO	No data	No data

*Table 8 Technical evaluation of the Food (fish) sector's companies quoted on the Warsaw Stock Exchange in Poland as of 30.06.2015 (own development based on the financial data of the companies quoted on the Warsaw Stock Exchange in Poland)*

Name	EBITDA in thousands PLN	Assets in thousands PLN
GRAAL	11990	610123
SEKO	927	96423
WILBO	No data	No data

*Table 9 The Food (fish) sector's companies quoted on the Warsaw Stock Exchange in Poland as of 30.06.2015 (own development based on the data of the Warsaw Stock Exchange)*

Name	Book value per share in PLN
GRAAL	35.335
SEKO	8.016
WILBO	No data

According to the book value per share, it is possible to deduce that some companies are overvalued, and these are GRAAL and SEKO (Table 9).

However, it is important not to follow this opinion because the values are only the book values, and the calculation of them is purely mathematical and financial. In the case of using the economic attitude and interpretation, it would occur that the companies do not have the fair value [2, 8, 9, 13, 14, 15].

The profitability of the equity as well as the profitability of assets is shown by GRAAL, SEKO and WILBO. Therefore, according to the presented study, it is possible to observe that the flagship food (fish) concerns have the profitability and they are not threatened by any disturbance of the financial liquidity (Table 10).

*Table 10 The Food (fish) sector's companies quoted on the Warsaw Stock Exchange in Poland as of 30.06.2015 (own development based on the data of the Warsaw Stock Exchange)*

Name	ROE	ROA
GRAAL	6.63	3.78
SEKO	8.46	4.33
WILBO	3.26	0.48

Currently, the value of companies significantly deviates from the maximum value achieved a few years ago. The only one exception is GRAAL, which achieved the middle value in its history. Other companies have the value less than 25%, and even 82% of the maximum one (Table 11).

*Table 11 The Food (fish) sector's companies quoted on the Warsaw Stock Exchange in Poland as of 12.10.2015 (own development based on the data of the Warsaw Stock Exchange)*

Name	Current value	Maximum value
GRAAL	32.69	47.00
SEKO	5.30	19.06
WILBO	1.18	6.45

*Table 12 The Food (fish) sector's companies quoted on the Warsaw Stock Exchange in Poland as of 12.10.2015 (own development based on the data of the Warsaw Stock Exchange)*

Name	Fair value	Deviation from the fair value in PLN
GRAAL	45.00	12.31
SEKO	15.00	9.70
WILBO	4.50	3.32

However, the fair value which should be reflected by the share prices of the examined companies significantly differs from the calculated value, which was presented in Table 12. In some cases, it is even 82% of the current value. The fair value is considerable higher than the current value of the examined companies, and only similar in one company, GRAAL.

## 6. Conclusion

The share price of the food (fish) sector's companies quoted on the Warsaw Stock Exchange in Poland is significantly underestimated by the current financial situation in the world, especially when companies' values are so unstable.

The flagship companies of the WIG-SPOŻYW (fish) sector achieve enormous profits, which was proved in the examination of ratios in last years and a net profit in 2015. GRAAL, SEKO and WILBO are an example of it.

The share price of the property WIG-SPOŻYW (fish) sector's companies quoted on the Warsaw Stock Exchange in Poland is significantly underestimated by the current financial situation in the world [9, 11, 13].

The fair value of the WIG-SPOŻYW (fish) sector's companies quoted on the Warsaw Stock Exchange in Poland should be reached within three years, that is up to 2018 because it is the right estimation of further fast development of the Polish WIG-SPOŻYW (Fish) sector.

## References

- [1] Borowski K., „Wyznaczanie punktów zwrotnych indeksu Wig przy pomocy wybranych metod analizy czasowej”. *Bossa.pl*, pp. 1-5.
- [2] Jajuga K., Jajuga T. „Inwestycje”. Wydawnictwo Naukowe PWN, Warszawa 1996, pp. 34-57.
- [3] Jędrzejczak M., „Estymacja wartości godziwej. Podejście symulacyjne”, Powszechne Wydawnictwo Ekonomiczne, Warszawa 2011, pp. 133-138.
- [4] F. Kapusta, Zmiany struktury agrarnej i kierunków produkcji rolniczej w Legnicko-Głogowskim Okręgu Miedziowym, PWN, Warsaw 1976, pp. 11-12; S
- [5] Parvi R., “Share price of the companies listed on the WIG-UKRAINE and their fair value”, Share price of the companies listed on the WIG-UKRAINE and their fair value”, Itall Ltd., 2014, pp. 179-185.
- [6] Parvi R., “Investment funds and their financial effectiveness”, Goce Delchev University Macedonia & THOMSON Ltd. Slovakia, *EDIS* - Publishing Institution of the University of Zilina, 2014, pp. 262-267.
- [7] Parvi R., “Share price of companies listed on WIG20 and their fair value”. *EDIS* - Publishing Institution of the University of Zilina EIIC – 3 rd Electronic International Interdisciplinary Conference 2014, pp. 169-177.
- [8] Pastusiak R., “Przedsiębiorstwo na rynku kapitałowym”. Wydawnictwo CeDeWu, Warszawa 2010, pp. 34-46.
- [9] Pierce R., “Stocks, Options & Spreads, Infinity Publishing” 2004, pp. 110-115.
- [10] S. Stachak, Wstęp do metodologii nauk ekonomicznych, Książka i Wiedza, Warsaw 1997, pp. 132-133.
- [11] Thompson B., “Stock Market Superstar”, Insomniac Press 2008, pp. 52-54.
- [12] Tkaczewska J., Migdał M., „Spożycie i preferencje nabywcze konsumentów ryb i ich przetworów w Polsce”, *Przemysł Spożywczy* 2013 No. 5, vol. 67, (42-45), pp. 42, 44.
- [13] Veale S., “Stocks, Bonds, Options, Futures”, Prentice Hall Press 2001, pp. 88-125.
- [14] Bankier.pl., „Rynki, giełda, notowania GPW”, <http://www.bankier.pl/gielda/notowania/akcje>, accessed: January 27th, 2015.
- [15] Stooq.pl, “WIG-SPOŻYW”, [stooq.pl/q/?s=wig\\_spozyw](http://stooq.pl/q/?s=wig_spozyw), accessed: October 12<sup>th</sup>, 2015.
- [16] Przetwórstwo ryb w Polsce i jego problemy, *Prace Naukowe Akademii Ekonomicznej we Wrocławiu* No. 1005, Technologia 10, Wrocław 2003, p. 34.

## FAIR VALUE OF THE WIG-TELEKOM SECTOR COMPANIES QUOTED ON THE WARSAW STOCK EXCHANGE IN POLAND WITHIN 2006-2015 AND THEIR FINANCIAL ANALYSIS

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**Abstract:** *this paper examines share price of the companies listed on the WIG-TELEKOM and their fair value between 2006-2015. Data from 2006 to 2015 were collected from the Stooq.pl (Polish portal of shares). Two hypotheses are tested: (1) value of the shares based on the market price; (2) value of the shares as the fair value of shares. Moreover, the financial condition of several companies with respect to the sector was examined with the selected financial ratios. In addition, the author expressed his view on the opportunities of the property companies market's WIG-TELEKOM in 2015-2017.*

**Keywords:** *telecommunication, company, market value of shares, profit.*

### 1. Introduction

The structure of the telecommunication market in Poland has been stabilised for several years. Access to the Internet, mobile and fixed telephony generate more than 60% of the entire market's value. In 2014, the total value of the telecommunication market amounted to PLN 39.21 billion (total amount of revenue generated by the telecommunication entrepreneur, in respect of conducting the telecommunication business in the year under report, in PLN, excluding VAT) [12].

The only segment, which reported the increase of value, was the Internet access services. The mobile access was one of the most popular services, exceeding the European average with its level of satisfaction. Despite many actions undertaken by the Regulator, the Government, local government units and the telecommunication entrepreneurs, the access to the landline Internet still represented one of the lowest levels among the European Union's countries. The positive trends within the market definitely include the increase in the number of lines with higher and higher transfers offered by operators [12].

### 2. Fair value of listed companies

Share price of the companies listed on the Stock Exchange should reflect also their fair value. The fair value can be defined in several ways. In view of the foregoing, the fair value is a value used repeatedly in accounting, and thus in Article 28 (6) of the Accounting Act of 29.09.1994 as "the amount for which a given asset component could be exchanged, and the liability could be paid on market transaction terms between interested and well-informed, unrelated parties.

In view of whether the price of shares that are quoted on the stock exchange corresponds to their fair value, should be found in the value alone, since, after all, the values may be diverse, like the value of a similar company, producing similar goods and operating in the same industry, will also be diverse for various reasons.

The subject of trade covers minority shares, and the main market participants are retail investors or minority institutional investors, thus the price of shares should

reflect the fair value characterizing the liquid minority interest.

The value presented in this way seems righteous, which is confirmed by the premium paid by the investors who announce calls for subscription for shares and plan in this way the purchase of the controlling interest. Then the premium reflects the difference between the level of liquid minority interest and the level of controlling interest. Sometimes the level takes into account benefits resulting from synergy. An investor purchasing the controlling interest in this way receives premiums that appear after taking over control of a company, in the form of funds, business management and making a number of strategic decisions.

The fair value of the share price should be determined in accordance with the idea of capital market, namely the market participants should have equal access to data, information and all messages concerning a given company [8, 10]. However, the investors are divided into three groups:

- a) People with access to the most closely guarded information that affects the price and the business value, namely those can the company's management board or shareholders,
- b) Institutional investors with blocks of shares with simultaneous access to the company's management board,
- c) Individual investors who have access to public information.

At this point, there should be no differences in particular groups, at least officially, however, it happens that a group that is closest to the company has information which can obviously change its value overnight or distort its value artificially, e.g. other data or informal data, and even fictitious data.

Worldwide we can also appreciate companies that treat individual investors seriously, namely provide them data concerning a company and treat them as equal and as strategic investors, with a large impact on a company in the present and in the future.

Transactions that are concluded on the Warsaw Stock Exchange relate to transactions between interested parties, namely a purchase or sale order should be submitted. Sometimes there are cases of wrongly submitted orders, but these are marginal orders that do not have a large impact on the transactions conducted on the Warsaw Stock Exchange.

Share liquidity is understood as a percentage quantity of shares in a company that are in the possession of minority shareholders. This is, at the same time, free float and the face value of such shares and the value of average daily trade in shares in a given company.

Thus, we may presume that if during a day a large trade in shares takes place and a greater part of shares remains in the hands of minor shareholders, the share price reflects their fair value. We cannot agree with the fact that at small or minimum trade the value of shares is reduced to its daily minimum and it would be its fair value. Then it is only a change in the share price to a lower one and it does not indicate its fair value, as the trade alone suggests that this is only a pure coincidence. Such an impact can be exerted by large shareholders, as they can, by using one block, decrease the share value, preventing smaller players from raising the price for one reason: the capital of smaller shareholders does not enable them to raise the share price.

There is one premise more to determine the fair value of share price. The investors are fond of investing in shares, namely they buy them as in the past they managed to earn on them and they feel that presently the share price is ideal and reflects their fair value and will enable them to obtain fair dividend in the future.

Such a purchase or sale of shares can largely overestimate or underestimate the share value of a quoted company. Here the IT industry may serve as an example, namely shares in technological companies at the beginning of the new millennium, when shares in these companies were being purchased without any analysis in technical terms, but looking at their name and value, which was increasing overnight. In view of the foregoing, this led to excessively high business value above its fair value.

The share price should thus reflect the fair value of a company listed on the Warsaw Stock Exchange. For the value of these companies be fair, the market must make available to all investors information regarding companies listed on the Warsaw Stock Exchange [10]. The shareholders should be treated equally; therefore we cannot distinguish majority shareholders as those who should have information unavailable for minority shareholders. First of all, shares should be liquid securities, therefore they should be in free float and have real-time transferability, namely at any moment and at any time during the office hours of the Warsaw Stock Exchange on a business day.

The WIG-TELEKOM index, presented in Figure 1, shows that from 2009 to the second quarter of 2012, the WIG-TELEKOM sector's companies in Poland showed an upward trend in their values. However, from the third quarter of 2012, a significant downward trend can be noticed, until 2013, in which the augmentation and consolidation at the level of 884.06 points on the index

take place. The values reported on 18.09.2015 reflect the lateral trend and confirm it. However, the market values do not reflect their fair value.



Figure 1: WIG-TELEKOM in the period from 01.2006 to 10.2015 [9].

### 3. Analysis and valuation of the WIG-TELEKOM sector companies quoted on the Warsaw Stock Exchange (WSE) in Poland

In the WIG-TELEKOM sector, three companies, the values of which approach to their maximum prices after economic crisis on 18.09.2015, and they are HYOERION and ORANGEPL. However, three company does not show its maximum or even fair value, though it can show the net profit and good financial condition, and they are HAWE, MIDAS and MNI. Some companies were overvalued by even 95%.

These companies are MIDAS and NETIA. The flagship companies, such as ORANGEPL and HYPERION, stay ahead with the best results, as shown in Table 1-2

Table 1 The property WIG-TELEKOM sector's companies quoted on the Warsaw Stock Exchange in Poland as of 18.09.2015 (own development based on the financial data of the Warsaw Stock Exchange)

Name	Average rating	rating
HAWE	3.5/5.0	No data
HYPERION	3.5/5.0	D
MIDAS	3.5/5.0	D
MNI	4.0/5.0	BB
NETIA	4.0/5.0	AA
ORANGEPL	2.5/5.0	BB

In the WIG-TELEKOM sector, it can be seen that MIDAS has a overestimated value in relation to the maximum value by more than 95%, but the ORANGEPL and the HYPERION are presented as companies of a high value in the sector. It is obviously a very good recommendation for future investors. These companies prosper properly and are quoted on the Warsaw Stock Exchange [1, 3, 4, 5, 6, 7]. In tables are nominal prices in PLN.

*Table 2 The property WIG-TELEKOM sector's companies quoted on the Warsaw Stock Exchange in Poland as of 18.09.2015 (own development based on the financial data of the Warsaw Stock Exchange)*

Name	Current price PLN	Maximum price PLN from the beginning of the stock exchange quotation
HAWE	1.18	14.80
HYPERION	3.43	12.19
MIDAS	0.61	14.89
MNI	1.01	12.47
NETIA	5.59	129.40
ORANGEPL	7.25	19.59

*Table 3 Technical evaluation of the property WIG-TELEKOM sector's companies quoted on the Warsaw Stock Exchange in Poland as of 18.09.2015(own development based on the financial data of the Warsaw Stock Exchange)*

Name	P/OE (price/ operating earnings)	P/BV (price/ book value)	P/PF (price/ profit)
HAWE	37.28	0.36	0.32
HYPERION	-2.19	1.44	4.58
MIDAS	-4.39	2.58	1.65
MNI	4.61	0.29	0.59
NETIA	14.03	0.95	1.23
ORANGEPL	10.90	0.79	0.79

In table 3-4, the most important ratios presenting the financial condition of the WIG-TELEKOM sector's companies were presented. The profit per share was generated in 4 examined companies. It shows that WIG-TELEKOM invest a lot, what determines their value and the generated profit per share [2].

The price to the operating earnings shows the losses of the company, and this state of affairs was reported in the examined stock exchange quoted companies (HYPERION and MIDAS). The MNI, NETIA, ORANGEPL achieved a very high ratio, and the HAWE – an average one.

Generally, the value of the index P/OE is a useful tool for determining an absolute share value referred to the operating profits. Using the operating profit instead of a net profit (the P/E index) allows for rejecting single events. Moreover, a net profit is easier to handle. Fewer companies incur losses at the level of an operating profit rather than a net value, which allows for a broader use of P/OE [2, 3, 4, 5, 11].

The P/BV index informs how the company's own capital is valued by the market at a given moment. A general interpretation of the index consists in the fact that the P/BV indices below 1 mean a low price of a company, whereas a value over 3 that a company is overrated [2, 6, 7].

The value of the P/PF index is expressed in the way that when the value of the index is lower, then the price for the purchased company's shares is theoretically lower too, which means that the enterprise is more attractive. It is used in order to demonstrate cyclic profits and losses of

the analyzed companies (the income is much more stable than the company's profit) [2].

In contrast, analysing P/BV and P/PF, it should be noted that both the price to the book value and the price to profit demonstrate that two companies exemplary operate on the market and have a value of more than 1.0, and these are HYPERION, MIDAS and NETIA.

*Table 4 Technical evaluation of the property WIG-TELEKOM sector's companies quoted on the Warsaw Stock Exchange in Poland as of 30.06.2015(own development based on the financial data of the Warsaw Stock Exchange)*

Name	Net profit (net loss) in thousands PLN	Depreciation in thousands PLN
HAWE	-22891	3171
HYPERION	2542	3214
MIDAS	-58264	33056
MNI	10793	13199
NETIA	6564	0
ORANGEPL	126000	733000

Other companies do not significantly differ from the average values. Only HAWE, MNI and ORANGEPL is significantly below the thresholds and shows the negative values.

Table 5 presents the studies concerning, among others, the net profit, depreciation, EBITDA and assets of the WIG-TELEKOM sector's companies.

*Table 5 Technical evaluation of the property WIG-TELEKOM sector's companies quoted on the Warsaw Stock Exchange in Poland as of 30.06.2015(own development based on the financial data of the Warsaw Stock Exchange)*

Name	EBITDA in thousands PLN	Assets in thousands PLN
HAWE	-16022	754055
HYPERION	7569	241234
MIDAS	-11759	1425380
MNI	24416	747318
NETIA	10244	2571295
ORANGEPL	965000	22186000

According to the obtained values, it is clear that only HAWE and MIDAS showed a loss, which was confirmed by the previous ratios included in Table 3.

According to the book value per share and profit per share, it is possible to deduce that some companies are overvalued, and they are HAWE and HYPERION, and in the case of the MNI, NETIA and ORANGEPL company, they are undervalued. However, it is important not to follow this opinion because the values are only the book values [2], and the calculation of them is purely mathematical and financial. In the case of using the economic attitude and interpretation, it would occur that the companies do not have the fair value (table 6).

*Table 6 Technical evaluation of the property WIG-TELEKOM sector's companies quoted on the Warsaw Stock Exchange in Poland as of 30.06.2015(own development based on the financial data of the Warsaw Stock Exchange)*

Name	Profit per share	Book Value per Share
HAWK	-0.213	3.274
HYPERION	0.078	2.379
MIDAS	-0.039	0.237
MNI	0.109	2.869
NETIA	0.019	5.864
ORANGEPL	0.096	9.200

The profitability of the equity, as well as the profitability of assets is shown by MIDAS, MNI, NETIA and ORANGEPL, while HYPERION does not have it. Therefore, according to the presented study, it is possible to observe that the flagship TELEKOM concerns have the profitability and they are not threatened by any disturbance of the financial liquidity (table 7).

*Table 7 Technical evaluation of the property WIG-TELEKOM sector's companies quoted on the Warsaw Stock Exchange in Poland as of 30.06.2015(own development based on the financial data of the Warsaw Stock Exchange)*

Name	ROE	ROA
HAWK	-1.57	-1.34
HYPERION	-8.26	-56.67
MIDAS	1.01	0.73
MNI	1.74	1.40
NETIA	12.07	8.20
ORANGEPL	11.52	5.67

Return on equity (ROE) measures the rate of return for ownership interest (shareholders' equity) of common stock owners. It measures the efficiency of a firm at generating profits from each unit of shareholder equity, also known as net assets or assets minus liabilities. ROE shows how well a company uses investments to generate earnings growth. The return on assets (ROA) shows the percentage of how profitable a company's assets are in generating revenue. Other companies have shown a substantial profit which was generated in 2015, and they were 4 companies. Currently, the value of companies significantly deviates from the maximum value achieved a few years ago. The only exceptions are HYPERION and ORANGEPL, which achieved almost the medium value in its history. Other companies have the value less than 50% of the maximum one (Table 8).

*Table 8 The WIG-TELEKOM sector's companies quoted on the Warsaw Stock Exchange in Poland as of 30.06.2015(own development based on the financial data of the Warsaw Stock Exchange)*

Name	Fair value	Deviation from the fair value in PLN
HAWK	11.10	9.92
HYPERION	10.25	6.82
MIDAS	9.50	8.89

MNI	9.98	8.97
NETIA	80.34	74.75
ORANGEPL	19.05	11.80

However, the fair value which should be reflected by the share prices of the examined companies significantly differs from the calculated value, which was presented in Table 8. In some cases, it is even 95% of the current value. The fair value is considerably higher than the current value of the examined companies.

Deviation from the fair value in PLN = DevFV

DevFV = Fair value - current value.

## 6. Conclusion

The share price of selected companies of the Telecom sector's companies quoted on the Warsaw Stock Exchange in Poland is significantly underestimated by the current financial situation in the world.

The flagship companies of the WIG-TELEKOM sector achieve enormous profits, which was proved in the examination of ratios in last years and a net profit in second quarter 2015. HYPERION, MNI, NETIA and ORANGEPL are an example of it.

The share price of the property WIG-TELEKOM sector's companies quoted on the Warsaw Stock Exchange in Poland is significantly underestimated by the current financial situation in the world [8, 10, 11].

The fair value of the WIG-TELEKOM sector's companies quoted on the Warsaw Stock Exchange in Poland should be reached within two years, that is up to 2017 because it is the right estimation of further fast development of the Polish WIG-TELEKOM sector.

## References

- [1] Czekaj J., "Efektywność giełdowego rynku akcji w Polsce z perspektywy dwudziestolecia", PWE, Warszawa, 2014, pp. 201-205
- [2] Jajuga K., Jajuga T. „Inwestycje”, Wydawnictwo Naukowe PWN, Warszawa 1996, pp. 34-57.
- [3] Parvi R., "Analysis of companies of the energy sector based on an example of the companies quoted on the Warsaw Stock Exchange in Poland and their fair value" CER – International Scientific Conference, LONDON 2014, pp. 33-36.
- [4] Parvi R., "The analysis of companies of the Polish fuel sector based on an example of PKN Orlen and Lotos companies versus value of fuel prices and their impact on fuel sector management", ESD – International Scientific Conference Economic and Social Development, Zagreb Croatia 2014, pp. 52-60.
- [5] Parvi R., "Investment funds and their financial effectiveness", Goce Delchev University Macedonia & THOMSON Ltd. Slovakia, EDIS - Publishing Institution of the University of Zilina, 2014, pp. 262-267.
- [6] Parvi R., "Valuation of share and their fair value of the banking sector's companies quoted on the Warsaw Stock Exchange in Poland within 2008-2014", Goce Delchev University Macedonia & THOMSON Ltd. Slovakia, EDIS - Publishing Institution of the University of Zilina, 2014, pp. 76-81.

- 
- [7] Parvi R., “*Share price of companies listed on WIG20 and their fair value*”. EDIS - Publishing Institution of the University of Zilina EIIC – 3 rd Electronic International Interdisciplinary Conference 2014, pp. 169-177.
- [8] Pierce R., “*Stocks, Options & Spreads*, Infinity Publishing” 2004, pp. 110-115.
- [9] Stooq.pl - [http://stooq.pl/q/?s=wig\\_telkom](http://stooq.pl/q/?s=wig_telkom), 18.09.2015.
- [10] Veale S., “*Stocks, Bonds, Options, Futures*”, Prentice Hall Press 2001, pp. 88-125.
- [11] Zaremba, A., „*Giełda. Podstawy inwestowania*”, Warszawa, Helion, 2014, pp. 67-70.
- [12] Urząd Komunikacji Elektronicznej – „*Raport o stanie rynku telekomunikacyjnego w 2014 roku*”. Warszawa, 2015, Departament Strategii i Analiz Rynku Telekomunikacyjnego.

## CHANGES IN THE VALUE ORIENTATION OF EUROPEANS

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**Abstract:** *The main objective of this paper based on the analysis of the specific changes in the value orientation of the society within the context of European integration is to point out the changes in the value orientation of the Europeans. The transformation of the value system occurs at the European level, respectively within the European Union, as well as at the level of each nation and individual separately. Modern society adopted in the context of the integration certain new common values, but also leads to differentiation on the level of individual social groups. Furthermore, the article discusses what impact has an economic integration and social-political integration on this value system and within the conclusion of the paper an article reviews that the processes of globalization and integration within the field of culture are taking place more slowly rather than in the economic area.*

**Keywords:** *analysis, value orientation, modern society, value system, economic integration*

### 1. Introduction

Globalization and integration are today the most frequent terms, not only in political and economic sectors. They have influenced each person, in disregards of realizing it or not. For Europeans the integration is the most common and notable. The Union that was established fifty years ago on the bases of an ambitious Schuman's plan combines twenty-eight states and the integration itself keeps growing and widening.

A part of this article is integration and changes in evaluation of Europeans. The transformation of the value system has been changing all around the Europe, or more precisely in European Union, in each nation and within each European. A modern public has been taking within integration new values, but as well a differentiation of particular social groups occurs.

### 2. Dimension of a value and economic integration

A human being is daily exposed to many situations that he or she must positively or negatively react on. So we can't live in belief, that we are all independent and we can do whatever we want. This argument means much more. Our thinking and actions do not influence only our inhabitants so people who live in the same state. In consequence of integration and globalization, we are becoming a part of a huge complex system, where if something happens in one part of the world, all these actions may have eminent effects on doings on the other part of the world.

Before we start describing all these changes and their influence on particular part of a public life, mostly their influence and integration in economic sector, on formalization of value system of individuals and

globalized public, it is inevitable firstly define basic terms, that are directly connected with this topic.

#### *The Value*

A term value belongs among the most problematic and the most discussed term in psychology, sociology, philosophy and also in more social and science disciplines. This term was originally used in mathematics and in political economics. Currently it is considered as „imagination of something that is desired and influenced selected behavior“[9]. Sociology and psychology explain the process of gaining and realizing values. The human being learns throughout socialization. It means that values cannot be given to anybody. It is inevitable to grow up an individual the way, which he or she „will be able to realize his or her function in this world, that surrounds us and at the same time in harmony with progress and development to contribute to changes“[3].

#### *Economic integration*

The term integration represents the creation process of integrity, the process of merging. European integration is presented in two basic dimensions: as formal integration processes, for example an entrance of countries to European Union, and also as informal integration processes, straightening cooperation in various areas by contracts and agreements.

The most common form of integration is an international economic integration. According to V. Balhar, it is „a system of processes, intensive, focused, voluntary group of economical, scientific, technical and more social affiliations of particular independent countries with an aim to reach new and more effective economic and later also political, generally integrated group with a higher



qualitative level not only services and products, economic and monetary-financial processes, especially though quality of life and emplacement within a global world. The highest level of an economic integration is a global economics. In spite of current tendencies of continuously globalized world it introduces so far a utopia.

### 3. Position of values in the process of European integration

After the World War II was gone, the world has become a witness of intensive global connections that were supported by various integrated processes, though in European continent. After many unsuccessful initiatives in the beginning of fifties in 20th century were all efforts for approximation and integration in Europe became real. Today, an ambitious project is called European Union that merges 28 countries.

If we want to examine, describe and compare values and life approaches of today's world among nations, but mostly in relationship to process of European integration as a one unit, it is inevitable to remind and realize basic values, from which, more than 50 year ago went out Robert Schuman in his great project. „If a society, that came out from the Schuman plan should be viable, it must draw from the roots, from which they grew“ [23]. And they know about all these principles, roots and values. „Robert Schuman has delivered all these principles to us in his publication *Pour l'Europe – For Europe*, that consists of moral and spiritual testament“ [23]. The most important values and „the demonstration of a spirit of an integrated Europe are created with a humanism and solidarity“ [23]. Schuman adds: „A new politics is based on a solidarity and trust (...) in rational deduction of a society, that is finally persuaded about the fact that their salvation consists in understanding and cooperation“ [23].

Robert Schuman, called as a Father of an integrated Europe was a humanist and a pragmatic visionary. „As a deeply believed politicians and lawyer accepted, that above the positive law stands a natural law, that a history has its sense and that the aim and the criteria of our actions must be a defense and dignity of each person“ [23]. His ideas came from his Christian values, which were basic stones for the real democracy.

Although ideas of reconnecting Europe have a long lasting history, only Schuman's ideas who were built on a strong spiritual belief and on conciliation of nations were accepted“ [23]. How did he bring it into reality? Just through values of solidarity and humanity. Via project, about which Dean Acheson (The Minister of a foreign affairs of the US) has said in his memoirs as „breath taking step to integrate western Europe, that he firstly could not understand“ [23].

Today we can witness, that aborigine solidarity has come through step by step into other different areas of a social, political and economic life. A direct result is a fact, that any war between France and Germany has become not only unthinkable, but also practically not possible.

### 4. Economic versus social-political integration

Globalized and integrated processes are possible to apprehend from more points of view. Basically it is possible to diversify globalization, economic integration and globalization, let us say social-political integration. The second type of integration causes various changes in cultural, national, ethnical or religious character. Globalization may be understood in its quality – as recognized values, that are people able to take and understand“ [17]. Social-political integration influences nations within various processes of international integration that lead to countries connections and so lead to contact among different nations and their cultures.

Globalization and integration processes in culture area run more slowly than in economic area. Additionally, in consequence of a different dynamic of integration tendencies of individual units of a cultural system, where the civilization unit is developed much faster, institutional unit slowly and spiritual resists against changes, there accrues a situation called a global cultural space.

The Global cultural space is a part of a global cultural crisis. Ethnicity and nationality are in processes of economic and political integration marginalized. European nations stand today on the beginning of a multipolar European village. It brings a need of a bilateral interaction. Living in a peace among different nations in the same „village“ call for a respect of various cultures but also an acceptance of the rules of the Europe as a one unit. An effective global integration asks for the same approach of the society, the same moral values.

### 5. Integration and its influence on changes in value orientation

„In current the current European integration processes it is possible to notice two tendencies: accepting values and at the same time creation of new values that are not accepted in general with everyone“ [17]. We can call it as a change in value orientation in different nations. „It is possible to watch an internal globalization of a European value system, but also its internal diversity“ [17].

These processes are influenced and influence value orientation of a nation and also a value orientation of all integration society. If the European Union needs to become a really strong group, it is inevitable to persuade its inhabitants that they belong into one civilization with the same value system.

In the process of integration it is not enough to coordinate only economic and cultural cooperation, to support an international exhibitions and presentation of different artists, fighting for cherishing national traditions or to strengthen national identity. It is inevitable to offer Europeans right values and to motivate them to accept and follow them. Because only Europe that is built on the right values may be able to procure itself among a world cultures and to be able to stand against particular negatives that come from the economic integration.

The basic positive value progress that was visible in whole Europe (European Union) is a fact, that all members of the EU have embraced the same progress and the same values while building European house.

It is just a formal commitment of the country representatives. The real solidarity in a sense of a preparedness to allocate sources and opportunities with regard to environment, living, to start a family, growing up children, approach to education and employment is slowly disappearing [14].

## 6. Conclusions

European integration has caused many changes. Within members of the European Union is visible an economic growth, standard of living and education. Speaking about values and moral manners, the situation is not that bright. The proof is and absence of a value politics in various countries of the European Union. To speak about economic results without even speaking about values is the beginning of the destruction process in European Union.

At the moment, the Europe is on the cross road. Strategies for the following development and growth, educational plans and future investments are precisely defined in many important documents. The real hope for a brighter future are mostly young people, who should accept these values in their lives and although live brings many obstacles, they should still carry these values with them.

## References

- [1] *The Amsterdam Treaty* [online]. [2015-09-10]. Available at: [http://www.euroinfo.gov.sk/index/open\\_file.php?file=ZmluvyEU/AmsterdamskaZmluva.pdf&lang=sk](http://www.euroinfo.gov.sk/index/open_file.php?file=ZmluvyEU/AmsterdamskaZmluva.pdf&lang=sk)
- [2] BAUMAN, Z.: *Úvahy o postmoderné době*. 2. vyd. Praha: Sociologické nakladatelství Slon, 2002. 165 s.
- [3] BRŮŽEK, M.: *Teorie kultury*. 2. vyd. Praha: Státní pedagogické nakladatelství, 1987. 367 s.
- [4] *Česko-francouzský dialog o dějinách evropské rodiny*. CEFRES - Praha, 2001, č. 22. 125 s.
- [5] DODRILL, R.: *Violence, Values & the Media*. California: Foundation for Change, 1993. 157 s. ISBN 0-9640418-0-4
- [6] DUDOVÁ, I.: *Ekonomika vzdelávania*. Bratislava: EKONÓM, 2003. 166 s. ISBN 80-225-1758-5
- [7] Forum 21: *European Journal on Youth Policy*. The National Youth Agency. 2006, č. 7-8. 463 s. ISSN 1611-1397
- [8] GAVORA, P.: *Úvod do pedagogického výskumu*. 3. vyd. Bratislava: Polygrafické stredisko UK v Bratislave, 2001. 236 s. ISBN 80-223-1628-8
- [9] GEIST, B.: *Sociologický slovník*. Praha: Victoria publishing, 1992. 647 s. ISBN 80-85605-28-7
- [10] JOHN, E.: *Hodnoty kultúry, hodnoty života*. Bratislava: Pravda, 1983. 131 s.
- [11] KUBÁTOVÁ, H.: *Hodnotové orientace versus postoje: Kulturní transformace české společnosti na pozadí transformace ekonomické a politické*. In: Sociológia, 2005, č. 4, s. 351 – 372.
- [12] LIPKOVÁ, Ľ. a kol.: *Európska únia*. Bratislava: Sprint, 2006. 402 s. ISBN 80-89085-65-2
- [13] MACHÁČEK, L.: *Kapitoly zo sociológie mládeže*. Trnava: Univerzita sv. Cyrila a Metoda v Trnave, 2002. 236 s. ISBN 80-89034-18-7
- [14] MACHÁČEK, L.: *Youth in Slovakia and European Identity*. Bratislava: Veda, 2004. 108 s. ISBN 80-85544-30-X
- [15] MACHÁČEK, L.: *The Central European Dimension of Youth Research*. Trnava: Univerzita sv. Cyrila a Metoda v Trnave, 2005. 114 s. ISBN 80-89220-14-2
- [16] MÁRTON, M. a kol.: *Kultúra a medzinárodné vzťahy*. Vybrané kapitoly. Bratislava: EKONÓM, 2004. 118 s. ISBN 80-225-1780-1
- [17] Mistrík, E.: *Kultúrna globalizácia Európy a súčasná civilizačno-kultúrna situácia na Slovensku*. In: Goňcová, 2003. [online]. [2015-09-15]. Available at: [www.erichmistrík.sk/texty/global.rtf](http://www.erichmistrík.sk/texty/global.rtf)
- [18] MU, J.: *Demokracie a Evropa v době globalizace*. Brno: Národní správa o kulturní politice Slovenskej republiky: Správa skupiny európskych expertov. Ministerstvo kultúry Slovenskej republiky, 2003. 474 s. ISBN 80-968317-1-2
- [19] PAWERA, R.- ŠMEHÝLOVÁ, Z. - URBANOVÁ, G. *25 years after the political regime change - socio-economic inequalities persist*. Inc Magnanimitas, 2014 S. 882-887. ISBN 978-80-87952-07-8.
- [20] Programové vyhlásenie vlády Slovenskej republiky, 2002, 2006, 2010, 2012 [online]. [2015-09-16]. Available at: <http://www-8.vlada.gov.sk/index.php?918>
- [21] *Rodina na prelome tisícročí – subjekt kultúry, kresťanských a vŕšudských hodnôt*. Medzinárodná vedecká konferencia 23. – 24. 11. 1999. Trnava: Univerzita sv. Cyrila a Metoda v Trnave, 1999. 67 s. ISBN 80-968191-3-5
- [22] *Rodina v súčasnom svete*. Zborník z medzinárodnej vedeckej konferencie 25. – 26. novembra 2005. Bratislava: Teologická fakulta Trnavskej univerzity v Bratislave, 2005. 185 s. ISBN 80-7141-506-5
- [23] SCHUMAN, R.: *Pre Európu*. Bratislava: Vydavateľstvo Michala Vaška, 2002. 137 s. ISBN 80-7165-340-3
- [24] SKLENKA, I. – SLÁDEK, K.: *Európa hodnôt*. Bratislava: Centrum pre európsku politiku, 2004. 194 s. ISBN 80-7165-495-7
- [25] STANEK, V. a kol.: *Sociálna politika*. Bratislava: EKONÓM, 2004. 498 s. ISBN 80-225-1881-6
- [25] ŠKVRNDA, F.: *Svetová politika*. Úvod do teórie. Bratislava: EKONÓM, 2005. 100 s. ISBN 80-225-2035-7
- [26] VALENTOVÁ, M.: *Balancování rodinného života a pracovní kariéry v kontextu analýzy pozice žen na pracovním trhu*. Mezinárodní srovnání zemí Evropské unie a České republiky. In: Sociální studia. Rozšířená Evropa: předpoklady, důsledky, problémy. 2004, č. 1, s. 49 – 74.

## EUROPEAN COMMISSION'S LEGISLATIVE AND ENFORCEMENT ACTIVITIES IN THE ENERGY SECTOR

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**Abstract:** *One of the European Commission's priorities for the upcoming period is establishment of the European Energy Union by connecting infrastructures, enforcing legislation and increasing competition to help drive down costs for citizens and businesses and boost growth. Reliable energy supplies at reasonable prices both for consumers as well as for businesses with the minimum environmental impact are crucial to the European economy. The aim of this article is to describe what the European Commission does to ensure competition in the main energy sectors: electricity, gas and oil.*

**Keywords:** *liberalisation, energy sector, competition, European Commission, dominant position*

### 1. Introduction

Over the few decades more and more Member States of the European Union have been taking measures to secure energy supplies. These actions have an impact on competition in the internal market. Except of the liberalisation process, the European Commission has launched a sector inquiry, established working group with Member States, started individual assessments of Member States' capacity aid scheme and launched several investigation in major energy companies.

### 2. Liberalisation of energy sector (electricity and gas market)

During the 1990s, when most of the national electricity and natural gas markets were still monopolized the European Union and the Member States opened discussion to gradually liberalise these markets and to promote competition within them. The European Commission came to the conclusion that there is enough room for improvements and more competition in this sector and adopted a number of rules to help the Member States and the market in this respect. [1] In a broader sense, it was necessary to distinguish clearly between competitive parts of the industry that represent e.g. supplies to customers and non-competitive parts that secure the operation of the networks and to oblige the operators of the non-competitive parts of the industry to allow third parties to access the infrastructure. Moreover, freeing up the supply side of the market and removing barriers preventing alternative suppliers from importing or producing energy, together with gradual removal of any restrictions on customers from changing their supplier were considered as crucial parts of the whole process of liberalisation. Last but not least the initiative emerged to introduce independent regulators to monitor the energy sector. [2]

#### 2.1 The First Energy Legislation Package

"Liberalisation of the Energy Market", the project of the European Union, started with the first EU Directives in 1996 (electricity) and 1998 (gas) that should have been implemented into Member States' legal systems by 1998 (electricity) and 2000 (gas). [3] The project dealt with common rules for the internal market in electricity and

natural gas respectively and gave rise to a long and controversial discussion among the Member States on the theory of monopolies and signalised the start of a larger plan towards more integration and competition in the European Union. [3] Directive 96/92/EC and Directive 98/30/EC [4] made significant contributions towards the creation of an internal market for electricity and gas. Experience in implementing these EU Directives showed the benefits that may result from the internal market in electricity and gas separately, in terms of efficiency gains, price reductions, higher standards of service and increased competitiveness.

At this point it was clear that through "liberalisation" the aim was to abolish all rules and measures adopted by the Member States used to excuse and retain competition barriers. The idea was not to prevent competition and discourage initiatives, but to create and protect efficient competition in the energy market. [5]

#### 2.2 The Second Energy Legislation Package

From the beginning of 2001 and as the results of the first step of the liberalisation process were not the ones desired, the debate on a second energy package started. The new rules for the internal market in electricity and natural gas, repealing the old ones, were adopted in 2004. [5] Main development was the introduction of strengthened provisions on the separation of the transmission and distribution and the mandatory establishment of national energy regulators. The new provisions aimed at increasing competitiveness and improving service quality, at guaranteeing reasonable prices for consumers, establishing rules on public service obligations, improving interconnection and bolstering security of supply. Measures were to be put in place to protect consumer interests and allow them to actually exercise the right to choose their supplier. The Second Energy Legislation Package consisted of two EU Directives (Directive 2003/54/EC and Directive 2003/55/EC) and two EU Regulations (Regulation 1228/2003/EC and Regulation 1775/2005). [6] It further focused on the concepts of unbundling and third party access and defined the need for independent regulatory authorities. Moreover, the Second Energy Legislation Package set two different specific

deadlines for the liberalisation of electricity and gas retail markets, namely July 2004 for industrial customers and July 2007 for private households. [7]

### 2.3 The Third Energy Legislation Package

Although significant progress had been made, competition was slow to take off, with markets remaining largely national, with relatively little cross-border trade, and highly concentrated. Companies trying to enter the market, business leaders, parliamentarians, and consumer groups were concerned about the slow development of wholesale gas and electricity markets, high prices and limited choice for consumers. [1] The European Commission therefore launched a sector inquiry in 2005 to identify the barriers preventing more competition in these markets pursuant to Article 17 of Regulation 1/2003. [14] Article 17 provides possibility for the European Commission to conduct its inquiry into a particular sector where the trend of trade between Member States, the rigidity of prices or other circumstances suggest that competition may be restricted or distorted within the common market. [8]

According to the conclusion of the Communication from the Commission, the sector inquiry has identified a number of serious shortcomings which prevent European energy users and consumers from reaping the full benefit of the liberalisation process. [9] The European Commission published its final sector inquiry report on 10 January 2007 and identified several deficiencies still remaining in the internal market of the European Union. Its main concerns were: [10]

- High market concentration especially at the wholesale level;
- Insufficient cross-border capacities and different market designs constituting an obstacle to further market integration;
- Vertical foreclosure resulting from an insufficient level of unbundling between network operation on the one side and supply and/or generation activities on the other side;
- Lack of efficient and transparent price formation as well as information asymmetry between incumbents and market entrants;
- Long contract duration and restrictive practices in relation to the operation of supply contracts resulting in the foreclosure of downstream markets;
- Regarding balancing markets, the existing balancing regimes were often found to favour incumbents and create obstacles for new market entrants. [10]

To combat the concerns identified and to strengthen competition in the electricity and gas markets, the European Commission brought forward in September 2007 further regulatory and structural measures. Core elements of the third liberalisation package consisted of ownership unbundling (separation of sales operation from transmission networks), and the establishment of National regulatory authority for each member State, and the Agency for Cooperation of Energy Regulators which interconnects all national authorities and promotes mutual cooperation. The Third Energy Legislation Package consists of two Directives and three Regulations. [11]

To tackle the problems that emerged in relation to the sector inquiry, the European Commission has pursued individual cases under EU competition rules, mainly anti-trust, and initiated further actions to develop the regulatory framework. [12]

### 3. Enforcement Activities in the Energy Sector

In May 2006 the European Commission confirmed that it initiated unannounced inspections at the premises of gas companies in five Member States, and thus Austria, Germany, Italy, France and Belgium. The European Commission was of the opinion that companies concerned may have violated EU competition rules that prohibit restrictive business practices and/or abuse of a dominant position (Articles 101 and 102 TFEU respectively). Surprise inspections are usually a preliminary step in investigations into suspected anti-competitive practices. It has to be understood that the mere fact that the European Commission is carrying out an inspections does not mean that the companies are immediately charged with anti-competitive behaviour. The European Commission must respect the rights of defence, in particular the right to be heard applicable to companies in the Commission's proceedings against them. Duration of such inspection depends on a number of factors, including the complexity of each case, the extent to which the undertakings concerned co-operate with the European Commission and the exercise of the rights of defence.

#### 3.1 Applicable EU Legislation

As to the legal background, with regards to common interest of both business and consumers, the European Union has adopted legislation that outlaws anti-competitive agreements between undertakings that e.g. fix prices or carve up markets between competitors. The European Union also tries to prevent undertakings from abusing their dominant position in a market. Abuse of a dominant position usually occurs in form of charging unfair prices or limiting production.

Regulation 1/2003 [14] as a relevant legislative act, implements the EU competition rules laid down by Article 101 and Article 102 TFEU. It introduced rules that changed, above all, the enforcement process of EU competition policy managed by the European Commission. Generally, it allows for competition law previously applied by the European Commission to be enforced on a decentralised basis by EU countries' competition authorities. [15] It stressed the importance of national antitrust authorities and courts in implementation of EU competition law. The European Commission has been able to focus more its resources on enforcing the most serious competition infringements that reach cross border dimension. [15]

A national competition authority or the European Commission may open an investigation on its own initiative, following a complaint, or an application under a leniency programme (only 101 TFEU). Once the European Commission launches an investigation, it has wide-ranging powers. According to Article 18 Regulation 1/2003 in order to carry out the duties assigned, the European

Commission may, by simple request or by decision, require undertakings and associations of undertakings to provide all necessary information. Moreover, it can enter undertakings' premises, seize their records and interrogate their representatives.

Afterwards, based on the outcome of the investigation, the European Commission either decides to pursue deeper investigation, or it sets out a statement of objections which it sends to the undertakings in question. This document informs the parties of the European Commission's objections raised against them. It gives the companies the possibility to exercise their rights of defence. [15]

Undertakings may request to access the European Commission's file and respond to the statement of objection. They may also request a hearing according to Article 27 Regulation 1/2003. If, after this stage, the European Commission is still convinced there is an infringement, it may issue an infringement decision which may include the imposition of fines on the parties.

Alternatively, the Commission may take a commitment decision under Article 9 Regulation 1/2003. Commitment decision represents a quick way of restoring effective competition on the market. Under these decisions, the European Commission is not obliged to prove an infringement of the competition rules and does not impose fines. It only stresses its concerns and undertakings concerned may propose commitments to address these concerns. If the European Commission finds these commitments sufficient, it 'approves' them and takes a decision to make it legally binding. [14]

### 3.2 Applicable EU Legislation

This part of the paper should give to the reader the overview about the most important antitrust cases. Moreover, it has to be stated that the European Commission, except of antitrust cases, also deals with merger cases and controls the necessity and proportionality of state aid to energy companies.

In antitrust, the European Commission has carried out the above mentioned inspections in a number of energy companies since 2006.

The first fines for antitrust case in energy sector totalling €1 106 000 000 were imposed by the European Commission on E.ON Ruhrgas AG and on GDF Suez SA [16] for market sharing in breach of EU competition rules on agreements restricting competition and restrictive business practices. The fine was later decreased by the decision of the General Court. [17] Companies concerned agreed in 1975, when they decided to build the MEGAL pipeline to import Russian gas into Germany and France, not to sell gas transported over this pipeline in each other's home markets. They maintained the market-sharing agreement after the liberalisation of European gas markets, and only abandoned it definitely in 2005. [18]

In the second important case the European Commission has adopted a decision against Distrigas, [18] the incumbent gas supplier in Belgium. However, Distrigas offered commitments to open the Belgian gas market and the European Commission made these commitments legally binding by a formal decision as described above.

Commitments address concerns raised by the European Commission in the course of an investigation under EU competition rules prohibiting the abuse of a dominant market position according to Article 102 TFEU. Concerns dealt with supply problems on the Belgian gas market because of the existence of long-term contracts concluded by Distrigas with gas customers. Under the commitments, Distrigas offered mainly reduction of the gas volumes tied in long-term contracts.

In 2013 the European Commission has accepted a set of commitments offered by CEZ, the Czech electricity incumbent and made them legally binding by the decision. [21] The main concern in this case was that CEZ may have abused its dominant market position pursuant to Article 102 TFEU by reserving capacity in the transmission network in order to block competitors from entering the market. After the European Commission opened an investigation under EU competition rules that prohibit such behaviour, CEZ offered to divest a significant generation capacity. [22]

### 4. Final remarks

Although significant process in liberalisation was made in respect of energy sector in the European Union, the European Commission is still concerned about the level of effective competition in the market. Therefore following the sector inquiry in 2007, it has started to perform in-depth investigation into the whole industry, trying to elaborate on as many violations of competition rules as possible. This investigation process plays an important role in the policy making of the European Union. It is mainly because the undertakings concerned are the biggest players on the market.

Recently the investigation against Gazprom has been launched and the statement of objection for alleged abuse of dominance on Central and Eastern European gas supply markets has been sent in April 2015. It will be very interesting to follow this case and see the outcome, taking into account not only EU competition rules but also the formation of the foreign policy of the European Union against Russia in respect of formation of the European Energy Union.

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### References

- [1] [http://ec.europa.eu/competition/sectors/energy/overview\\_en.html](http://ec.europa.eu/competition/sectors/energy/overview_en.html)
- [2] CPB Document, *Liberalisation of European energy markets: challenges and policy options*, The Hague, CPB Netherlands Bureau for Economic Policy Analysis, 2006, ISBN: 90-5833-305-1
- [3] Albers Michael, *Energy Liberalisation and EC Competition Law*, Fordham 28th Annual Conference of Antitrust Law and Policy, 2001 [online] [http://ec.europa.eu/competition/speeches/text/sp2001\\_028\\_en.pdf](http://ec.europa.eu/competition/speeches/text/sp2001_028_en.pdf)

- [4] The First Energy Legislation Package:  
Directive 96/92/EC of the European Parliament and of the Council of 19 December 1996 concerning common rules for the internal market in electricity  
Directive 98/30/EC of the European Parliament and of the Council of 22 June 1998 concerning common rules for the internal market in natural gas
- [5] <http://www.rokas.com/en/press-articles-a-publications/energy-and-environment/item/65-towards-a-truly-open-european-energy-market-the-benefits-for-serbia>
- [6] The Second Energy Legislation Package:  
Directive 2003/54/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in electricity and repealing Directive 96/92/EC  
Directive 2003/55/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in natural gas and repealing Directive 98/30/EC  
Regulation (EC) No 1228/2003 of the European Parliament and of the Council of 26 June 2003 on conditions for access to the network for cross-border exchanges in electricity  
Regulation (EC) No 1775/2005 of the European Parliament and of the Council of 28 September 2005 on conditions for access to the natural gas transmission networks
- [7] <http://fsr-encyclopedia.eui.eu/eu-energy-legislation-packages/>
- [8] Article 17 of the Council Regulation (EC) No 1/2003 of 16 December 2002 on the implementation of the rules on competition laid down in Articles 81 and 82 of the Treaty
- [9] COMMUNICATION FROM THE COMMISSION  
Inquiry pursuant to Article 17 of Regulation (EC) No 1/2003 into the European gas and electricity sectors (Final Report), 2007
- [10] Scholz Ulrich, Purps Stephan, *The Application of EU Competition Law in the Energy Sector*, Journal of European Competition Law & Practice, Vol. 4, No. 1, 2013, pp. 63 – 82
- [11] The Third Energy Legislation Package:  
Directive 2009/72/EC concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC[7]  
Directive 2009/73/EC concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC[8]  
Regulation (EC) No 714/2009 on conditions for access to the network for cross-border exchanges in electricity and repealing Regulation (EC) No 1228/2003[9]  
Regulation (EC) No 715/2009 on conditions for access to the natural gas transmission networks and repealing Regulation (EC) No 1775/2005[10]  
Regulation (EC) No 713/2009 of the European Parliament and of the Council of 13 July 2009 establishing an Agency for the Cooperation of Energy Regulators
- [12] [http://ec.europa.eu/competition/sectors/energy/2005\\_inquiry/index\\_en.html](http://ec.europa.eu/competition/sectors/energy/2005_inquiry/index_en.html)
- [13] Lowe Philip, *Speech - The Liberalisation of EU Energy Markets*, 2006 [online] [http://ec.europa.eu/competition/speeches/text/sp2006\\_017\\_en.pdf](http://ec.europa.eu/competition/speeches/text/sp2006_017_en.pdf)
- [14] Council Regulation (EC) No 1/2003 of 16 December 2002 on the implementation of the rules on competition laid down in Articles 81 and 82 of the Treaty
- [15] <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=URISERV:l26092&from=EN>
- [16] Case COMP/39.401 — E.ON/GDF
- [17] Case T-360/09 E.ON Ruhrgas AG and E.ON AG v European Commission
- [18] [http://europa.eu/rapid/press-release\\_IP-09-1099\\_en.htm](http://europa.eu/rapid/press-release_IP-09-1099_en.htm)
- [19] Case COMP/37.966 – Distrigaz
- [20] [http://europa.eu/rapid/press-release\\_IP-07-1487\\_en.htm?locale=en](http://europa.eu/rapid/press-release_IP-07-1487_en.htm?locale=en)
- [21] Case COMP/39.727 – CEZ
- [22] [http://europa.eu/rapid/press-release\\_IP-13-320\\_en.htm](http://europa.eu/rapid/press-release_IP-13-320_en.htm)

## THE ROLE OF A FINANCIAL STATEMENT AUDIT PLANNING AT WORK OF AN AUDITOR

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**Abstract:** *Contrary to all appearances, audit of a financial statement already took place in the nineteenth century. It has to be said that the beginning of the professional auditing can be considered for the year 1862 and the issuance of the British Companies Act in the UK. It is clear that the profession of the auditor comes from this legal regulation, and the task of the controller is to create a written opinion about a possible compatibility of the financial statement of a particular company with the accounts, as well as a report setting out the accuracy and reliability of the statement - (vv. opinion is the main objective of the financial statement audit - according to regulations of the article 65 paragraph 1 of the act on accounting). This study should be divided into three main stages: audit planning, implementation of verification, and the creation of working papers and drawing up conclusions. The main area of discussion in the present study is audit planning, because this stage is a kind of foundation for the proper conduct of the study. At this stage, the collection of information about the organization and the activity of the audited entity occurs, its current financial situation, the applied accounting techniques and the implemented internal control. Information collected during this phase of control is used by the expert to assess the internal control system, accounting system, and to determine the degree of risk and the importance of individual areas of the financial statement.*

**Keywords:** *financial audit, stages of the financial statement audit, audit planning, the auditor*

### 1. Introduction

The growing importance of business entities, and thus also the increasing demand for information about their functioning, have consequently led to an increased interest in an accounting, because it is a crucial source of information about the functioning of businesses. At the same time, it is important to remember that the messages delivered by an accountancy are very often essential not only for the people strictly connected with the company (management, board, etc.) but they are also extremely useful for a comprehensive range of external customers. This implies that this information should be thoroughly reviewed, in order to create an actual full picture of the asset and financial situation of the economic entity. An adequate system of internal and external control is to ensure the same. It should be noted that one of the crucial and actually characteristic elements of the external control is the audit - (also known as revision of the financial statements), which is carried out by an independent auditor. Its general task is to confirm the accuracy of the financial statement and also proving the correctness and accuracy of the information which they contain.

Auditing of financial statements enforces selecting and using the appropriate examination methods by the auditor, as well as requires creating the audit documentation later. The work areas - (audit), designated by the auditor, are the result of the unit evaluation made before, and determining the level of assumed impact and risk dependent on the audited financial statement, therefore, to be extremely brief, the auditor determines the audit tasks.

It can be presented in a concise way, that the process of the financial statements revision has three stages [1]:

1) audit planning; 2) audit implementation and creating working papers; 3) drawing up conclusions from the study.

In order to narrow the range of subjects, the work is limited to discuss only the first of these three points, so: the problem of financial statements audit planning will be presented. Therefore, the priority objective of the study is to show the essence and the role it plays during the auditor's work.

### 2. Contribution and Benefits of the Study

This article reviews the available compact items describing analyzed subject. Due to the theoretical nature of this work, selected references, but also scientific articles were used. It should be noted that a detailed and precise analysis was primarily based on the following document: International Standard on Auditing 300 - "Planning an Audit of financial statements".

The presented matter is extremely fascinating both from a scientific as well as a practical point of view. Regarding the first aspect, it is certain that the elaboration will be the complement of the primary literature for the people who study the subject associated with the financial audit, therefore, it will be a specific kind of supplementary item. Moreover, it may also be useful for graduates who plan to see their future with the revision of the financial statements, because this description, in a clear way, brings one of the most important points of the effective work of an auditor.

However, taking into consideration that aspect from a practical point of view, the proposed elaboration may certainly be useful for audit firms, because they should constantly develop according to all requirements, even through constant updating and expanding the knowledge of the auditors. It is of great importance for these companies while competing for potential customers of their services.

### 3. Planning the audit of financial statements

Planning the audit comes down to determine the overall

strategy of the study and to elaborate the study plan [2]. Proper planning provides multiple benefits for the audit of financial statements. Advantages of planning, in particular, include the following aspects:

- it makes it easier for the auditor to pay appropriate attention to important areas of the study;
- it assists the auditor in identifying and counteracting to potential dilemmas on time;
- it supports the auditor in organizing and directing the commission of a study to carry it out in an effective and efficient way;
- it helps in the selection of members of the team which conducts the audit, so it is the question of skills and competences level which is appropriate to respond to the assessed risk according to an adequate division of work among them;
- it allows the management and supervision of members of the team which conducts the audit and a review of the work done by them;
- it helps, where applicable, to coordinate the work of group of auditors and experts.

The most significant sentence that at the same time describes the examined subject the best, is probably the one saying that the aim of the auditor is to plan the examination in such a way to conduct the audit in the most efficient way [3].

In professional standards issued by the National Chamber of Statutory Auditors, (as in ISA), the auditors are applied to plan the audit. The Standard No. 1 (p. 32) states: "In consideration of all unaudited elements that make up the items and information indicated in the financial statement, it is necessary to choose such subjects (areas) and to determine the aspect, range and terms of detailed studies, which would reduce the risk of not including the required issues in an appropriate analysis, and which would also ensure about carrying out the study in an economical way, and completing it - on time, within the time agreed with the individual. It can be achieved by conscious determination, the course and scope of the study adapted to the conditions of the unit by planning the study in an appropriate way" [4].

The principle of the examination economy is extremely important, because it requires to obtain a sufficient high reliability degree of an expressed opinion according to the use of solutions, which, if possible, limit the time and resources reserved for the study [5]. The consequence of this rule application will be such a analysis planning which while using rational procedures, methods and techniques of the study will help to reduce the risk of the study.

The auditor sets the overall strategy of the audit which defines the range, timing and direction of the analysis and forms the basis for the study plan elaboration.

When the general audit strategy is set, the auditor:

- a) examines the characteristics of the audit commission, which in fact determines its scope;
- b) verifies the reporting purposes of the commission to be able to plan the audit schedule and the type of information which should be communicated;
- c) considers the incentives which, from the professional

judgment's point of view, are critical to control the work of the team which conducts the test;

d) analyzes the results of preliminary activities strictly connected with the commission and, if applicable, the suitability for the job, the knowledge generated by the partner responsible for the audit according to the implementation of other commissions;

e) establishes the type, the use of time and the amount of resources essential to realize and thus also to accomplish the audit commission.

The auditor formulates the schedule of the audit, which must certainly include a description of:

- the kind, timing and range of risk assessment planned procedures [6- International Standard on Auditing, ISA] ;
- the kind, time of conducting and scope of further procedures of the study at the level of statements [7];
- other planned audit procedures that are essential to be carried out to realize the commission in accordance with International Standards on Auditing.

Paragraph A13 of ISA 300 [8] determines that the auditor has the right (if necessary) to update and change the overall audit strategy and the plan of the audit in the course of its duration. It may occur when the auditor obtains information significantly different from information available to him when audit procedures are planned. For example, the audit evidence obtained through testing the reliability may be contrary to the audit evidence obtained during the survey of control tests.

However, in terms of the necessary documentation, the auditor includes in the audit documentation, first, the overall strategy of the study, moreover, the study plan and, finally, any significant changes in the overall strategy of the analysis or in the study plan, made during the audit and the reasons for these changes [9].

It should also be noted that the nature and extent of planning varies depending on the size and complexity of entity, previous experiences with this unit, critical members of the team which conducts the audit and changes in circumstances that occurred during the work whilst carrying out the study.

Planning is not a separate stage of the study, but it is a constant and repeatable process that usually begins shortly after the end of the previous study (or in connection with it) and lasts until the end of the current audit commission. Planning also includes the timing of certain activities and conducting audit procedures, which should be completed before carrying out further procedures of the audit. As an example, it should be specified that planning includes the need of establishing, before the auditor makes the diagnosis and evaluation, the risk of significant distortion of issues such as: analytical procedures that should be used as risk assessment procedures; obtaining a general knowledge about the law and regulations by which the unit is obliged and keeping to these rules by the unit; calling and defining the level of significance; the appointment of an expert; making other risk assessment procedures.

The expert conducting the audit may decide to analyze with the management of the unit elements of planning in



order to simplify, facilitate and direct the commission of the audit, for example, the discussion about the type and timing of detailed audit procedures with the management may compromise the effectiveness of tests with respect to make audit procedures too predictable. Taking into consideration the fact that such a discussion often takes place, the auditor, nevertheless, is still responsible for setting the overall strategy and formulating a plan of the analysis. When it comes to discuss the issues included in an overall strategy or in a plan of the study, it is essential to make every effort to ensure that this will not undermine the effectiveness of this testing.

The process of establishing the universal testing strategy helps the auditor, provided that risk assessment procedures will be completed, to determine the following formalities:

- deployment of resources among different areas of analysis, even by engaging accordingly experienced team members to examine high-risk areas or the appointment of experts to the multi-faceted issues;
- size of resources used in the specific areas of the study, such as the number of members of the team conducting the test set to observe the physical stocktaking of inventory in important locations, the work review scope of other auditors in the case of capital group study or working hours budget of the study assigned to high-risk areas;
- exactly when these resources are to be used, eg. in various stages of the study or on crucial dates;
- the way of management of these resources, but also their supervision, as, for example, the deadlines for passing on information to - and getting it from the team, the method of carrying out the control by the partner responsible for the audit and the examination manager (eg. on the spot or working from home) and if to complete carrying out the quality control of the task implementation.

After determining the overall strategy of the audit, the study plan can be compiled. The plan refers to different issues included in the overall strategy of the study and takes into account the need to achieve the objectives of the study through the effective use of resources that are at the disposal of the auditor. Determining the overall audit strategy and a careful audit plan are not necessarily distinct and successive processes, but are strictly related to each other, because changes in one may have the effect of changes in the other.

The team of auditorial procedures, that are applied to the study properly, creates a revisory method. The procedure, which is adopted by the auditor to obtain reasonable assurance that the financial statement is reliable and takes into account aspects of the analysis and its stages adjusted to the scope of the study, is called a method. The choice of these testing methods depends on the expert and team's professional experience, the audited entity, its economic situation, the segment of the market and the time [10]. In addition to the distribution of methods for the full and random ones, we can find a distribution into full, random and selective, as well as systemic, analytical and transactional methods. With the proper application of the method, the auditor may be convinced that the unit activity

is clear or may detect and prove some irregularities and frauds in this area. Using the method, the auditor aims to formulate specific allegations by gathering evidence [11].

The type, duration and scope of the management and supervision of members of the team conducting the test, but also a review of their work, vary diametrically, depending on the number of different factors, including primarily: size and complexity of the unit; survey area; assessed risk of material misstatement; abilities and competences of individual members of the team conducting the study.

It should be noted that in the case of small entities, the entire test can be carried out by a relatively very small audit team. A partner responsible for the audit participates in the work of many small units. Coordination of work and flow of information among team members is much easier in a smaller team. Establishment of an overall study strategy of a small unit does not have to be a complex or time consuming undertaking - because it depends mainly on the size of the unit, the complexity of the study and even the size of the audit team.

It should be emphasized that the primary purpose of auditing is to obtain a written expert opinion as to the compatibility of the financial statement of a company with the accounts, as well as a report specifying the accuracy and reliability of the statement [12]. It is worth noting that the tasks and purpose of the study plan are the same regardless of whether the study is the first or a recurring commission. In the case of working on the first audit commission, it may be essential for the auditor to expand activities strictly related to the planning, mostly because he had not had the necessary experience relating to the audited entity, used for planning recurring commissions. While examining the unit for the first time, the auditor may, determining the overall strategy of the audit and formulating a study plan, consider additional issues such as:

- previous auditor's findings - (if it is not prohibited by law / regulations);
- analyzing with the management all crucial issues, including for example, used accounting principles or auditing standards and financial reporting;
- audit procedures essential to obtain sufficient and appropriate audit evidence about the initial state [13];
- moreover, also other procedures, that must be used in an audit quality control system of an audit firm when the examination is conducted for the first time.
- Absolutely each economic entity which runs a business is exposed to numerous risks. Both these which have their sources within the organization as well as in its close or distant surroundings. Therefore, the audit of financial statement should be a process aimed at areas of specific - the greatest risk, and using the concept of importance based on the usefulness of the information for users of the financial statement [14].

#### 4. Conclusions

The planning stage of the audit is to collect information about the organization and the activity of the audited unit,

its current financial position, accounting techniques used and implemented internal control. It is also considerable to determine interrelated areas of the financial statement. The aim is to use the time and knowledge of the auditor in the most efficient way later. It also reduces the costs of the unit associated with the study. Information collected during this phase of the control helps the expert to assess the internal control system, accounting system, but also to determine the degree of risk and the importance of individual areas of the financial statement. Furthermore, during the planning phase of the study, the master plan and test schedule are made. It contains the preferred methods and techniques of the study.

The study plan should emphasize the important elements of financial statements. It requires from the auditor pre-tested knowledge of business operations of the company, its organizational structure, financial situation and the systems of internal control and accounting systems used.

Based on ISA 200 – [15] (The general objectives of the independent auditor and carrying out the study in accordance with International Standards on Auditing), specifically section 3, it should be noted that the purpose of the study is to increase the degree of confidence of intended users in the financial statements. It is achieved by expressing by the auditor an opinion with a report on whether the financial statements were, in all important aspects, made in accordance with the applicable general assumptions of financial reporting.

That report should state whether the financial statement:

- 1) has been made on the basis of properly maintained books of account,
- 2) has been formulated in accordance with the accounting rules set out by law,
- 3) is compatible as to the form and content with the law, statute or agreement, by which the unit is obliged,
- 4) truly and clearly presents all relevant information for the unit assessment, and referring to the unit activity statement, whether the information included in this report takes into account provisions of art. 49 paragraph 2 and are consistent with the information included in the annual financial statement.

At the present stage the auditor should carefully consider the audit report for the previous year in order to ensure the regularity and continuity of the opening balance, the continuation of the applied valuation principles and ensure comparability of annual financial statements. The auditor should obtain appropriate and sufficient evidence of the inspection that the assets and liabilities recognized in the financial statement have been valued at their respective values.

The study plan is the result of:

- external factors impact assessment (industry, ownership structure, legal regulations) on the audited entity;
- internal factors impact assessment (internal control system, organizational structure, the complexity of the processes, the IT environment);
- establishment of the risk and significance level.

The final element of the planning phase is to make a plan with the program and schedule of the study. This

plan highlights the preferred methods and examination techniques, depending on the initial assessment of the risk and the degree of auditor's confidence in internal control systems.

There is no doubt that a careful and proper preparation of the first phase of the study is of extreme importance for the effective and efficient operation of any auditor, because it plays a major role whilst the proficient and correct conducting the audit of financial statement. Therefore, it is really worth focusing on this particular element of the study.

## References

- [1] Hołda, A., & Pocięcha, J. *Rewizja finansowa*, Akademia Ekonomiczna, Kraków 2004, p. 145.
- [2] Skoczek-Spychała, M. *Metodyczne aspekty audytu sprawozdań finansowych*. In W. Gabrusewicz (Ed.), *Audyt sprawozdań finansowych. Teoria i praktyka*. Polska: Warszawa 2014, p.69.
- [3] Helin, A., & Wisłowski, J. *Tryb badania sprawozdań finansowych*. Biuletyn BDO Rewizja Finansowa, 3(3) 2012.
- [4] Owczarek, Z. *Szacowanie istotności podczas badania sprawozdań finansowych*. Rachunkowość 5. November 20, 2014, from [http://rachunkowosc.com.pl/artukul/200405/16/Szacowanie\\_istotnosci\\_podczas\\_badiani\\_sprawozdan\\_finansowych](http://rachunkowosc.com.pl/artukul/200405/16/Szacowanie_istotnosci_podczas_badiani_sprawozdan_finansowych)
- [5] Kwasiborski, A. *Procedury badania sprawozdań finansowych według międzynarodowych standardów rewizji finansowej*, Krajowa Izba Biegłych Rewidentów, Warszawa 2007, pp.47-58.
- [6] Międzynarodowy Standard Rewizji Finansowej 315.
- [7] Międzynarodowy Standard Rewizji Finansowej 330 .
- [8] Międzynarodowy Standard Rewizji Finansowej 300.
- [9] Międzynarodowy Standard Rewizji Finansowej 230 - paragraphs 8-11 and par. A6
- [10] Wisłowski, J. *Metody badania sprawozdania finansowego*. Biuletyn BDO Spółki Gieldowe, 5(18) 2010.
- [11] Klimas, M. *Podręczna encyklopedia rachunkowości*, Poltext, Warszawa 1997, p. 741.
- [12] Encyklopedia Zarządzania, Radzewicz, A., & Ludwiczak, P. *Badanie sprawozdania finansowego*. Retrieved November 12, 2014, from [http://mfiles.pl/pl/index.php/Badanie\\_sprawozdania\\_finansowego](http://mfiles.pl/pl/index.php/Badanie_sprawozdania_finansowego).
- [13] Międzynarodowy Standard Rewizji Finansowej 510.
- [14] Czyż, W., *Planowanie procesu badania sprawozdań finansowych. Analiza i ocena systemów kontroli wewnętrznej na przykładzie procesu sprzedaży i zakupów*. FCCA, Polska 2013, p. 6,
- [15] Międzynarodowy Standard Rewizji Finansowej 200.
- [16] Ustawa z dnia 29 września 1994 r. o rachunkowości art. (tekst jednolity), Dz. U. 2013, poz. 330, Rozdział 7 *Badanie, składanie do właściwego rejestru sądowego, udostępnianie i ogłaszanie sprawozdań finansowych*.

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## FACTORS AFFECTING EFFICIENCY OF SOLAR CELLS

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**Abstract:** In the renewable energy, solar cell power is the best method to produce the power. But the efficiency of the system is fairly low compared to the conventional method. A solar cell produces electrical energy directly from visible light. This paper presents the most important factors that affecting efficiency of solar cells. These effects are cell temperature, MPPT (maximum power point tracking) and energy conversion efficiency. The changing of these factors improves solar cell efficiency for more reliable applications. The output power of photovoltaic cells or solar panels has nonlinear characteristics and these are also affected by temperature, light intensity and load.

**Keywords:** solar cell, efficiency, temperature, fill factor, factor affecting

### 1. Introduction

Among the renewable energy resources, solar energy is the most essential resource of sustainable energy because of its ubiquity, abundance, and sustainability. Solar cells convert the solar radiation directly into electricity using photovoltaic cell or the so called solar cells generate electromotive force as a result of absorption of ionizing radiation.

The photovoltaic (PV) system provides an alternative renewable energy resource due to its environment friendly natural source of energy. It generates electricity on-site in remote and isolated areas without transmission losses or greenhouse gas emissions. The current - voltage output of photovoltaic battery is nonlinear, coupled with changes in the sunshine, temperature and other factors, the output power is constantly changing [2].

The problems with energy supply and use are related not only to global warming but also to such environmental concerns as air pollution, acid precipitation, forest destruction, ozone depletion and radioactive substance emissions. To prevent these effects, some potential solutions have evolved including energy conservation through improved energy efficiency, a reduction in fossil fuel use and an increase in environmentally friendly energy supplies. Among them, the power generation with solar cells system has received great attention in research because it appears to be one of the possible solutions to the environmental problem [4].

Several factors affect solar cell efficiency. This paper examines the factors that affecting efficiency of solar cells according to scientific literature. These factors are changing of cell temperature, fill factor, using the MPPT with solar cell and energy conversion efficiency for solar cell [13].

### 2. Factors affecting efficiency of solar cells

#### 2.1 Temperature

Solar cells are sensitive to temperature. Temperatures play major factor in determining the solar cell efficiency. As temperature increases, the band gap of the intrinsic semiconductor shrinks, and the open circuit voltage ( $V_{OC}$ ) decreases following the p-n junction voltage temperature

dependency of seen in the diode factor. Solar cells therefore have a negative temperature coefficient of  $V_{OC}$ . Moreover, a lower output power results given the same photocurrent because the charge carriers are liberated at a lower potential. Using the convention introduced with the Fill Factor calculation, a reduction in  $V_{OC}$  results in a smaller theoretical maximum power given the same short – circuit current [14].

$$P_{max} = V_{OC} \times I_{SC} \quad (1)$$

where  $P_{max}$  is maximum power,  $V_{OC}$  is open – circuit voltage,  $I_{SC}$  is short – circuit current.

As temperature increases, again the band gap of the intrinsic semiconductor shrinks meaning more incident energy is absorbed because a greater percentage of the incident light has enough energy to raise charge carriers from the valence band to the conduction band. A larger photocurrent results, therefore,  $I_{SC}$  increases for a given insolation, and solar cells have a positive temperature coefficient of  $I_{SC}$  [14].

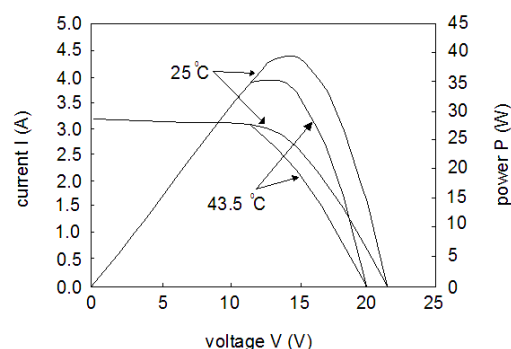


Figure 1: I-V and P-V characteristics of solar cell module [12]

Figure 1 shows the I – V and P – V characteristics at the constant illumination when the temperature changes [12]. Temperature effects are the result of an inherent characteristic of crystalline silicon cell-based modules.

They tend to produce higher voltage as the temperature drops and, conversely, to lose voltage in high temperatures. Any solar panel or system derating calculation must include adjustment for this temperature effect [15].

## 2.2 Energy conversion efficiency

Solar cells, the basic elements for photovoltaic conversion of solar energy, are especially susceptible to high temperatures and also to radiation damage, primarily due to their large surface.

A solar cell's energy conversion efficiency ( $\eta$ ), is the percentage of power converted from absorbed light to electrical energy and collected, when a solar cell is connected to an electrical circuit. This term is calculated using the ratio of the maximum power point,  $P_m$ , divided by the input light irradiance ( $E$ ) under standard test conditions and the surface area of the solar cell ( $A_c$ ) [8],

$$\eta = \frac{P_m}{E \times A_c} \quad (2)$$

where  $P_m$  is maximum power point,  $E$  is input light irradiance in  $\text{W/m}^2$ ,  $A_c$  is surface area of the solar cell in  $\text{m}^2$ .

The efficiency of energy conversion is still low, thus requiring large areas for sufficient insulation and raising concern about unfavorable ratios of energies required for cell production versus energy collected [10].

In order to increase the energy conversion efficiency of the solar cell by reducing the reflection of incident light, two methods are widely used.

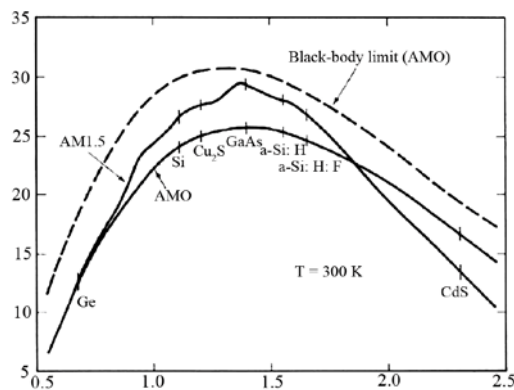


Figure 2: Dependency of the conversion efficiency on the semiconductor band gap [6].

One is reduction of the reflection of incident light with an antireflection coating, and the other is optical confinements of incident light with textured surfaces. They showed that the transformation of the wavelength of light could significantly enhance the spectral sensitivity of a silicon photodiode from the deep UV and through most of the visible region. The change of the spectral irradiance influences the solar power generation.

A semiconductor can only convert photons with the energy of the band gap with good efficiency. Photons with lower

energy are not absorbed and those with higher energy are reduced to gap energy by thermalization of the photo generated carriers. As seen from figure 2, the curve of efficiency versus band gap goes through a maximum.

## 2.3 Maximum power point tracking

The efficiency of solar cells should be improved with various methods. One of them is maximum power point tracking (MPPT).

The MPPT operates with DC to DC high efficiency converter that presents an optimal and suitable output power. Furthermore the characteristics of a PV system vary with temperature and insolation (figure 3 and 4) [11]. The resulting I-V characteristic is shown in Figure 2. The photo generated current  $I_L$  is equal to the current produced by the cell at short circuit ( $V = 0$ ). The open circuit Voltage  $V_{OC}$  (when  $I = 0$ ) can easily be obtained as [3].

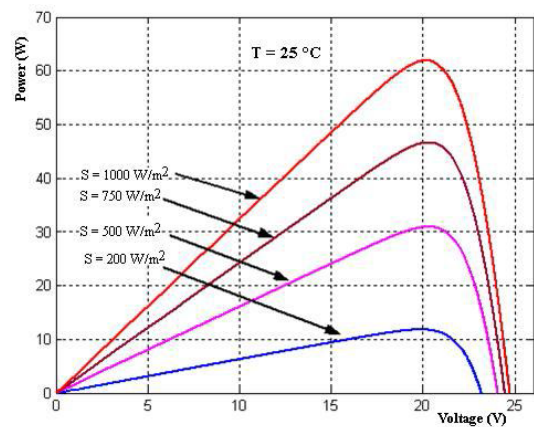


Figure 3: Influence of the solar radiation for constant temperature

No power is generated under short or open circuit. The maximum power  $P$  produced by the conversion device is reached at a point on the characteristic. This is shown graphically in Figure 5 where the position of the maximum power point represents the largest area of the rectangle shown.

One usually defines the fill-factor  $ff$  by [3].

$$ff = \frac{P_{max}}{V_{OC} I_L} = \frac{V_m I_m}{V_{OC} I_L} \quad (3)$$

where,  $V_m$  and  $I_m$  are the voltage and current at the maximum power point.

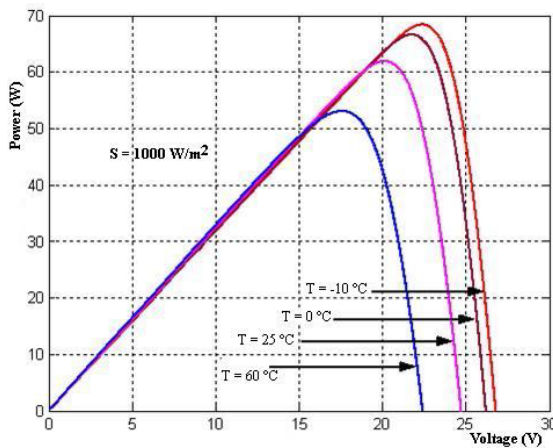


Figure 4: Influence of the temperature of junction for constant insolation

When the output voltage of the photovoltaic cell array is very low, the output current changes little as the voltage changes, so the photovoltaic cell array is similar to the constant current source, when the Voltage is over a critical value and keeps rising, the current will fall sharply, now the photovoltaic cell array is similar to the constant voltage source.

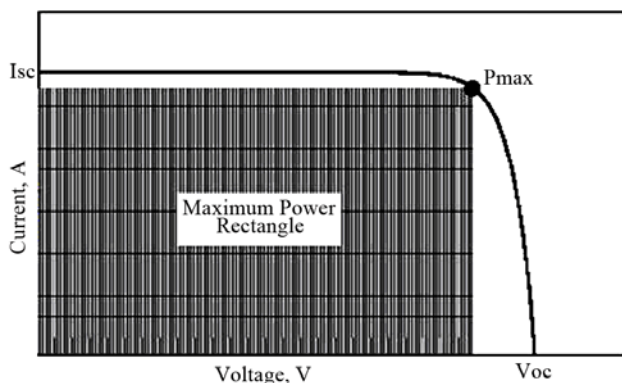


Figure 5: The I-V characteristic of an ideal solar cell [3]

As the output voltage keeps rising, the output power has a maximum power point. The function of the maximum power tracker is to change the equivalent load take by the photovoltaic cell array, and adjust the working point of the photovoltaic cell array, in order that the photovoltaic cell array can work on the maximum power point when the temperature and radiant intensity are both changing [4].

### 3. Conclusions

Many factors have to be considered while designing the solar cell power plant. This paper examines factors that affecting efficiency of solar cells. These are changing of cell temperature, using the MPPT with solar cell and energy conversion efficiency for solar cell.

Temperature effects are the result of an inherent characteristic of solar cells. They tend to produce higher voltage as the temperature drops and, conversely, to lose voltage in high temperatures. The temperature is directly related to the solar radiation. The solar radiation is the

critical factor for the solar cell efficiency. The optimum solar radiation gives the maximum power output from the solar cell.

The energy conversion efficiency is increased by reducing the reflection of incident light. The function of the maximum power tracker is to change the equivalent load take by the solar cell array, and adjust the working point of the array, in order to improve the efficiency.

Changing of these factors is very critical for solar cell efficiency. The good exploitation solar energy may enhance the renewable energy generation capabilities and participate in generating at good costs.

### References

- [1] AitCheikh, M.S., Larbes, C., TchoketchKebir, G. F., and Zerguerras, A., "Maximum power point tracking control scheme", *Revue des Energies Renouvelables* Vol. 10 N°3, pp. 387 – 395, 2007.
- [2] Aryuanto Soetedjo, Lomi Abraham Yusuf Ismail Nakhoda, AwanUjiKrismanto, *Telkomnika*, Vol.10, No.3, pp. 419~430, 2012.
- [3] Capar, S. "Photovoltaic Power Generation for Polycrystalline Solar Cells and Turning Sunlight into Electricity," Thesis, Engineering Physics, University of Gaziantep, July 2005.
- [4] Dinçer, F., Meral, M. "Critical Factors that Affecting Efficiency of Solar Cells", *Smart Grid and Renewable Energy*, pp. 47-50, 2010.
- [5] Femia N., Granozio D, Petrone G. Spagiuolo G., and Vitelli M., "Optimized one-cycle control in photovoltaic grid connected applications," *IEEE Trans. Aerosp. Electron.Syst.*, Vol. 42, pp. 954–972, 2006.
- [6] Goetzberger, A., Hebling, C., and Schock, H. – W., "Photovoltaic Materials, History, Status and Outlook," *Materials Science and Engineering*, Vol. 40, pp. 1-46, 2003.
- [7] Hohm D. P. and Ropp M. E., "Comparative study of maximum power point tracking algorithms using an experimental, programmable, maximum power point tracking test bed," in *Proc. Photovoltaic Specialist Conference*, pp. 1699–1702, 2000.
- [8] Maruyama, T., Shinyashiki, Y., Osako, S., "Energy Conversion Efficiency of Solar Cells Coated with Fluorescent Coloring Agent," *Solar Energy Materials & Solar Cells*, Elsevier Science, 1998.
- [9] PRIYA, S., *Energy Harvesting Technologies*. Springer US, 2009, p. 517, ISBN 978-0-387-76463-4, e-ISBN 978-0-387-76464-1.
- [10] Queisser H. J. and Werner, J.H., "Principles and Technology of Photovoltaic Energy Conversion," *Solid-State and Integrated Circuit Technology*, pp. 146-150, 1995.
- [11] SRIVASTAVA, P., GUPTA, P., SINGH, A., *Critical Factors Affecting Efficiency of Maximum Power Point Tracking in Solar Cells. SAMRIDDHI: A Journal of Physical Sciences, Engineering and Technology*, 2015.
- [12] Suita, Y. and Tadakuma, S., "Driving Performances of Solar Energy Powered Vehicle with MPTC," *IEEE*, 2006.
- [13] Wai, R. –J., Wang, W. – H., and Lin, C. – Y., "High-Performance Stand-Alone Photovoltaic Generation

*System,”* Proceedings of IEEE Transactions on Industrial Electronics, Vol. 55, No. 1, January 2008.

[14] [http://alumni.media.mit.edu/~nate/AES/PV\\_Theory\\_II.pdf](http://alumni.media.mit.edu/~nate/AES/PV_Theory_II.pdf)

[15] <http://www.altestore.com/howto/Solar-Power-Residential-Mobile-PV/Off-Grid-Solar-Systems/Electrical-Characteristics-of-Solar-Panels-PV-Modules/a87/>



## TRANSPORTATION OF CONTAINERS USING THE INLAND WATERWAYS

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**Abstract:** Slovakia ranks among the countries with a long tradition of transporting freight via rivers between inland and sea. However, in recent years inland waterway transport losing importance in comparison to other modes of transport. Incorporating inland waterway transport into the combined transport in Europe, using the potential of the Rhine and the Danube may have a positive impact on the environment and other sectors of the economy. This paper provides analysis of the current state of transportation of containers on the inland waterways in Europe. The key objective is to analyse the transport policy of combined transport in Slovakia and attitudes authorities in terms of strategic development.

**Keywords:** containers, combined transport, inland waterway transport, TEU

### 1. Introduction

It is now 55 years since famous Barbie was 'born' and thanks to her we can easily demonstrated how the power of global supply chains can transform international trade. In the book *The Box*, economist Marc Levinson [1] explains how this famous doll had developed her very own global supply chain. Mattel's 'all-American' Barbie was anything but all-American. Thanks to containers that represented low transport costs helped make it economically sensible for a factory in China to produce Barbie dolls with Japanese hair, Taiwanese plastics, and American colorants and ship them off for little girls all over the world. Mattel took a value chain approach and realized the possibility of wealth from outsourcing production. This eventually led to a wave of globalization and a symbol of commerce in the latter part of the 20th century. Nowadays, every product and many services are now imagined, designed, marketed and built through global supply chains that seek to access the best quality talent at the lowest cost, wherever it exists. [2]

Since its inception in 1956, containerization for the transport of goods by sea has grown exponentially. From 1990 to 2010, container trade was the fastest-growing cargo segment at an average annual rate of 8.2%. After a recession in 2009, global container trade volumes rebounded 12.9% in 2010, accounting for 140 million TEU, more than 1.3 billion tons, and almost six times its 1990 volume. In 2013 it formed 22% of the total marine trade. According to the statistics of the Clarkson Research Centre [3], in 2013 the volume of the container transport worldwide was 160 mil. TEUs (+ 4.6% compared to 2012). The commodities carried in the marine containers are mainly manufactured goods, but more often there are also the products such as coffee or food that require to be transported under the controlled temperature.

In Europe we mostly use terminology "combined transport" for intermodal transport where the major part of the European journey is by rail, inland waterways or sea and any initial and/or final legs carried out by road are as short as possible [4]. In this paper we closely look at possibilities to better integrate inland waterways into

intermodal transport network from Slovakia point of view. We also analyse the current state of transportation of containers by inland water transport and combined transport in Slovakia.

### 2. Container transport by inland waterways

Water transport infrastructure plays an important role inland, but especially in international traffic relations to unify the network of the European inland waterways and of the world oceans. In 27 out of the 56 countries that are the members of UNECE there are the navigable rivers of international importance, which have or may have an important role in the international freight and passenger traffic. The place of the inland waterways transport in the total freight transport of the EU member states varies considerably both between the countries and also within the countries.

The focus of the European inland waterway is bound to the Rhine corridor. The main contributors to the EU inland waterways transport performance (in Tkm) are by far Germany and the Netherlands. Combined, both countries represented more than 70% of the EU inland waterways transport performance in 2013. When looking at the transport of goods in tonnes, the Netherlands is by far the leading country with a share of 38% of the total EU transport of goods in 2013. Germany follows with a share of 24%. The third country was Belgium with a share of 20% [5]. The prerequisite is the corresponding demand, especially the availability of powerful infrastructure in the form of waterways and ports.

The development of the container transport by inland waterways was also affected by the global crisis in 2008, when there was an overall decrease in the world transport capacities (see Fig. 1). From 2010, a regular recovery is observed every year to reach a peak in the 3rd quarter 2013, exceeding the levels recorded before the crisis in 2008. A rise of 14% is observed between the 3rd quarter 2007 and the same quarter in 2013.

Compared with 2012, EU freight container transport performance in 2013 in terms of TEU-km rose by 3% for



loaded and 5% for empty containers giving a 4% rise in total.

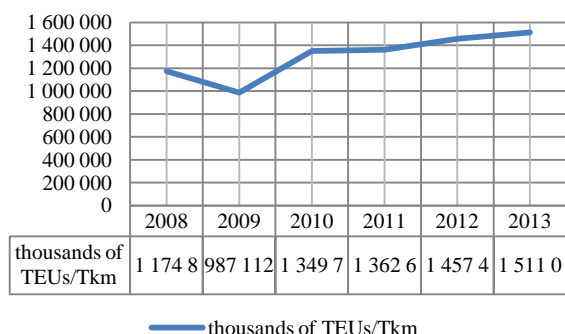


Fig. 1 The annual turnover of the transported containers by inland waterway in the EU (Thousands of TEUs/km) [5]

In 2013, loaded containers accounted for two thirds of the total container transport performance. The largest contribution came from the Netherlands, closely followed by Germany. Both countries combined accounted for almost 90% of the EU container transport performance. These two countries, together with Austria showed an increase of the container transport performance in 2013 compared to the previous year, while all other countries registered substantial decreases. Germany and the Netherlands increased their container performance for both loaded and empty containers. Belgium observed a rise of the empty container transport performance whereas the loaded container transport performance decreased. In the context of the South-East European countries the transportation of empty containers dominated. In Slovakia, 1120 TEUs were transported in 2013. There was the international transportation of empty containers mainly in Austria and Germany [5, 6].

### 3. Current state of combined transport in Slovakia

These days, combined transport in Slovakia is not directly governed. It is fully liberalized with almost no state regulation. Furthermore, there is no company, or logistic cluster that would control combined transport. Slovakia has only a small group of mutually competing combined transport operators (Metrans, RCO, TransContainer, Maersk-SPaP). Ministry of transport (whole name *The Ministry of Transport, Construction and Regional Development*) have with these operators sporadic contact and usually help them with current issues, or maintain related legal regulations of combined transport. To comparison with Western state where companies despite strong competitiveness cooperate in common interest, in Slovakia only tough competition, but also the atmosphere of hard non-cooperation. Due to the inland position of the SR is the largest subcontractor of intermodal transport rail, which carries almost 100% of the cost of combined transport.

The combined transport began to develop in Slovakia in the seventies, as a mutual project of the former socialist

community countries (CMEA). Before the independence of the Slovak Republic the combined transport had been operated by the organization ČSKD Intrans Prague, a.s. INTRANS carried on the administration, management of terminals and transshipment operations as well as the container transport for its customers in the regime of individual and group carriage loads. In 1993 the company was privatized (in SR - SKD Intrans, a.s.). In 2010, the organizational structure returned again to the central management of a common organization- ČSKD INTRANS s.r.o. Since 2003, the operator of the intermodal transport, company METRANS (Danubia), a.s. which is a subsidiary of the Czech company METRANS Prague, has operated in Dunajská Streda. In 2010 it expanded its scope to the eastern part of Slovakia, where in Haniska near Kosice was opened an extra container terminal. To the other combined transport operators belong Green Integrated Logistics (Slovakia), s.r.o., which is the owner of the container terminals in Sládkovičovo and the transport for the Korean producer of SAMSUNG in Galanta is provided by the transportation company INTRANS. The shipbuilder company Maersk operates the terminal Pálenisko at the port of Bratislava. TransKontajner Slovakia, s.r.o. is a subsidiary of the Russian operator of the combined transport TransKontajner, which has leased the transshipment terminal in Dobrá near Čierna nad Tisou since 2009. All operators in the SR are the private companies and their transshipment terminals are used for one final user. [7]

The above mentioned operators offer also overseas intermodal transport in the mode of so called hinterland port connection - an inland port service of two major ports (Hamburg and Koper). The terminal in Dobrá is used as a transit container transshipment to change the gauge (broad Russian one from / to the European standard). The continental intermodal transport is not operated in any Slovak terminal.

The number of intermodal transport terminals slightly decreased in the years 2000 - 2015. In 2000, there were 11 intermodal transport terminals, 8 of them in the constant operation and 3 of them temporary out of service. In 2015, there are 7 intermodal transport terminals in constant operation- in Bratislava (UNS, Pálenisko), Sládkovičovo, Žilina, Dunajská Streda, Košice and Dobrá near Čierna na Tisou. [7] All these terminals are bimodal (road - rail), excluding terminal in Pálenisko which is trimodal (road - rail - inland waterway) – Fig. 2.



Fig. 2 Intermodal transport terminal Bratislava – Pálenisko [self-proceed]

Currently, there is none public terminal in Slovakia, which could provide the services according to the EU law and to offer public and non-discriminatory access to terminals for all customers. The transshipment terminals also do not have a direct connection to the main railway lines and main roads communications which prevents effective and environmentally friendly approach to the main railway and road communications. Another disadvantage is their location in an intra-urban places resulting in the inability of their further development.

After Slovakia's accession to the EU, in our country occurred inflow of foreign capital and new industrial manufacturing base for the automotive and electronic industries have been made. This resulted in with arrival of supplier companies that are direct suppliers of large industrial factories. The most important include automakers Volkswagen, Peugeot, KIA MOTORS, other international companies such as SAMSUNG, CONTINENTAL – MATADOR and other firms in Slovakia, which are the main customers of combined transport. Transport of goods is provided by freight forwarders and combined transport operators. Due to the inland position of the SR is the largest subcontractor of intermodal transport rail, which carries almost 100% of the cost of combined transport. The development trend of the combined transport shows Fig. 3 [7].

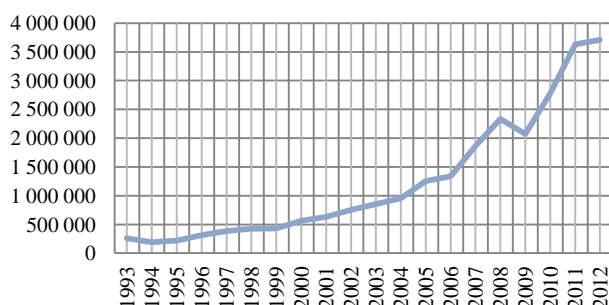


Fig. 1 The development of combined transport in Slovakia (thousands tonnes) [self-proceed]

Few years ago, the ministry attempted to create a comprehensive concept of development of combined transport in the form of construction of intermodal terminals with public resources that would had been put into use combined transport operators on a non-discriminatory basis, but this concept was withdraw from further consideration because of politician reasons. The only terminal that is building is located in Žilina. Considering the development and interconnection of existing and planned intermodal transport terminals within the TEN-T network, planned terminals in Bratislava and Žilina are placed into the core TEN-T network and terminals in Leopold and Košice into the complex TEN-T network.

#### 4. The inland waterway transport using the port of Bratislava

It is clear that each transport mode (rail, road, air and water transport) has its advantages and disadvantages. Considering the use of the water transport for the transportation or cars or container it is logical that its use is possible only near the waterways enabling this type of transportation. In Slovakia it is possible to implement such shipments through the port of Bratislava. Its connection with the river Danube, its channels and junctions on the inland waterway network enables the transportation to the North and Black Sea. The port is located almost exactly in the middle of approximately 3600 km long waterway between the North and Black Sea (European waterway Danube-Mohan-Rhine) and nearby two other European capitals and important ports – Vienna and Budapest, at the south-eastern edge of Bratislava on the left bank of Danube, approximately between the river kilometers 1,865 and 1,867. [6]

Nowadays, the transportation of containers in Slovakia is realized only occasionally and transported are usually empty containers. Modernization of the railway transport network and the transport policy of the European Union aimed at finding the alternatives to the road transport are important factors that affect the constant increase of the environmental transport modes portion when transporting the goods all over the world. The EU orientation to alternative transport modes (in relation to the road transport) represents a high potential of the involvement in the "rarely" usage of the inland waterway transport not only when transporting the vehicles.

However, if the water transport wants to be a competitive partner to the rail and road transport, it is necessary to draw attention to its main advantages (environmental aspects, price of transport, capacity) and weaknesses (transport time, location and availability of trimodal logistics centres and their connection to the manufacturing companies, multiple transshipment).

#### 5. Conclusions

Today, container transport for door-to-door moves has become the main form of transport for manufactured goods and component parts. Unfortunately, with current situation of combined transport in Slovakia, there is almost no possible way to integrate of the inland waterways into intermodal transport network in Slovakia very soon. It is associated with not only weak legal framework, but also the almost no effort of operators to use alternative means of transport. It is necessary to get the growth of the road transport under control and to provide funds to other, more environmentally friendly, modes of transport in order to make some competitive alternatives. Nowadays, intermodality presents the possibility to avert the collapse of the road freight transport system. Intermodality makes better use of the existing infrastructure and sources of service by integrating the short sea shipping, rail and inland water transport into the logistics chains. There is no need to wait for the better transport system until we do have the large-scale network of infrastructure at disposal.

In this case, we can say that connection of Slovakia and the inland waterway network using the Danube River is a way how to unburden the transportation flows, especially from the road networks and also to reduce costs of transport.

#### Acknowledgement

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#### References

- [1] Levinson, M. The Box: How The Shipping Container Made the World Smaller and the World Economy Bigger. Princeton, NJ: Princeton University Press, 2006. 400 p. ISBN: 0691136408.
- [2] Grobarčíková A., Sosedová J.. Carrier's liability under the international conventions for the carriage of goods by sea. In: Transport problems. 2014. Vol. 9 No. 3. P. 75-82.
- [3] UNCTAD, Review of maritime transport 2014. Geneva: UNCTAD, 204 p. ISBN 978-92-1-112878
- [4] United Nations. Terminology on combined transport. New York and Geneva, 2001, 71p.
- [5] EUROSTAT, Inland waterways freight transport - quarterly and annual data, 2014. Available at: [http://ec.europa.eu/eurostat/statistics-explained/index.php/Inland\\_waterways\\_freight\\_transport\\_-\\_quarterly\\_and\\_annual\\_data](http://ec.europa.eu/eurostat/statistics-explained/index.php/Inland_waterways_freight_transport_-_quarterly_and_annual_data)
- [6] Jurkovič M., Dávid, A. Technological and educational requirements for inland navigation simulator in the Danube region. In Naše more = Our sea : znanstveno-stručni časopis za more i pomorstvo. 2015. Vol. 62. No. 1. P. 13-19.
- [7] The Ministry of Transport, Construction and Regional Development. Plan for Transport Infrastructure Development in the SR until 2020, 2014. Available at: <http://www.telecom.gov.sk/index/index.php?ids=1>

## Session: Applied Informatics

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## IMPROVING SPEED OF DIGITAL IMAGE CORRELATION ALGORITHM USING OPENCL

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**Abstract:** Two-dimensional digital image correlation (DIC) is a well-established algorithm for quantitative in-plane deformation measurement of a planar object surface in the field of experimental mechanics. In this paper, we present means to improve speed of calculation for this algorithm using OpenCL to allow computation of very large and precise analysis on generally available hardware (both GPU and CPU). We provide an approach to speed-up the computation of correlations along with discussion and analysis on how each optimization behaves.

**Keywords:** DIC, displacement, correlation, OpenCL, GPU

## 1. Introduction

Measurement of surface deformations is an important task of experimental solid mechanics. There are many techniques to achieve the results, both with and without contact. Most used contact method used is point-wise strain gauge technique, overview of available non-contact methods can be found in [1], [2] and [3]. DIC is a contact-less technique using a fixed camera to capture the stress test followed by digital image processing and numerical computing to compute full-field displacements and strains. Advantage of DIC is its simplicity of test setup - we only need single camera and no modification to tested material to obtain results with good quality. It should be also noted that DIC has wide range of measurement sensitivity and resolution, since its precision is based on camera used, not the algorithm itself. Disadvantage of the algorithm is that quality of results depends heavily on the quality of imaging system and the computation is slow compared to other techniques.

### 1.1 DIC fundamentals

The complete description of DIC can be found in [4]. The input data are comprised of single video file or sequence of images capturing the specimen during the stress test. In case the input data are in color (usually RGB), they need to be converted to gray-scale. The first step is to split the calculation area (i.e. region of interest) into evenly spaced grids on which the displacements will be computed. The next step is to track (or match) same points (pixels) between two images (typically before and after the deformation) as illustrated in Figure 1.

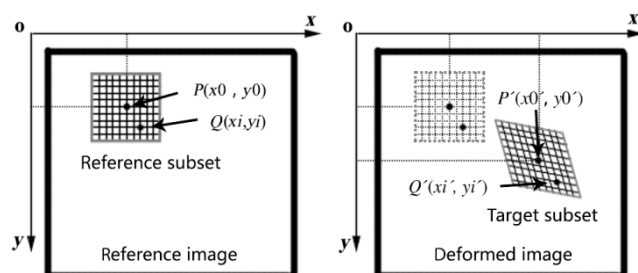


Figure 1 Deformation of subset

The displacement of a point P is computed using a square reference subset of  $(2M + 1) \times (2M + 1)$  pixels centered on point P to track its corresponding location in the deformed image. The subset of points is important because it offers good protection against noise and allows better distinguishing of the subset from other subsets in case of images with low gray level variations. The similarity is evaluated using some correlation criterion and searching for peak position of the deformed subset. The difference between the position of subsets center before and after the deformation yields the in-plane displacement vector.

In most cases, the displacement is not equal in all points of subset. In that case we need to employ some kind of "shape" function to describe the subsets change in the deformed image (in

Figure 1 we can see that point P has moved differently compared to point Q). There are multiple kinds of shape functions, each able to describe different kinds of deformations. The overview of the functions can be found in [4], for us it is sufficient to know that the shape function is a simple equation using pixels absolute position, its relative position to subsets centers and deformation coefficients to compute the new position.

## 2. DIC parallelism

The computation for one subset and deformation is isolated from others. The synchronization point, where all workers must meet, is after the correlation is computed, so the best result can be picked. With this in mind, we can create parallel version of the task quite easily in terms of task splitting. Problem with this approach can be in memory management, because every worker needs different data, so it might be problematic to transfer the data to all workers in time.

We have focused only on the part where the correlation of original and deformed subset is computed, because the rest of the algorithm is comprised of part with generally good parallel. Another reason we focused only on the correlation part is that there are multiple approaches to complete DIC computation chain, but the correlations are always necessary. So it is not important if developer decides to use Newton-Raphson method ([5]), Stochastic

Parallel-Gradient-Descent ([6]) algorithm or any other kind of solver, he can use our results to optimize his solver in terms of correlation calculation speed.

## 2.1 DIC on GPU

There has been some success in DIC computation using GPU for computation, details can be found in [7]. Our work differs from other papers in two factors; first the implementation is done using OpenCL (as opposed to CUDA for others), which offers compatibility on many platforms. The second difference is that our paper focuses on maximal performance optimization and we present a thorough analysis on how to improve performance of DIC algorithm using OpenCL.

## 2.2 Parallelism on CPU

Most basic mean of running the computation in parallel on CPU is to use threads. Modern processors have multiple cores (ranging from 2 to 16) and in ideal case each core computes one thread independently from other cores and threads. In real cases threads are sharing some data and need to wait for other threads to finish the work before they can utilize shared data.

## 2.3 Parallelism on GPU

GPUs have been a standard part of PC for some time, but there was no way to use them for numeric computation. Only available option was to use Direct X or OpenGL methods to access its rendering engine (frame-buffer in most cases) to produce some kind of graphic output (which can be used not only for games, but also for visualizations and video rendering, but not for pure numeric computation).

## CUDA

First company to offer a true GPGPU (General-purpose computing on graphics processing units) was NVIDIA with its CUDA platform. CUDA's advantage is direct access to virtual instruction set and memory, the downside is that it is only available on NVIDIA GPU cards. This limits the usability of the developed algorithm, but despite that CUDA received a lot of attention due to good performance in numerical computations.

Initial test concerning the speedup of correlation computation using CUDA can be found in [8]. The results are promising, the gain is usually around factor 15, which might be good, but the paper uses single thread CPU computation as reference. The paper [9] focuses on digital image correlation (as opposed to general correlation in [8]). The authors used library OpenCV to achieve computation on GPU and their results showed average improvement by factor of 10. Further speedup has been achieved by better utilizing GPU using simultaneous computation of products sums and also utilizing texture cache. Another way to achieve GPU computation using CUDA is to use MATLAB coupled with software Jacket, which is able to run MATLAB code on GPU. A test case using FFT variant of DIC algorithm can be found in [10]. The results clearly show that GPU computing provides a noticeable speedup, but performance of general solution

like Jacket might vary a lot according to tested algorithm and input data size and organization.

## OpenCL

In 2008, Apple submitted a proposal to Khronos Group (non-profit industry consortium, to create an interface called OpenCL (Open Computing Language) to allow easy execution of program on heterogeneous platforms consisting of CPUs, GPUs, DSPs and other processors. The main advantage of OpenCL is platform independence, so theoretically we create one code that can run on all platforms that support OpenCL.

## 3. Implementation

We used Java as main programming language. OpenCL offers API in form of C language headers, so we had to use some kind of wrapper, which will allow us to call methods of the API via Java method calls. We decided to use JOCL library ([11]), because it has low overhead due to direct Java code generation from C API.

For testing we used correlation part of DIC algorithm (given set of subsets and deformations, compute correlation value for each combination of subset and deformation coefficients), subsets were square shaped and as order deformations we chose first order. In our test we have used 9 data combinations - 200 / 5000 / 100000 deformations, subsets of sizes 7 / 20 / 40 and ROI size 88 x 240px (resulting of subset counts of 408 / 48 / 12).

We have run the test on multiple devices to see how the algorithm scales and how it behaves on different device types. The testing devices were following: NVIDIA GeForce GT650M, NVIDIA GeForce GTX765M, Intel Core i7 3610QM, Intel Core i7 4700MQ and Intel HD4000. In this paper, we will present numerical results from GT650M along with notes on how the variants behave on other devices.

### 3.1 CPU

Given complete test set, we can choose if we want to compute all deformations for one subset first (we call it per-subset) or try one deformation for all subsets (per-deformation).

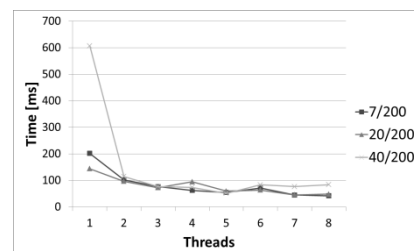


Figure 2 Computation time vs. thread count

In case of per-subset variant, threading can help a lot, cutting time by as much as 75%. In comparison of per-subset and per-deformation is no clear winner.

### 3.2 GPU porting using OpenCL

The code for computation on GPU has two parts; first is in Java using JOCL library, which consist of data preparation and loading to / from GPU, second part is the kernel written in OpenCL language. In previous section there was virtually no data preparation required (we generated data beforehand to minimize error in time measurement due to background OS operations), but for GPU you need to transfer the input data to GPU and results back from GPU which can take a lot of time compared to computation time (required time for transfers is presented with red color).

#### Direct code conversion to OpenCL

First variant is almost a direct code conversion to OpenCL program flow. The deformation and correlation is computed on GPU, the rest will be done on CPU (looping etc.). Images are arrays of integers, deformations, subsets and results are all float arrays. In this variant we utilized 1D kernel, which means we let OpenCL control one of our indexes and we control the second one in Java code.

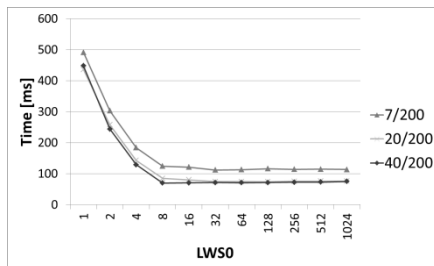


Figure 3 Execution time with different LWS0 values

Figure 3 shows how the kernel behaves with different LWS0 parameter, which is equivalent to thread count in CPU version. The graph shows that it is quite easy to choose the best LWS0, simply pick the biggest one available. Absolute results show that Java variants are superior to 1D OpenCL per-deformation variant, but per-subset variant performs the same or better in all cases than Java variant.

#### 1.5D kernel

Next kernel variant also uses 1D kernel execution, but we copy all of the data before the computation and only change the index of subset / deformation via kernel parameter. The results show identical behavior to 1D variant, but with far less overhead which provides better computation times.

#### 2D kernels

2D variant removes all looping from Java and lets OpenCL control the indexing. In this case we need to provide two parameters - LWS0 and LWS1, denoting the count of deformations (LWS0) and subsets (LWS1) computed in parallel.

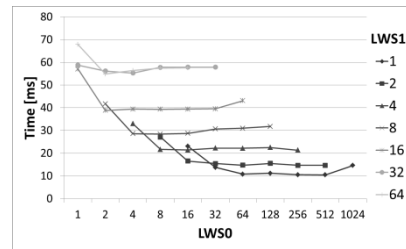


Figure 4 Behavior of kernel with different LWS0 and LWS1 values

From the graph we can tell that computing more than 1 subset in parallel is counterproductive, perhaps due to memory bandwidth limitations. Total count of workers ( $LWS0 * LWS1$ ) should not reach the highest values (1024 in our case).

#### Array vs image2d\_t

OpenCL contains class called "image2d\_t" which offers optimized memory access using cards texture cache. The downside of image2d\_t is that it requires more data preparation, some setup in kernel code and some devices might not support it (this will be discussed later). The results show that an image2d\_t variant is superior to array variant, cutting the time by as much as 40% in all cases.

#### Using private memory

This variant aims to use kernels private memory to store subset data. The problem with private memory size is its size. The results clearly show that the use of local memory is not productive. The reason is that each work-item has only a handful of registers available, so even when we store the data to local memory in source code, OpenCL discovers that the data are too large to fit so they are read from global memory each time, not from private memory.

#### Memory coalescing

Main bottleneck in OpenCL applications are usually memory transfers. The reads can be "misaligned" and a lot of data on the bus might get discarded. The fix for this is called memory coalescing. The results are not conclusive; there is some improvement but also some worsening. This is perhaps due to use of image2d\_t, which helps with data transfers by sending image data via another bus.

#### Vector data types

DIC is a 2D task (can be 3D), so we utilize OpenCL's vector instructions to compute both X and Y coordinates at once. The results are showing that optimized variant performs better in almost all cases than the basic one (up to 7% faster), only in one cases is performs same as the basic variant.

#### Using constant memory

We tried to mark some input data as constant to force OpenCL to store them in constant memory, which might be offer quicker access to some data. The results show that there is virtually no improvement, sometimes the



optimized variants perform worse than the basic one. The main problem with this approach is that while definition of constant memory in OpenCL is quite clear, the real implementation and thus the performance of constant memory vary a lot.

## Using local memory

Last block of memory we have not used is local memory. This memory is shared between threads in a group. In our case we used local memory to store subset data. The improvement in our test cases is around 10% which is probably the best optimization we have used so far.

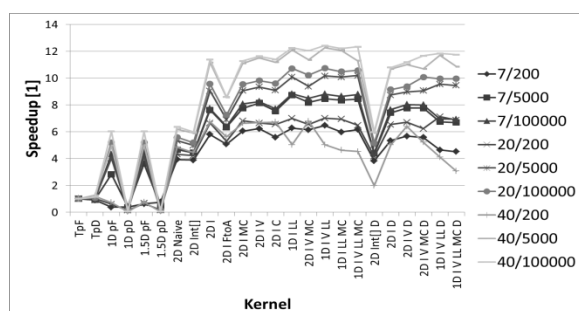
## Combining approaches

Optimization we used varied in performance, some performed very well while others not so much. Next step in speeding up the computation was to try to combine the approaches and see how they behave. We decided not to use the variant with constant parameters, because it is a not so robust approach with questionable performance gains. This left 3 optimizations - memory coalescing, using vectors and local memory storage. There is no clear absolute winner, but the best candidate would be the combination of vectorization and local memory.

### 3.3 OpenCL platform limitations

Problem of OpenCL programming is kernel running time limit. Every OS has a watchdog built-in which is trying to prevent GPU from freezing by monitoring execution time of kernel. The solution is to split the task, but now the data can be kept all on GPU until the total end computation, we only need to launch small portions of task to comply with the time limit. The results clearly show that the performance for driven kernels (time limited ones) is worse by as much as 5% in worst cases.

### 3.4 Results graph



*Figure 5 Results for all kernels*

Figure 5 present complete results of our optimization process. For each optimization, we have picked the best result in terms of absolute computation time. The graph present result as speedup against base variant, which was Java per subset variant. The kernel names are created as abbreviations of section titles. Last 6 kernels are the driven variants (D at the end of the name).

### 3.15 GPU vs CPU vs iGPU

The results presented so far have been all from computation on NVidia GT650M. We tried the same bulk of tests on other devices also. Second device we tested was NVidia GTX765M. The behavior of kernels was quite the same, only the absolute performance is better as expected. CPU's can't handle image2d\_t and have limited or none local memory. The best variant for CPU was 1D per-subset, which performed as best in dominant part of data configurations. But OpenCL variants were still faster than Java variants. As expected, model Intel Core i7 4700MQ was faster than i7 3610QM and behaved comparably.

Last device we have tried was Intel HD4000, an integrated graphics card. The performance itself wasn't bad, but the behavior of the card was quite random. In some cases the performance plummeted almost to a halt with no reasonable explanation why it happened. From the results we could obtain it is clear that driven variants behave quite the same as on CPU.

## 4. Conclusion

To conclude all our findings, we can say that using GPU and OpenCL to speed up the computation of DIC algorithm is a very good approach. The time of best OpenCL variant was always around 30 times faster than basic Java single thread implementation and round 9 times faster than the threaded one. We saw that vectorization and local memory usage was beneficiary in almost all cases while using memory coalescing not so much. Next good thing apart from speed improvement is that the CPU can perform other tasks (such as result post-processing, presentation etc.) while the computation continues in the background on GPU so user can browse "live" results without slowing down the computation itself.

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## References

- [1] Rastogi P.K., 2000, Photomechanics, (Topics in Applied Physics) (Berlin: Springer)
- [2] Sirkis J.S., Lim T.J., 1991, Displacement and strain-measurement with automated grid methods, *Exp. Mech.* 31
- [3] Goldrein H.T., Palmer S.J.P. and Huntley J.M., 1995, Automated fine grid technique for measurement of large-strain deformation maps, *Opt. Lasers Eng.* 23 305–18
- [4] Bing Pan, Kemao Qian, Huimin Xie, Anand Asundi, 2009, Two-dimensional digital image correlation for in-plane displacement and strain measurement: a review, *Meas. Sci. Technol.* 20 062001, <http://iopscience.iop.org/0957-0233/20/6/062001>.
- [5] H. A. Bruck, S. R. McNeill, M. A. Sutton, W. H. Peters III, Digital image correlation using Newton-Raphson method of partial differential correction, *Experimental Mechanics*, September 1989, Volume 29, Issue 3
- [6] X. Long, S. Fu, Z. Qi, X. Yang, Qifeng Yu, 2013, Digital Image Correlation Using Stochastic Parallel-Gradient-Descent Algorithm, *Experimental Mechanics*, April 2013, Volume 53, Issue 4, pp 571-578



- [7] H. Leclerc, J.-N. Périé, S. Roux, F. Hild, 2009, Integrated Digital Image Correlation for the Identification of Mechanical Properties, MIRAGE 2009, LNCS 5496
- [8] D. Gembris, M. Neeb, M. Gipp, A. Kugel, R. Manner, Correlation analysis on GPU systems using NVIDIA's CUDA, Real-Time Image Processing (2011) 6:275–280
- [9] B. Marcinak , T. Marcinak , Z. Lutowski , S. Bujnowski, Usage of digital image correlation in analysis of cracking processes, Image Processing & Communication, vol. 17, no. 3, pp. 21-28
- [10] A. Singh, S.N. Omkar, Digital Image Correlation using GPU Computing Applied to Biomechanics, Biomedical Science and Engineering, 2013, Vol. 1, No. 1
- [11] Java OpenCL (JOCL) library description, February 2015, <http://jogamp.org/jocl/www/>.

## CLOUD AND VIRTUALIZATION IN LINUX ENVIRONMENT

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**Abstract:** *The basic idea behind the article is to analyze the possibility use of Linux and open source for deployment of the private cloud environment and wide range of applications. This includes analysis of the necessary software and hardware components, as well organizational needs, costs and human resources. The article deals with the bases of various software functionalities and offers a selection of specific functional deployment of private cloud solutions. The aim of the article is to give information about possibilities in private cloud computing and virtualization software based on open source OpenStack and Ubuntu.*

**Keywords:** *cloud, Linux, OpenSource, virtualization, data storage*

### 1. Introduction

The first point of this article is the fact that currently is here increasing emphasis on environmental behavior of enterprises, but also the whole society and the "green" direction. Together with rising energy prices are increasingly showing the benefits of virtualization and cloud solutions. This will signify into lower costs, for example by reducing the number of real PCs in the enterprise, but also the whole society. From the perspective of the client could be used for multiple operating systems and services as primary real operating system, allowing to greater unification and uniformity of application equipment, as well as better data consistency. Virtualization and cloud technologies are for the following reasons increasingly important. Notion, the important technologies, is that type of technologies that currently has or is likely to affect the future business model. Cloud technologies due to its innovativeness bring big changes to several corporate processes. Nowadays, referred as age of information technologies it is an essential tool for every company, but also for the whole society, appropriately managing and resolving method of communication, data storage and appropriate use of various application software. About any topic in the field of information technologies is not so often discussed as on model of services and cloud computing. The name Cloud, takes its name from a lay point of view of the logic of such a system. It combines in itself an infrastructure and platform and services. The whole system is then provided to the client as a single product. Cloud computing is changing the view of the functioning and financing of systems, while cloud offers new possibilities and opportunities on the IT market.

### 2. Virtualization Services in the Cloud

Virtualization services are linked to an architecture that is oriented to service-oriented architecture. It is a set of services to each other in complicated way connecting and communicating with each other. It means to ensure mutual bonding of these services. The service is most frequently located between the client services and execution services.

This method of mediatorial service is a baseline precondition for all architectures of virtualized services.

In such virtualization, the communication does not take place directly between the client and process of doing, but by using mediatorial service. Then all the used components work together regardless of their physical location. This allows independent ownership of each level. In the service-oriented architecture that provides a high degree of flexibility. Service virtualization allows organizations to use wide possibilities offered by cloud computing. Virtualization of services cannot be confused with cloud computing. Virtualization of services is actually a flexible set of design principles in the development and implementation of the system. Cloud computing could be used for computing and services on global networks, sharing resources, information and software. It may be, as appropriate, provided as a public service. Such a process promotes the free access connection and minimal dependence between different parts of the system. As a consequence, the change of the system has minimal effect on the system as a whole. The difference is in drawing attention to the use of services horizontal to vertical use of services. At the service-oriented architecture, one service means only one business need. However, if these services are combined, it creates actually enterprise application or solution. In this case, the services are already horizontal.

### 3. Analysis of Open Source Cloud Software

Today, modern technology come into consideration of various choices of software for building cloud solutions, but to build a self-contained system with full control, based on open source and virtualization, there is significantly less choices. Possible strong alternative is OpenStack, CloudStack and Eucalyptus. OpenStack developed Rackspace and NASA together in 2010 and currently is a massively supported and used by major software and hardware world giants.

Eucalyptus compared to OpenStack and CloudStack is the longest standing open source project underpinned by its very close technical ties with Amazon Web Services with the intent to persuade businesses to go the hybrid route in

the area of the cloud computing. Allow run private clouds under the software Eucalyptus and seamlessly provide the transition to Amazon public cloud when needed.

#### 4. OS Choice

Ubuntu has been tested as the main supporting operating system with version 14.04 for cloud-based OS. Canonical provides native support for their systems and OpenStack, also provide private hosting named BootStack.

The big advantage is the version available with port for the 64-bit ARM architecture and ARM version is officially supported for the server platform. Giving preference to the ARM architecture can create considerable savings in electric energy.

During installation is quite significant to set management of Disk Format LVM (Linux Volume Manager). This method of storage management allows to create from two or more hard drives integrated compact storage or to create the mirror for higher security against data loss. The mirror system can be assembled using LVM either to external media. In case of failure of internal disk the system can be restored.

Ubuntu is one of the most popular operating systems for deployment of OpenStack. The fastest way for deploy OpenStack in enterprise precisely consists in the solutions and support tools such as Juju, MAAS, Landscape.

Juju is a tool to orchestrate services via a graphical interface and allows one of the quickest ways to deploy OpenStack, or any complex workloads to public or private cloud.

Canonical has created Metal as a Service (MAAS), system that allows quick and easy adjustment of the physical hardware on which is possible to deploy scalable, comprehensive services, such as Ubuntu OpenStack for cloud infrastructure. MAAS is software that allows bonding of different hardware to create server clusters.

Landscape, is robust tool for systems management that allows monitoring cloud resources and draws attention to potential problems. It offers a complete solution for managing software for Ubuntu, including management and compliance functions. Landscape allows management of computers in bulk and ensures the integrity of the network configuration but it is also possible to set custom groups and subgroups for the different management structures in environment.

#### 5. OpenStack

OpenStack software can manage a large number of computing, storage and network resources across the data center, and provide control via the dashboard (Horizon) or through the OpenStack API. OpenStack works with popular business entities such as AT & T, AMD, Avaya, Canonical, Cisco, Dell, EMC, Ericsson, Go Daddy, Hewlett-Packard, Huawei, IBM, Intel, Mellanox, Mirante, NEC, NetApp, Nexenta, Oracle, PLUMgrid Pure Storage, Red Hat, SolidFire, SUSE Linux, Canonical, as well as many other open source technologies, making it ideal for heterogeneous infrastructure. Hundreds of the world's largest brands rely on OpenStack in the operation of its business, reducing costs and helping them move faster

across business. OpenStack has a strong ecosystem, is managed by a nonprofit foundation and users who are looking for commercial support can choose from a variety of OpenStack-powered products and services on the market.

OpenStack supports functions such as the management of floating IP addresses of security, availability zones and command line client in Python. OpenStack has a modular architecture with different names of its components.

OpenStack Compute (Nova), controller, is a major component of IaaS. It is designed to manage and automate IT resource and can work with commercially available virtualization technologies, as well as for high performance computing configurations. It is written in Python and uses a lot of external libraries such as Eventlet (for concurrent programming), Kombu (AMQP for communication), and SQL Alchemy (for database access). OpenStack Object Repository (SWIFT) is a scalable redundant storage system. Objects and files are written to multiple disk units located throughout the data center, with OpenStack software responsible for ensuring data replication and integrity of the entire cluster. Storage Clusters can scale horizontally simply by adding new servers. If the server or hard drive fails, OpenStack will copy the contents of the active nodes to new locations in the cluster. In this case can be used inexpensive hard drives and servers on a larger volume.

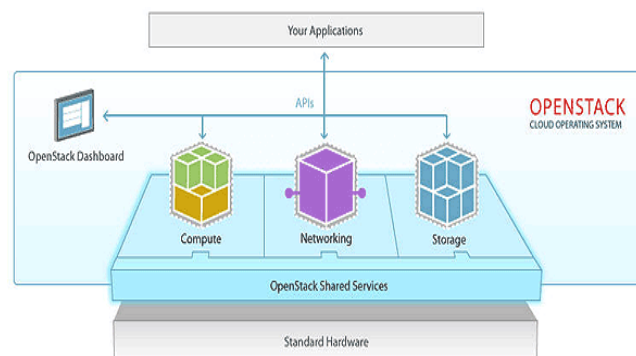


Figure 1: OpenStack: The Open Source Cloud Operating System

OpenStack Block Storage (Cinder) provides permanent storage, block-level storage for use with OpenStack. Cinder manages creating, connecting and disconnecting block devices for servers. Cinder is fully integrated into OpenStack Compute and Dashboard allowing users to manage their own cloud storage requirements. In addition to local storage of Linux server can be used for storage platforms, including CEPH, CloudByte, Coraid, EMC (ScaleIO, VMAX and VNX), GlusterFS, Hitachi Data Systems, IBM Storage (Storwize family, SAN Volume Controller, XIV Storage System, and GPFS ), LIO Linux, NetApp, Nexenta, Scalify, SolidFire, HP (StoreVirtual and 3PAR StoreServ family) and Pure Storage. Block Storage is suitable for performance-sensitive data, such as database storage, expandable system files.

OpenStack Networking (Neutron, formerly Quantum) is a system for managing networks and IP addresses. Neutron provides network where is no as an obstacle and even limiting factor in cloud deployment and provides users with self-service ability, even across network configurations. Neutron provides network models for different applications or user groups. Standard models are flat network or VLAN to separate the servers and network. Neutron manages IP addresses, which would enable a static IP address or DHCP. Floating IP addresses can be dynamically redirected to any other power in the IT infrastructure so that users can redirect traffic during maintenance or in case of failure. Users can create their own networks to manage communication and linking servers, devices with one or more networks. Neutron provides enhanced deploy and manage additional network services such as intrusion detection systems (IDS), load balancing, firewalls and virtual private networks (VPN). OpenStack Dashboard (Horizon) is dashboard that provides for administrators and users graphical interface to access, the provision and automate cloud-based resources. The design accommodates the products and the services of third parties, such as billing, monitoring, and other management tools. Horizon is one of several ways that users can interact with OpenStack resources. Developers can automate access or build tools for managing resources using OpenStack API or API compatibility to Amazon EC2.

OpenStack Identity (Keystone) provides a central directory of users mapped at the OpenStack service to which they have access. It supports multiple forms of authentication including standard, user name, password, credentials, tokens systems AWS-style (Amazon Web Services) login. In addition, it lists all the services deployed in the OpenStack cloud in a register. Users and third-party tools can programmatically determine which resources will be available.

OpenStack Image Service (Glance) provides detection, registration and delivery services for disk images and images of servers. The stored images may be used as a template. Glance can store disk images and servers including OpenStack Object Storage. Image Service API provides a standard REST interface to query information about the disk image and allows clients to transfer images to new servers.

OpenStack Telemetry Service (Ceilometer) provides a single point of contact for billing systems. OpenStack Orchestration (Heat) is a service that allows you to organize more cloud applications using templates.

OpenStack Database (Trove) is database as service (DaaS), relational and non-relational management database architecture.

OpenStack Bare Metal Provisioning (Ironic) is a project which aims to manage the provision of real instead of virtual machines.

Multiple Tenant Cloud Messaging (Zaqar) is a multi-tenant cloud system services for web developers. It combines the idea of Amazon SQS product with support for special events.

OpenStack Elastic Map Reduce (Sahara) aims to provide users with a simple means of delivering Hadoop cluster by entering a few parameters such as the Hadoop version topology clusters, nodes, hardware details, and a few others. After the user fills in all the parameters Sahara deploys monastery within minutes. Sahara also provides a means at a scale of already provided clusters, adding and removing of working nodes on request.

## 6. Virtualization Resources

For the needs of OpenStack cloud system is important to choose the most satisfactory production virtualization software. It has a great impact on the functionality of cloud solutions and can fundamentally alter the functionality and manageability of the production environment. This could be: Kernel-based Virtual Machine (KVM), Quick Emulator (QEMU), Linux Containers (LXC), XEN, User-mode Linux (UML), Hyper-V, VMware vSphere. Where Hyper-V, VMware vSphere are proprietorial virtualization software, which is freely available.

## 6. Conclusions

The article deals with the issue of private cloud for organizations based on OpenStack software and with the functionality of suitable operating system for server environment deployment. Also the desirability of use the ARM architecture infrastructure for cost, energy savings and smaller environmental burden.

In any solution or plans for the provision of services, it is appropriate to mention the risks and disadvantages that are associated with it. Cloud solutions can allow various forms of danger. At first glance the design of information system, which is based on outsourced cloud solutions, must be clear that comes to separation of corporate information environment from the internal environment of the company and this is risky. Just distribution of information infrastructure for internal and external conditions is giving new risks. These risks can significantly jeopardize the functioning of information systems and whole organization future. There is no such separation in private cloud and therefore less risk. Another issue is ensuring connectivity to the data cloud source for workers if they need access to data from the external environment. The basic precondition for the solution to this problem is reliable and high-speed connection to the Internet.

The whole solution is based on Open Source Software products and is therefore free. For full functionality of enterprise cloud it can be ensured without the use of proprietary software, but for full deployment can also be used proprietary management tools, support or accelerate the implementation and management of those systems.

## References

- [1] BARETT, D. - KIPPER, G. *Virtualization and Forensics: A Digital Forensic Investigator's Guide to Virtual Environments*, Syngress, 2010, ISBN 1597495573
- [2] Blem, E. *A Detailed Analysis of Contemporary ARM and x86 Architectures*, Jaikrishnan Menon, Karthikeyan Sankaralingam University of Wisconsin - Madison

- 
- [3] *Disruptive Information Technology Innovation Model* - model from Carlo (Carlo, et al., 2011 pp. 93-96)
- [4] Girish L. S. - Guruprasad H. S. *Building Private Cloud using OpenStack*, International Journal of Emerging Trends & Technology in Computer Science (IJETTCS), ISSN 2278-6856
- [5] <http://www.networkworld.com/article/2166407/cloud-computing/stack-wars--openstack-v--cloudstack-v--eucalyptus.html>
- [6] <http://www.ubuntu.com/server>
- [7] <http://www.ubuntu.com/cloud/tools/juju>
- [8] <http://www.ubuntu.com/cloud/tools/maas>
- [9] <http://www.ubuntu.com/management/landscape-features>
- [10] <http://www.rackspace.com/cloud/openstack>
- [11] [https://wiki.openstack.org/wiki/HypervisorSupportMatrix#Compute\\_Drivers](https://wiki.openstack.org/wiki/HypervisorSupportMatrix#Compute_Drivers)
- [12] Sonali Y. *Comparative Study on Open Source Software for Cloud Computing Platform: Eucalyptus, Openstack and Opennebula*, International Journal Of Engineering And Science, Vol.3, Issue 10 (October 2013), pp 51-54, ISSN (e): 2278-4721, ISSN (p):2319-6483.

## INFORMATION SECURITY

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**Abstract:** *In the era of globalization, increasing mobility and society's dependence on information and communication technologies increases the possibility of their misuse. A key problem at a high level of informatization becomes the ensuring of the smooth operation of information and communications infrastructure and protecting the information that are processed in it. Given the increasing number of security incidents it is useful in the management of information security to handle the process of business continuity planning.*

**Keywords:** *security, vulnerability, information, communication, protection*

### Introduction

Security is a basic need of every system. Vulnerability and the possibility of large-scale irreparable damage are a result of problems in the use of information and communication technologies, so they cause the requirements to adopt procedures to minimize risks and eliminate potential damage. The concept of information security has therefore become a very important aspect of reliability of ICT (information and communications technologies) systems.

This term represents a process of protection of information systems and data against accidental or intentional misuse by different persons. It covers a very broad range of issues. Development of ICT brings to this area, other new problems and conversely some old cease to exist.

Modern society's dependence on correct and uninterrupted operation of information systems is high and it is expected that it will further deepen and future information society is characterized by high sensitivity to these phenomena and events that its consequences will affect the ability of information and communication systems to provide services in the required quality.

Information security in communications and information systems is defined as the belief that such systems will protect the information with which are handle them, and will function as they should, and when they have to work, under the supervision of authorized users. Effective information security must ensure an adequate level of confidentiality, integrity, availability, authenticity and non-repudiation.

Today exploited systems are characterized by such a high inner complexity that, as the slightest deviation in the technical or programmatic implementation, any deviations from the expected or desired user activity can have irreversible consequences that are virtually unavoidable or that can be removed only with the enormous efforts and large volumes of financial investment. In addition, concentrating vast amounts of data on a small and often physically inadequately protected area, accessible via computer networks is forming a variety of new threats related to tampering with data. For example, electronic banking was stimulating activities aimed at stealing data to

allow the withdrawal of money from others bank accounts, companies offering services on the Internet are becoming the target of various attacks on their information systems.

### 1. Principles for Building a Culture of Safety

The nature of information security within an EU-wide information space perhaps best described by the OECD Guidelines for the security of information systems and computer networks. Directives define nine basic principles on which it is necessary to base the information security solutions.

#### 1.1. Awareness

All participants should be fully aware of the need for security of information and communication systems and what they can do to enhance security. This awareness of the possible risks, but also ways to avoid them, is the first line of protection of information systems security, affected by internal and external threats. Participants should understand that security failures may substantially damage the systems at their disposal. They should realize the potential damage that may arise as a consequence of links to other information systems and computer networks. As prevention of such damage should be aware of the possibilities of upgrading systems and also the appropriate procedures for implementation that can enhance the security of information and communication technologies.

#### 1.2. Responsibility

As the parties are dependent on interconnected local and global information systems and computer networks, they should be sufficiently aware of its responsibilities for the security and should carry it in a way that corresponds to their individual tasks. Periodically should review its own course of action, adopted security measures, regulations, practices and procedures and assess their relevance and effectiveness in relation to its surroundings. The creators of products and services should take into account every system and network security of their information systems to provide timely and relevant information, including updates to allow users to better understand the

functionality of products and services in terms of their security.

### 1.3. Responsiveness

Due to the interconnection of information systems and computer networks and the resulting large potential for spreading potential damage, participants should cooperate with each other in dealing with events having an impact on safety, to exchange information on various forms of threat and vulnerability information systems and implement relevant procedures for cooperation in detecting, responding and preventing security incidents. Where possible, this approach can simultaneously represent a cross-border exchange of information, as well as international cooperation in the field of information security.

### 1.4. Ethics

With respect to the interconnection of information systems and computer networks, participants should respect their interests and realize that their action or inaction may significantly harm those interests. Therefore, ethical behavior is a fundamental rule and all participants should develop and adopt practices and to promote conduct that recognizes security needs.

### 1.5. Democracy

Security of information systems and computer networks should be in any direction compatible with the values of a democratic society and implemented in a manner which is not incompatible with recognized values such as freedom of exchange of thoughts and ideas, the free flow of information, openness, transparency, and ensure the confidentiality of personal information.

### 1.6. Risk Assessment

Regular evaluation of the potential risks of information systems security is an ongoing process that can identify threats and weaknesses of information security. This evaluation should be sufficiently broad to prove summarize all the internal and external aspects of security, including damages, which could cause other participants to allow determination of the acceptable level of risk and assist in selecting the most appropriate control mechanisms to deal with damage information and communication systems of both in nature and degree of importance of the information to be protected.

### 1.7. Design and Implementation of Safety System

Principles for building information and communication technologies should participants carried out in order to optimize their safety, which should be an essential element of all information systems and also an integral part of their architecture designs. These efforts would be in most part had to focus mainly on designing and accepting of effective security features of technical and non-technical nature of such a solution that would be able to avoid possible damage by identified threats and weaknesses. At the same time, these security features and the chosen

solutions should be proportionally equal to the value of the information contained in information systems.

### 1.8. Security Management

Information security management should be sufficiently dynamic and should include all levels of activities and participants in all aspects of their undertaken operations. It should be focused on anticipating potential threats and also should its preventing, detecting and responding focus on ongoing maintenance, inspection, audit and recovery systems. All of the above policies and security measures should be coordinated and integrated to create a coherent system.

### 1.9. Review

All participants should continuously evaluate and depending on the results then revise or modify all aspects of security of information systems and computer networks. In practice this means that all participants should by appropriate way modify security policies, measures, processes and procedures and so faces security risks.

## 2. Common Mistakes in Information Security

To ensure information security is necessary to avoid the risks which may negatively affect the smooth running of IT systems. When analyzing the typical and most common mistakes, IT security may seem that the environment in which the information system is deployed, have no fundamental importance to achieve the desired level of security. To assess a particular situation is used a list of the most common examining weaknesses in information security, which are outlined below. At the same time it indicates precautions to prevent these deficiencies.

### 2.1. Does Not Place Emphasis on Safety

Compared with the requirements of the technical parameters or range of functions, information system security is often a low priority. Despite the fact that almost 95% of organizations stated that information security from the perspective of its strategic objectives have pointless importance; they still use to see it as a factor which is increasing the cost of building and operation of an information system. Especially when buying new products is often neglected or even disregarded the safety properties of application or information system. There are several reasons, from lack of support for Information Security by management through inadequate research of new product safety to the absolute ignorance of the issue of security of information and communication systems. In the worst case, the necessary precautions are postponed on indefinitely future or even not implemented at all.

### 2.2. Lack of Procedures to Maintain the Security Level

Safety is often seen in the context of individual isolated projects that are needed to initialize specific actions to adequately resolve the situation. However, many times is neglected the compliance of objectives of the project in the longer time frame. For example, the vulnerability analysis of system is drawn up together with recommendations on safety measures. However, the subsequent implementation

of the system is not being followed properly. Similarly, when you install new information system shall always be included requirements for the basic safe installation. However, experience shows that these settings are subsequently constantly changing, but rarely is carried out verification of compliance with the original requirements. Such cases are in everyday practice rather common.

### **2.3. Undocumented Safety Targets**

Nearly 75% of large enterprises and government institutions have their security policies and guidelines for its application have specified in a written form. But it is not common for most small and medium-sized enterprises. In addition, security policies are effective only in the case where compliance can be monitored. Many policies are very abstract and are giving a lot of freedom to different interpretations. Another problem is that compliance with the rules of the security policy is often not mandatory at the level of contract with the staff and so in individual cases it may happen that the security breach can be prosecuted only with difficulty or not at all punished. The mentioned cases affect the non-compliance with established rules, thereby increasing security risk.

### **2.4. Inadequate Protection of Access to the System**

Procedures to protect the access to information system are typically implemented on the basis of entering a password. However, users are often not led to choose secure passwords. The requirement to regularly change the password is also considered to be unnecessary. In another case, they use one password for entry into multiple systems, since it is a problem for users to remember multiple passwords. The problem occurs when such a password come to unauthorized person or attacker cleverly decipher it either by method of trial and error or test the same password in other applications related to the same person. Likewise, keeping passwords under the keyboard or computer unlocked desk drawer greatly facilitates access to sensitive data.

### **2.5. Inconsistency in Backing up the Data**

The data contained in information systems often tend to back up only rarely or even not at all, although interested users are familiar with the risk of data loss. If the regular backups of data are carried out, it often happens that the backup is not sufficient. If the backup again is done automatically, users usually have no idea at all that data is backed up, how often to back up and how long it shall be stored. Often also becomes that the storage media with data backups are kept in the same room where there is information system, which is from the view of the safety a fundamental error.

### **2.6. Lack of Training**

Constant changes in information systems and applications are requiring a high degree of initiative from users to work with these systems responsibly. It is difficult to consider as suitable way to learn controlling increasingly complex systems by learning for real in practice without training in a training environment. User manuals are either not

available at all, or if they are, many times there is not enough time to read them. Training usually does not cover the needs of users of information systems and knowledge of one isolated area of scientific interest is not sufficient, because absolutely not take into account the interaction between different systems. In addition, expensive training courses and participants during participation are missing the performance of professional duties by their employers.

### **2.7. The Absence of Restrictive Measures for Granting of Access**

The basic rule of information security is that every user and every administrator should have allowed access to the data and running the programs they need for their daily work. In practice, however, often it means to make an additional administrative and technical effort. For this reason, have amount of users' access to programs that do not need. Because client computers and servers are interconnected via a computer network, it is often possible without the existence of appropriate access restrictions simply to gain access to data belonging to other users or to the data stored in other computers. In that case, then it can become that lax admission to the system can be easily abused, whether accidentally or intentionally.

### **2.8. Sensitive Systems are not separated from Open Networks**

While are sensitive data and information accessible only to internal computer networks, security risks are limited solely to employees. However, if the system connects to the Internet network, it is necessary to take into account the threat of the risk that third parties can easily exploit its vulnerabilities. Secure connection of information systems to the internet requires specific knowledge of administrators without them cannot avoid configuration errors. Information systems and their data are not insulated at all or only weakly isolated from open computer networks. Even the existence of firewall does not always reflect the state of security. Many information systems administrators mistakenly believe that is sufficient firewall to protect computer networks from the external environment, external audit carried out by security specialists, however, can detect vulnerabilities.

### **2.9. Poor Maintenance of the System**

In the case when system administrators does not install security patches in a timely manner. Most of the damage caused by computer viruses is known after determining the existence of pest. When are already available security patches from different manufacturers, as these patches are not published regularly. The selection and testing of the patches that are relevant to the subject usually calls for enough time. Many administrators would prefer to wait until the operating system automatically installs the regular new updates. Such an approach can be considered as neglect.



## 2.10. Weak Protection against Intruders and Damages Caused by Natural Forces

Do not locked room with the computer systems, open windows or visitors moving unattended or notebook left in the car seat, are all factors providing many opportunities for uninvited visitors and increasing the risk that the information security will be broken down. Then there is a more severe data loss and the risk that the offender could exploit this data than loss of technical equipment caused by theft. Disasters such as fire or flood tend to be rare, but their result is usually fatal. Despite this quantity, particularly of small organizations does not have drawn up a recovery plan for the functionality of information and communication systems for major emergencies. Also absent drawn fire precautions, procedures to protect against water damage or other natural disasters and ensure uninterruptible power connection

## Conclusion

This article discusses about basics of information security for individuals and organizations of communication infrastructure to protect important data. It had been identified most security mistakes and issues that focus on high importance to take more attention. It is not easy and cheap to handle information security in organizations but there is lot of reasons to make it correct and manage whole system to by secure and safety. There is no complex solution for each organization or individuals. Each company has to do analysis for potential risks and make correction of their risk management. Basic precautions could help to be prepared and prevent safety incidents or loss potential important data. Most of security vulnerabilities are from personal aspects that can be handled or managed but it is not applied. One of the best possibilities to improve information security is external audit which gives independent scientific view of the state of information security and certification.

## References

- [1] Bíro, P. *Informačná bezpečnosť v medzinárodnom kontexte*. Zborník príspevkov z odbornej konferencie Informačná bezpečnosť 2008. Bratislava: Slovenská asociácia pre informačnú bezpečnosť, 2008.
- [2]<http://www.consilium.europa.eu/sk/general-secretariat/corporate-policies/classified-information/information-assurance/>
- [3] Kostrecová, E. *Informačná bezpečnosť*, Vydavateľstvo: STU, 2013
- [4] Strnád, O. *Riadenie rizík informačnej bezpečnosti*. Edícia: Teória a prax riadenia informačnej bezpečnosti. Ostrava: Vydavateľstvo Amos, 2010.

# ANALYSIS OF WIRELESS CONTROL OF MECHATRONIC CNC SYSTEM BY MEASURING FEEDBACK INTENSITY AND CONTROL SIGNALS

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**Abstract:** The article deals with the implementation of wireless control of an experimental model and analysis of the quality of the transmitted and received signal. Part of the article is a brief theory of operation principle of the wireless network and its distribution according to international standards. The main part of the article is devoted to the selected experimental model control by means of various wireless devices that have different quality depending on surrounding conditions. The range of received signal was measured at free space and through the wall, whereas these parameters have the greatest impact on the quality, radius of wireless control and values of signal delay.

**Keywords:** wireless, notebook, router, smartphone, CNC

## 1. Introduction

Currently it is continually more actual topic of wireless technologies not only for households, but also from industry sector. Wireless technologies offer sever advantages compared to classical cable connections, for example they allow to build LAN without cables and therefore lower costs of network creation, compatibility when changing the connection place, wide range of available products of various brands, incorporate norm, environmental impact etc. Among the basic disadvantages belong a safety of ciphering and limited reach, which varies depending on used devices and surrounding conditions. In light of diagnostics of wireless networks it is important to know intensity values of transmitted signal and feedback period between server and client. If the values are favourable enough, it is possible to ensure the quality of transfer which correspond to traditional cable connections. In our case we measured signal intensity and feedback period of Wi-Fi wireless network on various devices.

## 2. Wireless Network

Wi-Fi is a group of standards for wireless local networks LAN currently based on specifications IEEE 802.11 WIFI was developed for wireless devices and local networks, but today it is often used for connection to internet. It enables a person with wireless adapter (PC, notebook, smartphone) to connect to server in vicinity of access point. Physical area covered with one or several access point is called hotspot [1].

Typical Wi-Fi network includes one or more access points and one or more clients. AP emits its SSID (*Service Set Identifier, network place*) by means of packets, which are transmitted mostly every 100 ms at speed of 1 Mbps (the lowest speed of Wi-Fi). This ensures, that client receiving the signal from AP can communicate at the speed of at least 1 Mbps. According to settings (eg. according to SSID) the client can decide, if he will connect to AP. If in range of client are e.g. two access points with the same SSID, client can decide according to signal to which AP he

will connect. Wi-Fi standard leaves the choice of connection criteria and roaming completely on client. In the future, wireless adapters are going to be more controlled by operating system. Even though Wi-Fi is transferred through air, it has the same properties as non-switching ethernet. Even collisions can occur similarly to non-switching ethernet networks. 802.11 uses access method to medium is necessarily DCP [1].

Table 1 Overview of Wi-Fi standards IEEE 802.11

standard	year of publication	zone [GHz]	maximum speed [Mbps]	physical layer
IEEE 802.11	1997	2,4	2	DSSS
IEEE 802.11a	1999	5	54	OFDM
IEEE 802.11b	1999	2,4	11	DSSS
IEEE 802.11g	2003	2,4	54	OFDM
IEEE 802.11n	2009	2,4 or 5	600	DM
IEEE 802.11y	2008	3,7	54	-
IEEE 802.11ac	2013	5	1000	DM
IEEE 802.11ad	2014	2,4 – 5 – 60	7000	-

## 3. Model and Methods

We use measurement of feedback and intensity of signal of wireless network for analysis of quality transfer. For demonstration was chosen experimental CNC engraving miller, which controls are realized through VPN protocol. On Fig.1 is a chart of wireless controls of the model, which is controlled from personal computer straight through parallel LTP port (*Centronics*). It is possible to control controlling PC by device for remote usage through Wi-Fi network. Operator by PC and router, notebook or smartphone. (Fig.1\_1) creates a local Wi-Fi network (Fig.1\_2) through which it connects to controlling PC by means of VPN protocol. Controlled PC (Fig.1\_3) is connected to step motors by means of controlling board TB6560 (Fig.1\_4). CNC miller (Fig.1\_5) engraves shapes in 2D format (Fig.1\_6) or 3D to various materials (wood, plastic, aluminium) [3].

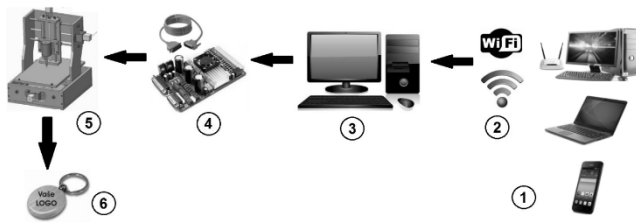


Figure 1: Chart wireless control CNC engraving milling

Measurement was realised on this model with purpose of detecting the range of network. In addition, we were able to realise controls and ensure required level of regulation of basic parameters. Three devices were chosen for comparison, all able to create wireless network. First device is traditionally used box personal computer connected to broad-band router TP-LINK WR-741ND (2010), notebook ASUS K55N (2009) and smartphone Huawei Y550 (2015). Our goal was to discover, which device achieves the best results in term of reach of created wireless network and also a quality of transfer, which indicator is a length of feedback - ping.

#### 4. Measurement of signal quality

This part is dedicated to signal measurement and feedback on laboratory model of experimental CNC engraving miller. The model is connected to controlling PC through created Wi-Fi network on router. Each wireless network has but only limited reach with quality and transfer speed, which is a result of various factors, for example physical obstacles (door, wall, shade), air humidity, presence of strong electro-magnetic fields (from server motors) etc. The aim of this measurement is to discover, which distance is acceptable for controlling of laboratory models. On Figure 2 we can see a block scheme of measurements of signal intensity (dBm) and feedback period (ms). Wi-Fi router with created network is installed on referential place and the amount of signal and feedback are monitored in various distances from 10m up to complete outage of signal and disconnection [2].



Figure 2: Block scheme of signal and feedback measurement

#### Conditions of measurement

surrounding	free and with obstacle (wall)
air humidity	52 %
temperature	18 °C
used router	TP-LINK WR-741ND
used programs	cmd, ping, inSSIDer Office

#### 4.1 Measurement of feedback period - ping

Program ping (*Packet InterNet Groper*) enables to verify functionality of connection between two network interfaces (computer, network device) in computer network, which uses a series of protocols TCP/IP. Ping during its activity periodically sends IP datagrams and expects feedback of counterpart (device). Upon successful receiving of answer it announces length of feedback (latency) and in the end a statistical summary. Length of feedback is written in milliseconds [2].

Service ping is executed through *cmd* command and is written in form:

ping (IP Address) -t > C:\ping\_wall\_30m.txt. Suffix „-t“ determines an interruption of measurement by pressing a short cut CTRL + C and ping is saved to a text document.

Example of ping service report:

Pinging 192.168.0.1 with 32 bytes of data:

Reply from 192.168.0.1: bytes=32 time=2ms TTL=64

Ping statistics for 192.168.0.1:

Packets: Sent = 38, Received = 38, Lost = 0 (0% loss)

Approximate round trip times in milli-seconds:

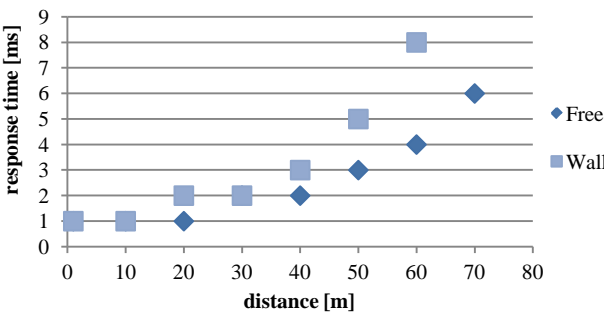
Minimum = 2ms, Maximum = 4ms, Average = 3ms

Table 2 Table with measured values of feedback period

distance [m]	signal intensity [dBm]					
	router		notebook		smartphone	
	free	wall	free	wall	free	wall
1	1	1	1	1	1	1
10	1	1	1	1	1	1
20	1	2	2	2	1	2
30	2	2	2	3	2	2
40	2	3	2	3	2	2
50	3	5	4	4	3	4
60	4	8	5	7	3	5
70	6				5	

From presented example we can see, that average value of feedback in measurement through a wall from 40m distance was only 3ms, which is considered to be a good result. All feedback values presented in Table 2 were measured the same way. Results of measurement were incorporated into graphs Figure 3 and evaluated in conclusion chapter.

Graph of measured feedback period values - Router



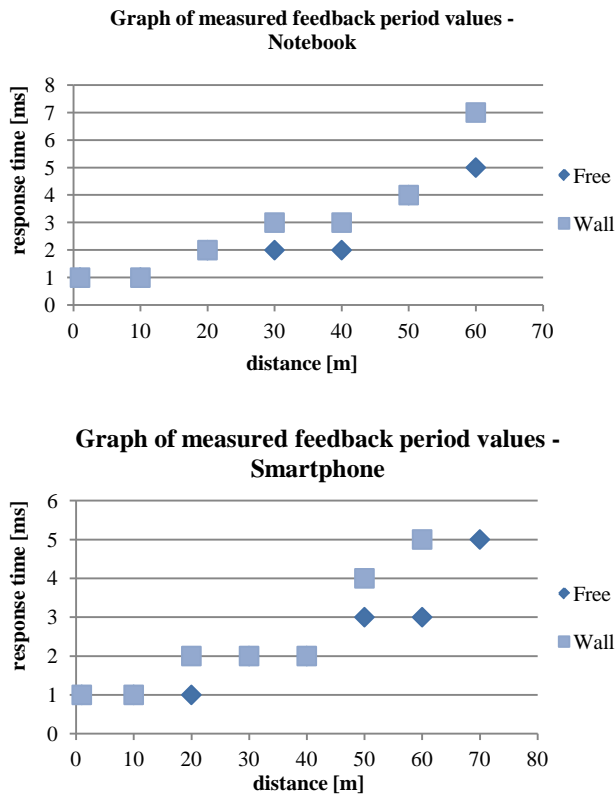


Figure 3: Graph of measured feedback period values – Router, Notebook and Smartphone

#### 4.2 Measurement of signal intensity

Unit dBm (*decibel per milliwatt*) is used to measure signal intensity. dBm (dBmW) is an abbreviation for unit of proportion of strength measured in decibels (dB) referring to unit mW. It is used in sound-transmitting, microwave and optical networks as a favourable expression of absolute performance, because it is able to express very big and very small values in shortened form. Considering it refers to watt, it is an absolute unit and is used in measurements of absolute performance (emission, signal, etc.). To compare, decibel (dB) is a non-dimensional unit, which is used for qualification of proportion between two values, which are ratio of signal to rustle [2].

Conditions of measurement were identical to those in feedback period, therefore measurement in free space and measurement through an obstacle (wall). Measured values are located in Table 3. Results of measurement were incorporated into graphs Figure 4 and evaluated in the conclusion.

Table 3 Table of measured signal intensity values

distance [m]	signal intensity [dBm]					
	router		notebook		smartphone	
	free	wall	free	wall	free	wall
1	-22	-44	-28	-48	-26	-45
10	-31	-55	-36	-59	-34	-58
20	-44	-68	-43	-67	-40	-69
30	-58	-79	-57	-78	-49	-76
40	-68	-88	-67	-86	-56	-89
50	-79	-92	-78	-90	-67	-91
60	-87		-91		-79	
70	-92				-90	

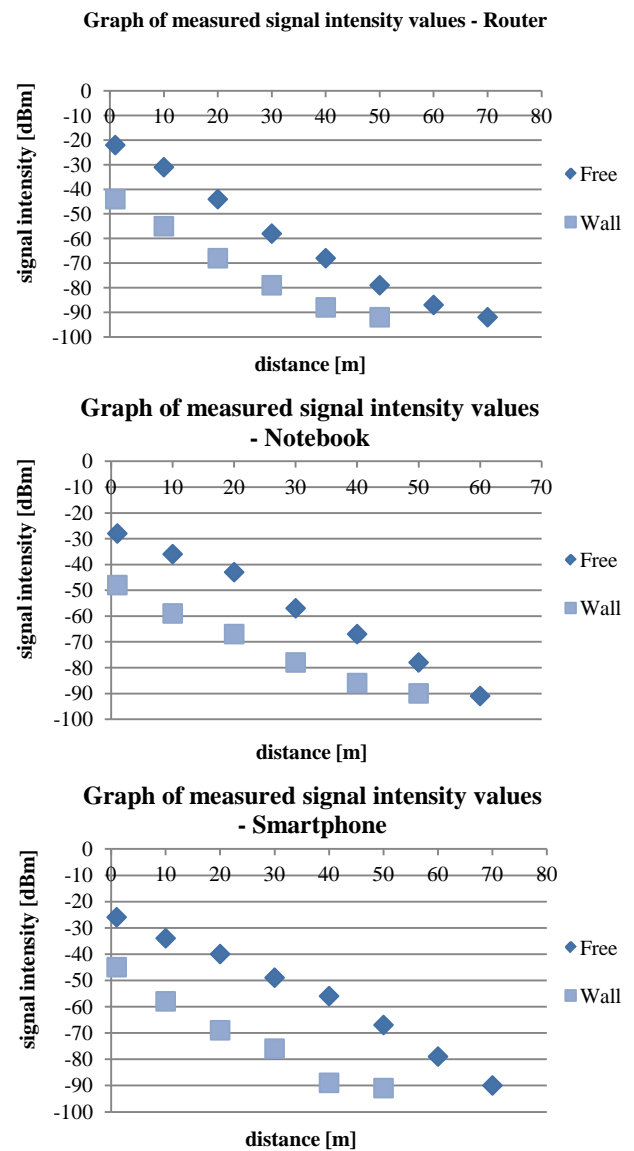


Figure 4: Graph of measured signal intensity values – Router, Notebook and Smartphone

#### 5. Evaluation of the results

The aim of this work was to evaluate impact of distance from used device to a quality of wireless controlling of certain models and processes. In our case we used a model of experimental CNC engraving miller, which was controlled by personal computer with connected router, notebook and smartphone.

During measurement of feedback on PC device with connected router on open space were achieved ping values from 1ms in 1m to 20m distance, until a threshold value of signal outage at 6ms in distance of 70m. Above 70m occurred a loss of transmitted packets and that interrupted the connection. Therefore we can proclaim that maximum distance, in which it is possible to control a model on open space, when a Wi-Fi router TP-LINK741ND is used, is maximally 70metres. When measuring through an obstacle, which was a wall (75mm), were measured values from 1ms in the distance of 10m, through 5ms in the

distance of 50m, where occurred outages of connection, to permanent disconnection in the distance of 60m at 8ms value of feedback. Notebook showed worse results during the measurement, because it does not provide as high-quality transmitting as antenna of router. The lowest times of feedback were reached by Huawei Y550, where outages occurred at 70m with value of 5ms on open space and 60m with value of 6ms through an obstacle. Modern smartphone dispose with superior antennas, which are currently more powerful than older routers or network cards of notebooks.

We can say that with increasing distance is also increased the period of system feedback, which results in creation of so called "traffic delay". Traffic delay is manifested in the fact that given system reacts on change of input parameter after certain time.

In our case this period consists of time of sending, time of transfer and time of processing at final receiver. Measured feedback (*ping*) is basically a double time of transfer, because feedback time consists of sending time and receiving time (packet is reflected off the receiver). Zero traffic delay can be achieved only theoretically. In reality, the impact of low traffic delay is neglected. When controlling very fast actions (regulation of dynamic processes) radio communication is inappropriate for controls, because even low times of traffic delay (1 – 5ms) can cause imprecision in controlling and obtained traffic delay also causes "slowing-down" of system.

When measuring a signal intensity of PC with connected router on open space were reached values from -22dBm in the distance of 1m up to threshold value in distance of 70m, when value of the signal was only -92dBm and after passing this distance the connection was interrupted. Hence we can proclaim, that maximum distance, in which it is possible to control a model on open space using Wi-Fi router TP-LINK741ND, is 70m at most. When measuring through an obstacle were values from -44dBm in the distance of 1m, up to -92dBm in 50m distance, where occurred an outage of signal.

Notebook offers almost the same results as router with difference of a few dBm. The best quality of signal from distance was smartphone, which on open space even in the distance of 50m and 60m transmitted -67dBm and -79dBm, which is more than a router which transmitted -79dBm and -87dBm in the same distance. From this we can conclude, that it is possible to replace older routers with high-performance smartphones with integral antenna, but only in case of direct visibility. A big disadvantage is, that they are not able to process more transmitted and received signals in comparison to a router, which is able to function as a switch for more users.

## 6. Conclusion

The aim of the work was to evaluate the impact of distance and the equipment used for quality wireless control of selected models and processes. In our case experimental CNC model of engraving milling machine was used. It was operated by a personal computer connected to a router, a laptop and a smartphone. We can affirm that increasing of distance also raises the response time of the system, which

results in traffic delays. The traffic delay causes the system to react to the change of input variable after increased period of time. In case that traffic delay does not cause problems we recommend wireless control, otherwise wired connection between controlling computer and controlled system must be used.

## References

- [1] ADÁMEK, J. 2006. *Bezdrátový přenos dat*: diplomová práce. Zlín: Univerzita Tomáše Bati ve Zlíne, 2006. 103 s.
- [2] ZANDL, P. 2003. *Bezdrátové síte WiFi*. Praha: Computer Press, 2003. 204 s. ISBN 80-7226-63-22.
- [3] MOZDÍK, R. - NAŠČÁK, Ľ. *Measuring quality of WiFi network for wireless control models and processes*. In Present day trends of innovations 2015. Łomża: Printing House of Łomża State University of Applied Sciences, 2015, s. 154--161. ISBN 978-83-60571-35-4.
- [4] KOLEDA, P. - NAŠČÁK, Ľ. *Interpolation of 2D trajectory*. In TEAM 2012: proceedings of the 4th International scientific and expert conference of the international TEAM society. Slavonski Brod, Croatia: Mechanical Engineering Faculty, 2012, s. 35--38. ISSN 1847-9065.
- [5] KOLEDA, P. - NAŠČÁK, Ľ. *Circular interpolation for circular trajectory*. In Annals of DAAAM for 2011 & proceedings of the 22nd international DAAAM symposium "Intelligent manufacturing & automation: power of knowledge and creativity": 23-26th November 2011, Vienna, Austria. Vienna: DAAAM International Vienna, Austria, 2011, s. 1017--1018. ISBN 978-3-901509-83-4.
- [6] NAŠČÁK, Ľ - KOLEDA, P. 2014. *Radiace systémy strojov a zariadení*. Zvolen: Vydavateľstvo TUZVO, 2014. 173 s. ISBN 978-80-228-2667-9.
- [7] KOLEDA, P. 2012. *Modelovanie a simulácia mechatronického systému podľa definovaných kritérií*. Dizertačná práca, TU Zvolen.
- [8] VANČO, M. 2013. *Perspektívne trendy elektrických pohonov v CNC výrobných systémoch*. Bakalárska práca, TU Zvolen.

## APPLICATION OF “PSE” – UNIVERSAL FRAMEWORK FOR VISUAL PROGRAMMING

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**Abstract:** The subject of this paper is an overview of the characteristics of a universal interactive framework for creating simulation models based on the programming language Python and a library SciPy - Scientific Python. The basic structure of the framework, programming model, the procedure for creating custom components, dissemination and use with external simulation tools is described and examples are presented.

**Keywords:** python, programming, simulation, framework, block editor

## 1. Introduction

Python programming language has in recent years built up a strong position in the rapid-prototyping and became dominant programming tool in many scientific and technical areas. Draft framework for the creation of simulation models based on the fact that the Python language [1] and its extensive infrastructure currently lacks suitable block editor, which could be easily tied with the visual form of the model with its program implementation.

Any available universal simulation environments such as Matlab-Simulink, Scilab-Xcos, Modelica and others are built on the top of existing infrastructure and expansion or modification required has to be done using non-trivial knowledge of the internal structure of the programming environment, moreover, sometimes associated with additional costs for the purchase of specific development tools. Fundamental axiom of our proposed framework is therefore the exclusive use of a single programming language Python for all parts of the framework including its modification, creation of custom components and its extensions. Technological methods directly contained in the structure of Python itself, such as usage of libraries created in other languages are not affected.

## 2. Framework requirements

Framework requirements were defined as follows:

- Publicly available open-source project released under the GNU-GPL
- Exclusive use of a homogeneous multi-platform infrastructure of Python programming language, it is simple and widely accepted by technical and scientific community, cross-platform, open source with plenty of libraries a.e. PyQt [2], SciPy [3], Matplotlib [4], in the field of natural and technical sciences, with a broad community support and with available literature
- Simple and intuitive internal structure of the framework allowing its easy extension and modification. Output structures of the framework should easily allow building simulation tools and specialized generators for specific simulators (eg. SPICE, Modelica)

- Framework environment itself must be suitable for the development of simulation models from different areas, with maximum ease of use, conceptually should be built as a separate plugin easy to implement in specialized applications
- Single bond to the host operating system through standard Python library system allowing the framework to interact with its environment (eg. integration of measuring and laboratory equipment) and communication via the Internet
- The possibility of using scripts in the actual framework, creating dynamic models and the dynamic changes in the parameters of components using the adaptive simulation tools.
- The possibility of real-time simulation with interactive components in the diagram for use the program as a demonstration of interactive teaching tool.

## 3. Framework Structure

Basic entities with which the user operates are the Component and the Net. The basic concepts are illustrated in Figure 1.

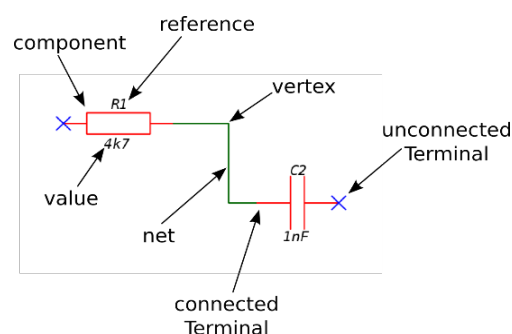


Figure 1: Basic concepts, Component and Net

Standard entity Component presents a graphical representation of the selected algorithm that transforms the input information to the output information. In general, Component has m arranged inputs and n arranged outputs - terminals. Net represents the link between a component, and its task is to transfer information from one component output terminal to the input terminals of other components.

Net contains a reference to the start and end component which it links together, the number of the terminal of the component and the list of vertex of which it is formed. Each component and interconnection is clearly identified in a diagram by its unique number, optionally a name.

Arranged set of components and nets connecting them forms a Diagram. Each component can be parameterized using optional parameters, which can be static - their values are defined by the user at the beginning of the simulation, or dynamic - their values can be changed during the simulation based on its condition.

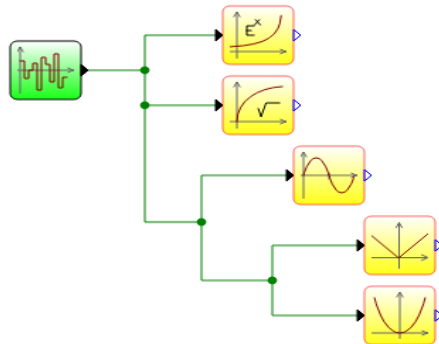


Figure 2: The link among multiple Nets.

In addition to standard entities, there are connecting entities specifically established into the framework - Connection node component enabling connection among multiple independent Nets in Figure 2, and Port that allows connection between the parts of the diagram or multiple separate diagrams in the case of larger models in Figure 3.

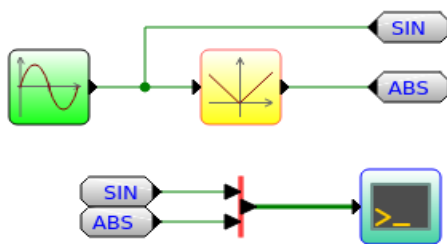


Figure 3: Usage of component Port.

In general, in the framework can be defined a link between any terminals of components in the form of a multigraph – eg. the case of electrical circuits. For the purposes of simulation models this can be limited to the shape of a oriented tree, where the root of the tree is the output terminal and the leaves of the tree are the input terminals. Carrier of the information in the framework are the terminals of components. Information is stored in the terminal in the form of one-dimensional array. If the array contains more than one value, in the graphical representation is Net connected to the terminal with a thicker line than a bus. The arrays of the values of multiple terminals can be aggregated by means of special components BusCompressor to any depth and extend back

through BusExtractor components, as shown in Figure 3 and Figure 4.

Graphical representation of components and their interconnections itself is separated from the logical structure of the diagram, virtual links are therefore not shown in the diagram. At the same time the separation of logical and graphical representation allows the framework implementation to support various graphic libraries used by Python infrastructure.

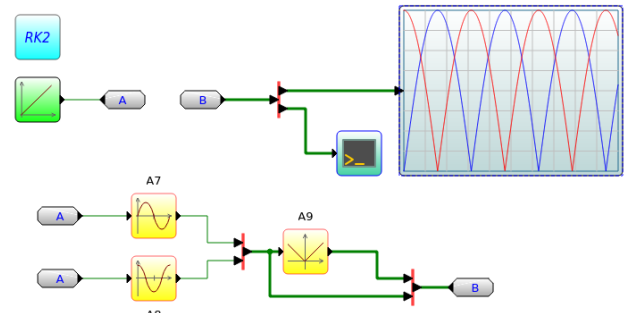


Figure 4: The link among multiple Nets.

From the point of user view the components are grouped according to their functional or logical meaning

- Sources - Resources - generators, load datas from a file, load informations from connected devices and the Internet
- Sinks - Appliances of information - write to a file, console output, graphs, sending information to an internet connection
- Control - Control Components Communications
- Linear - components for linear transformation of information
- Nonlinear - components for the nonlinear transformation of information
- Signal - Components for connecting editing , aggregation links scalar to vector and its decomposition
- Discrete - discrete and logical components
- Interactive - components for interactive management chart during the simulation
- Components from all groups in the diagram can be combined.

In the simulation of more extensive diagrams can create separate diagrams - blocks and use them in the simulation as separate components. Block diagram are expanded as macros with a separate namespace, Figure 5 and 6.

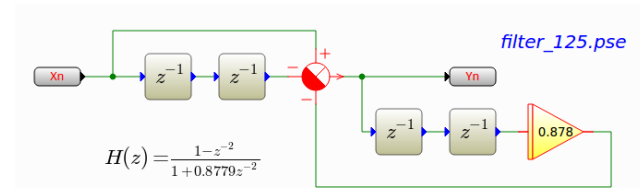


Figure 5: Block representing discrete IIR filter second order,  $X_n$  is an input port and  $Y_n$  is an output port of block.



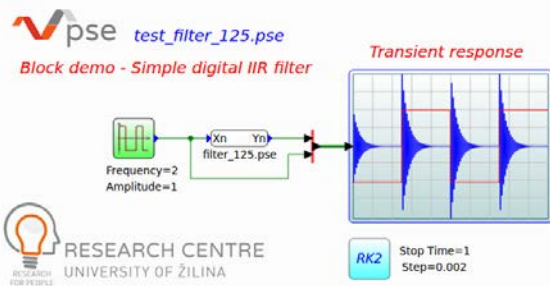


Figure 6: Simulation of IIR filter block, transient response

The internal structure of the framework is designed so that it can be easily edited and modified according to the specific requests of users. To create a new simulation components need to inherit from class Component basic structure of the component. Then define its input and output terminals, the relationship between values of terminals and the graphic display component.

#### 4. Example of use

For basic demonstration and a test, the framework has been extended by a simple simulation tool based on the one-step integration method Runge-Kutta 2nd order. The part of simulation tools are methods for validating connections among components and a recursive algorithm to find and check of the occurrence of loops in the tree. For the transformation of the input vector component on the output are used precompiled methods of Numpy libraries and the simulation itself runs in a separate thread outside the graphic system.

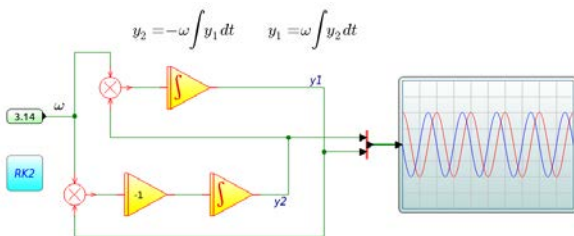


Figure 7: Simulation system of linear differential equations.

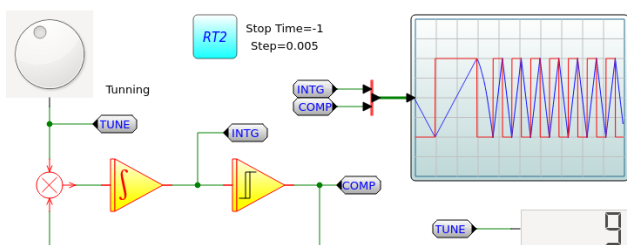


Figure 8: The use of interactive components in the diagram. Interactive components Dial is for real-time the simulation is used to frequency setting generated by the oscillation of the oscillator.

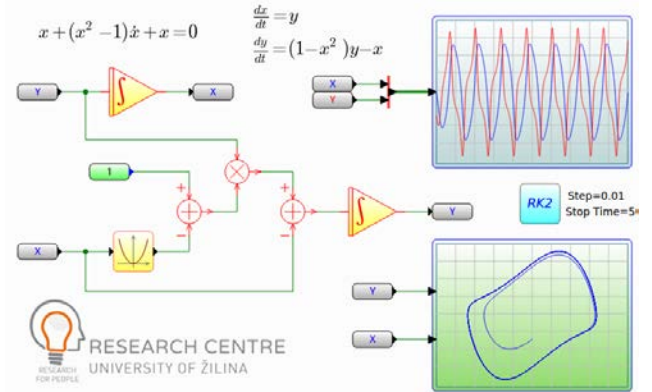


Figure 9: Simulation of Van der Pol oscillator with non-linear damping.

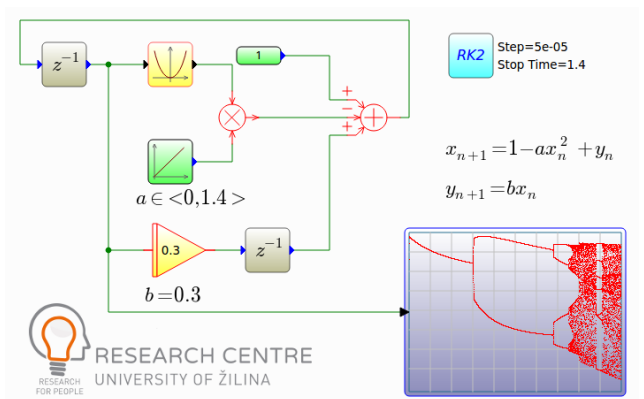


Figure 10: Simulation of nonstationary parametric solutions of differential equations - Hennon map and bifurcations in one-dimensional discrete dynamical system

#### 5. Conclusions

Framework was developed primarily for the creation of simulation models for predictive simulation parameters of road infrastructure within the project at Research Centre of the University of Žilina.

Description of the application framework includes a number of other options that the Article does not discussed, such as interactive management of the experiment and collect data from laboratory instruments, cooperation and data exchange between the Framework in the Internet environment, the possibility of creating interactive educational text in an environment Ipython and many others.

Sources framework of the "pse" are free available on the web site of the Research Center of University of Žilina (<http://www.researchcentre.sk/>)

#### Acknowledgment

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**References**

- [1] [www.python.org](http://www.python.org)
- [2] <http://www.riverbankcomputing.co.uk/software/pyqt/intro>
- [3] Travis E. Oliphant. Python for Scientific Computing, Computing in Science & Engineering, 9, 10-20 (2007), DOI:10.1109/MCSE.2007.58
- [4] Hunter, J. D., Matplotlib: A 2D graphics environment, Computing In Science & Engineering, vol. 9., number 3, pages 90-95 (2007)

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## MICROSATELLITE MARKERS IN THE CHINCHILLA GENOME – CROSS-SPECIES AMPLIFICATION

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**Abstract:** Microsatellite polymorphism is a useful tool to monitor genetic changes in populations. The identification of STRs usually requires screening genomic libraries to recognize and characterize microsatellite loci for each species under investigation. This makes the method difficult (especially when the genome of the investigated species is poorly known), expensive and time-consuming. We decided to use the cross-species amplification to recognize microsatellite markers in the chinchilla genome and use STR primers identified for two other species – *Lagidium viscacia* (also a member of Chinchillidae family) and *Myocastor coypus* (similarly to chinchilla, member of infraorder Caviomorpha). The aim of the research was to identify microsatellite markers in chinchilla. The performed research showed that 13 out of 20 analyzed STRs were amplified. The evaluation of the reaction conditions has been done. Chinchilla DNA is poorly understood and the amplification of the microsatellite markers provides the possibility of using them in genome research. Identification of STRs could allow the determination of genetic diversity of chinchilla population.

**Keywords:** chinchilla, microsatellite polymorphism, STR, chinchilla genome

## 1. Introduction

Chinchilla is a hystricomorph rodent native to Andes mountains of South America. In their natural environment chinchillas are extremely rare and nearly extinct. For a long time, wild populations of chinchillas were harvested at a higher level than reproduction rates could sustain. Currently Chinchilla spp. are listed in Appendix I of CITES [1]. Because of their valuable pelts, a hybrid of *Chinchilla lanigera* and *Chinchilla brevicaudata* has been produced, domesticated, bred and selected for more than 80 years [2]. Today we can observe the paradox – no other animal bred for fur is so common in captivity and so rare in natural environment [3].

One of the most popular molecular tools used in genetic research is microsatellite polymorphism, which occurs as a Short Tandem Repeat (STR). Due to large differences in the basic themes and even distribution in genomes, the level of heterozygosity at a microsatellite locus often exceeds 80%. STRs are mostly used in phylogenetic researches, genetic mapping, identification of quantitative trait loci (QTR) and characterization of population genetic structures. It can also be used to reveal genetic diversity, inbreeding level or to monitor changes in small populations.

The aim of the research was to test the microsatellite markers identified for vizcacha (*Lagidium viscacia*) and coypu (*Myocastor coypus*) in the chinchilla genome.

## 2. Material and Methods

The material for the research was liver tissue of one farm chinchilla, collected *post mortem*. The chinchilla was of standard color variety and was bred on a farm in Lesser Poland. Genomic DNA was isolated using Promega DNA Purification Kit according to standard protocol and stored at -20°C. The qualitative and quantitative analysis was performed by spectrophotometer analysis (NanoDrop Thermo Scientific).

In the research 20 microsatellite sequences were tested. Polymerase chain reaction (PCR) was carried out on Thermo Cycler T100 (BioRad). The total volume of each sample was 15 µl and contained the following reagents: 100 ng genomic DNA as a template, 1 µM forward and reverse primers, 1x PCR buffer (GoTaq® Flexi Buffer, Promega), 1 mM MgCl<sub>2</sub> solution, 0.3 µM of each dNTP and 1 U of GoTaq® G2 Hot Start Polymerase (Promega). PCR conditions consisted of 30 cycles including denaturation at 94°C for 45s, annealing at 57°C for 45s and an extension step at 72°C for 90s. The annealing temperature for two primers (LV8 and LV17) was lower (47°C). Results of the amplification had been subjected to electrophoresis in 2% agarose gel (70 V, 30 min) with a size marker (GeneRuler™ 50 bp DNA Ladder, Thermo Scientific). Table 1 shows primer sequences of analyzed loci.

Table 1. Primer sequences of analyzed loci (amplified primers are in bold) [4,5].

Locus	GenBank accession no.	Primer sequences (5'-3')	Annealing temp. °C
LV1	AF092896	F: taagtcaccagttccacctc R: ccgcccctctcttgc	57
LV4	AF092870	F: cctgggtccctcatcc R: ttggctgaagtggccaagaaa	57
LV5	AF092871	F: gctaggctgagtgctccaga R: atgtgaggcaggctccaa	57
LV8	AF092872	F: cacagaattgggcatagaat R: gacaagggtaggcttcag	47
LV16	AF092873	F: agcacacagacagggaatg R: gcagaactccacagggaac	57
LV17	AF092874	F: gtgctttgtcctttcacat R: gcctcgataactcacatcct	47
LV25	AF092875	F: cgaagacgcacctttacct R: ttgcaccattgattgttga	57
LV33	AF092876	F: tgccaagcacattgaaaac R: ttaaccacaacccaaccac	57

<b>McoC 118</b>	AY642491.1	F: ccatgtgtgaaggtgattctc R: agttcgtatccccagcacaac	57
<b>McoC 124</b>	AY642492.1	F: atctgtgttttgccaataac R: atgaccaggattcaagtgaag	57
<b>McoD 228</b>	AY642511.1	F: tgtaaaggttctgggttcaac R: ggtcttaacacatgagtacaaagctc	57
<b>McoD 59</b>	AY642502.1	F: tatttgaagcccaggagactaa R: acatcgctccctactgtttcaag	57
<b>McoD 60</b>	AY642503.1	F: tcaactcaataaatactcaggatgc R: tgggtgtaggtgtaggtagaca	57
<b>McoD 67</b>	AY642504.1	F: tgcagagcttggctaaataca R: gtgaagtgtgttctactcttc	57
<b>McoD 217</b>	AY642509.1	F: agtccaatctacatagcaaggc R: agatagcccagcagaataagtg	57
<b>McoA 04</b>	AY642486.1	F: cgggagaaaagggaattgattaac R: actggcagagaattcagaac	57
<b>McoB 17</b>	AY642488.1	F: caatcttggaattttcatagc R: ttttatttcttgagcatttggag	57
<b>McoD 10</b>	AY642498.1	F: tatttgaagcccaggagactaa R: aaaacatacatatccattcagcaa*	57
<b>Mco2 14</b>	AY642505	F: tcacaatcagaggctacaact R: tgaagcattagatgcctttgta	57
<b>McoD 69</b>	AY642505	F: tcacaatcagaggctacaact R: tgaagcattagatgcctttgta	57

\* Reverse primer changed for PCR reaction.

### 3. Results and discussion

The performed analysis showed that 7 out of 20 microsatellite markers (LV8, LV17, McoA04, McoB17, McoD10, McoD124, McoD69) did not amplify. For the 13 analyzed markers evaluation of the annealing temperature has been done. The length of microsatellite sequences was about 200 bp for all markers.

Currently the chinchilla genome is poorly understood and there is no information in literature about STR of this species. The use of 13 amplified STRs provides the possibility of using them in research on the chinchilla genome to evaluate the genetic variability, the level of inbreeding and the population structure. Identification of microsatellite markers in chinchilla allows searching for QTL genes of this species.

The cross-species amplification is a popular method used in research on microsatellite polymorphism. Usually identification of microsatellite loci requires screening genomic libraries, which makes the analysis expensive, time-consuming and difficult. Where the STRs for other species (often of the same family or order) are identified, they could be used to investigate the species of interest. Primmer et al. (1996) [6] showed the wide range of using cross-species amplification in research on the bird genome, especially *Hirundinidae* species. This tool turned out to be very useful in studying endangered species such as the crowned eagle (*Harpyhaliaetus coronatus*) [7], Korean goral (*Nemorhaedus caudatus*) [8] and Himalayan yew (*Taxus wallichiana*) [9]. We hope that the investigated STR loci will be useful in research on the endangered wild population of Chinchilla spp.

### 4. References

- [1] CITES. 1973. Convention in trade of endangered species.
- [2] Jimenez JE. 1996. The extirpation and current status of wild chinchillas *Chinchilla lanigera* and *Ch. Brevicaudata*. Biol Conserv 77: 1-6.

[3] Rice EK. 1988. The chinchilla: endangered whistler of the Andes. Animal Kingdom 91: 33-35.

[4] Walker RS, Farmerie WG, Branch LC. 2000. Characterization of microsatellite loci from mountain vizcacha *Lagidium viscacia* and their use for the plains vizcacha *Lagostomus maximus*. Mol Ecol 9: 1672-1674.

[5] Callachan CR, Henderson AP, Eackles MS, King TL. 2005. Microsatellite DNA markers for the study of population structure and dynamics in nutria (*Myocastor coypus*). Mol Ecol Notes 5: 124-126.

[5] Primmer CR, Moller AP, Ellegren H. 1996. A wide-range survey of cross-species microsatellite amplification in birds. Mol Ecol 5:365-378.

[6] Sarasola JH, Canal D, Solaro C, Galmes MA, Zanon-Martinez JI, Negro JJ. 2012. Cross-species amplification of seventeen polymorphic microsatellite loci in the endangered Crowned Eagle (*Harpyhaliaetus coronatus*). Mol Ecol Res 12: 779-781.

[7] Kim KS, Min MS, An JH, Lee H. 2004. Cross-species amplification of Bovidae microsatellites and low diversity of the endangered Korean goral. J Hered 95: 521-525.

## HIGH PRESSURE PROCESSING FOR PEA SPREAD SHELF LIFE EXTENSION: A PRELIMINARY STUDY

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**Abstract:** The effects of high pressure processing – HPP – (500 and 700 MPa/10, 20 and 30 min/20 °C) on the microbiological quality and colour of maple pea spread were compared to thermal processing (*sous vide* 80 °C/15 min). Microbiological quality during 15 days at 4 °C was evaluated. Pea spread was filled in polyamide/polyethylene film pouches, packaged in vacuum and hermetically sealed. Pea spreads were made of cooked peas ‘Bruno’ (*Pisum sativum* var. *arvense* L.), to which salt, citric acid, oil and herb spice were added. Total plate count was determined on Plate Count agar, *Enterobacteriaceae*- on Violet Red Bile agar with Glucose, coliforms- on Endo agar. Decontamination of seasonings was carried out using UV-C treatment and sterilization. Identification of bacteria was completed with API biochemical test system. Colour analysis was carried out in  $L^*a^*b^*$  colour space. Total plate count in untreated pea spread was  $3.41 \log_{10}$  CFU g<sup>-1</sup>, all processed samples showed significantly reduced microbial contamination ( $p < 0.05$ ). Coliforms were not detected and *Enterobacteriaceae* count was  $< 10^1$  CFU g<sup>-1</sup> after two week storage at  $+4.0 \pm 0.5$  °C. Spores of *B. subtilis* and *B. licheniformis* were found in all pea spread samples; source of these bacteria was herb spice. UV-C treatment showed considerable decrease in microbiological contamination of seasonings, however, sterilization did not destroy spores. HPP did not influence pea spread colour ( $p > 0.05$ ). HPP (at 700 MPa) demonstrates improvement in pea spread shelf life compared to untreated sample and thermal processing, and is suitable for pea spread shelf-life extension.

**Keywords:** maple pea spread, high pressure processing, *sous vide*, microbiological contamination, herb spice

### 1. Introduction

#### 1.1 Legume spreads

The growth in the number of vegetarians, meat avoiders and meat reducers has stimulated the use of plant based ingredients which can extend meat products while providing an economical, functional, and high-protein meat substitutes. Plant based meat alternatives are successful because of their healthy image (cholesterol free), meat-like texture, and lower cost [2].

Commercially available legume spreads are an innovative product and an alternative to traditional animal-derived spreads or pates. Most well-known vegetable protein spread is hummus. Legumes are one of the most reliable sources of good quality protein and dietary fibre. Plant based spreads could positively influence the low legume consumption in the Western world which is less than 3.5 kg per capita per year [11]. Some of the main reasons for low legume consumption in Latvia are hard-to-cook phenomenon, meteorism and time consuming preparation [9] which can be avoided with legume spreads. Maple peas (*Pisum sativum* var. *arvense* L.), a local legume growing in Europe and one of the staple foods in Latvian cuisine, has the potential for innovative product development to satisfy the daily needs for protein and fibre.

Shelf-life of maple pea spread without preservation techniques (e.g. water activity reduction, changes in pH, heat application) is less than six days [9] therefore innovative preservation methods must be considered as consumers increasingly demand convenience foods of the highest quality in terms of natural flavour and taste, and which are free from additives and preservatives [13].

#### 1.2 Preservation techniques

*Sous-vide* cooking can be defined as the cooking of raw materials under controlled conditions of temperature and time, inside heat stable vacuumized pouches or containers followed by rapid cooling. *Sous vide* technology could be a reasonable choice, as it allows to obtain products with an extended shelf-life and a quality similar to that of fresh food [4]. Nonetheless, some authors [3, 10] note that thermal treatment has a detrimental effect on texture, colour, flavour and nutritional value of foods.

High pressure processing (HPP) is a minimal processing technology, which serves as a cold-pasteurisation that eradicates microorganisms regardless of the geometry of the product and without the use of preservatives [14], thus making this technology accepted as safe and consumer friendly [13]. Food treated by HPP has been shown to keep its original freshness, flavour, taste, and colour. While the structure of high-molecular-weight molecules such as proteins and carbohydrates can be altered by HPP, smaller molecules such as volatile compounds, pigments, vitamins, and other compounds connected with the sensory, nutritional, and health promoting are unaffected [12].

*Sous vide* and HPP inactivates vegetative microorganism cells, however, bacterial endospores are resistant to pasteurizing (temperature  $< 100^\circ\text{C}$ ) and high pressure (survival at  $> 1000$  MPa) [3, 10], therefore both methods can be used to minimize contamination of vegetative microorganisms in packaged products.

The aim of this study was to investigate the effect of HPP and subsequent storage period (15 days) at 4 °C on microbiological quality and colour in maple pea spread,

compared to the same untreated and *sous vide* processed spread.

## 2. Materials and methods

### 2.1 Preparation of maple pea spread

The following materials were used for pea spread preparation: maple peas 'BRUNO' (*Pisum sativum* var. *arvense* L.) grown and harvested in 2014 at State Priekuli Plant Breeding Institute (Latvia), 'EXTRA VIRGIN' canola oil (Iecavnieks Ltd., Latvia), citric acid (Spilva Ltd., Latvia), Himalayan salt (Pakistan) and herb (sun-dried tomato, garlic and basil) spice 'BRUSCHETTA' (P.P.H. fleisch mannschaft®-Polska Sp. z o.o., Poland).

Maple pea spread was made of ground re-hydrated cooked maple peas (93%), to which salt (0.3%), citric acid (0.2%), oil (5.9%) and herb spice (1%) were added according to Kirse and Karklina [9].

Pea spread was vacuum packaged in two layer transparent laminate polyamide/polyethylene film pouches (45 mm x 170 mm, film thickness 45 µm) with barrier properties (Fig. 1) and hermetically sealed by chamber type machine Multivac C300, each sample was 50±1 g.



Figure 1: Vacuum packaged pea spread in transparent polymer pouches before preservation treatments.

### 2.2 HPP and sous vide treatment

HPP of pea spread was carried out using Iso-Lab High Pressure Pilot Food Processor (S-FL-100-250-09-W, Stansted Fluid Power Ltd., Essex, UK) in a 2.0 L pressure vessel. A propylene glycol, water mix (1:2 w/v) was used as the pressure transmitting liquid. Pea spread pouches were placed in pressure vessel and treated at 500 MPa with 10 and 20 min dwell time, and at 700 MPa with 10, 20 and 30 min dwell time. The experiment was carried out at room temperature which increased due to pressure increase in the vessel and maximally reached 40–42 °C during pressurization at 700 MPa.

*Sous vide* treatment of pea spread was carried out in Clifton Food Range water bath. Samples were pasteurized for 15 min at +80.0±0.5 °C temperature, which corresponds to the core temperature of the packaged pea spreads +76.0±1.0 °C. After heat treatment, packages were immediately chilled to sample temperature +4.0±0.5 °C in +2±1 °C cold ice-water. This heat treatment regimen was chosen based on previous experiments as the optimal *sous vide* regimen for pea spreads.

Samples were stored in a commercial cooler ELCOLD at +4.0±0.5 °C (temperature recorded by Greisinger

MINIlog) for 15 days under fluorescent light (OSRAM Lumilux De Luxe) with radiant flux at 100–800 lux (measured by Light meter LX-107). Sample abbreviations were: control – untreated pea spread, SV – *sous vide* treatment at 80 °C/15 min, HP – high pressure pasteurization where the first number describes pressure (MPa) and the second number describes treatment time (min). Samples were analysed in triplicate on days 0, 7 and 15.

### 2.3 Decontamination of seasonings

Seasonings (citric acid, salt and herb spice) were decontaminated for 30 min under UV-C germicidal lamp (254 nm / 20 Watt) in a laminar flow cabinet (S-KR 130, Kojair, Finland). Decontamination of herb spice was also performed in STERINOVER horizontal autoclave (Lagarde, France) for 15 min at +121±2 °C.

### 2.4 Microbiological analysis

Microbiological testing of pea spreads was completed within one hour after processing; testing of seasonings was performed before and after decontamination.

90 ml 0.1% sterile peptone water was added to 10 g sample of processed pea spread in a stomacher bag; then the sample was homogenized with a stomacher BagMixer400 (Interscience, USA) for 10 seconds. Serial dilutions in 0.1% sterile peptone water were pour-plated in triplicate for determination of aerobic and facultative anaerobic, mesophilic bacteria (hereafter referred to as TPC – total plate count) on Plate Count agar (Ref. 01-161, Scharlau, incubation at 30 °C for 72 h), for coliforms on Endo agar (Ref. Ref. 01-589, Scharlau, incubation at 37 °C for 24 h) and for *Enterobacteriaceae* on Violet Red Bile agar with Glucose (Ref. 01-295, Scharlau, incubation at 37 °C for 24 h). After incubation, the colonies were counted using automated colony counter aCOLyte (Topac Inc., USA) and reported as colony forming units (CFU). Data are expressed as log<sub>10</sub> CFU g<sup>-1</sup> indicating the amount of cells per gram of product inside a pouch.

Microbiological safety of pea spreads was evaluated according to the guidelines on microbiological contamination of food stuffs:

- Regulation No 461/2014 (by Cabinet of Ministers, Latvia) [8] describes vegetable products which have been pasteurised and/or sterilized, therefore TPC during storage for *sous vide* and HPP pea spreads is set at <5·10<sup>3</sup> CFU g<sup>-1</sup> (3.69 log<sub>10</sub> CFU g<sup>-1</sup>);
- according to Gilbert *et al.* [7] pea spread is included in savoury group and TPC during storage for untreated pea spread is set at <10<sup>5</sup> CFU g<sup>-1</sup> (5.00 log<sub>10</sub> CFU g<sup>-1</sup>);
- admissible count for coliforms is set at <20 CFU g<sup>-1</sup> and for *Enterobacteriaceae* <10<sup>2</sup> CFU g<sup>-1</sup> [7].

Identification of microorganisms was carried out by cultivating selected colonies on Plate Count Agar using streak plate method. Gram staining was performed followed by catalase and oxidase tests. Bacterial identification was completed by the API biochemical test system using API 50 CHB kit (bioMérieux, France).

## 2.5 Colour analysis

Colour changes in pea spread samples were measured in  $CIE L^*a^*b^*$  colour system using Colour Tec PCM / PSM (Accuracy Microsensors Inc., USA). Colour values were recorded as  $L^*$  (lightness) – the vertical co-ordinate that runs from  $L^* = 0$  (black) through grey to  $L^* = 100$  (white);  $a^*$  (redness) – the horizontal co-ordinate that runs from  $-a^*$  (green) through grey to  $+a^*$  (red); and  $b^*$  (yellowness) – another horizontal co-ordinate that runs from  $-b^*$  (blue) through grey to  $+b^*$  (yellow).

The measurements were repeated in tenfold on randomly selected locations at the surface of each sample. Colour difference ( $\Delta E^*$ ) was calculated according to equation (1) to describe the colour change of *sous vide* and HPP treated pea spread samples compared to untreated sample:

$$\Delta E^* = \sqrt{(L^* - L^*_0)^2 + (a^* - a^*_0)^2 + (b^* - b^*_0)^2} \quad (1)$$

where,  $\Delta E^*$  – total colour difference;  $L^*$ ,  $a^*$  and  $b^*$  – colour values of sample after additional treatment;  $L^*_0$ ,  $a^*_0$  and  $b^*_0$  – colour values of untreated sample.

## 2.6 Software and data processing

The obtained data processing was performed with statistical software 'R 3.0.2' and 'Microsoft Office Excel 14.0'; differences among results were analysed using one way analysis of variance and Tukey's test. The results were expressed as mean  $\pm$  standard deviation. Differences among results were considered significant if p-value  $< \alpha_{0.05}$ .

## 3. Results and discussion

### 3.1 Microflora in pea spreads and seasonings

TPC in untreated pea spread sample was significantly different ( $p < 0.05$ ) compared to pea spreads after *sous vide* treatment and HPP (Fig. 2). None of the samples exceeded either of the defined admissible TPC at day 0.

A 1 log reduction could be achieved with *sous vide* treatment and HPP at  $\geq 500$  MPa (with dwell time  $\geq 20$  min at 500 MPa HPP).

Microbial contamination in SV sample decreased from  $2.56 \times 10^3$  CFU g<sup>-1</sup> to 50 CFU g<sup>-1</sup> and in HPP samples at 700 MPa (HP 700\_10, HP 700\_20, HP 700\_30) from  $2.56 \times 10^3$  CFU g<sup>-1</sup> to  $< 100$  CFU g<sup>-1</sup> after pasteurization. Significant differences were not found among these samples during 2 week storage ( $p = 0.832$ ). HPP samples at 700 MPa and SV sample showed considerably lower microbiological contamination ( $p < 0.05$ ) compared to HPP (500 MPa) samples.

TPC in pea spread without additional treatment exceeded the admissible level ( $N < 10^5$  CFU g<sup>-1</sup>) for ready-to-eat spreads in less than seven days of storage at refrigerator temperature. TPC in all processed samples did not exceed the admissible level ( $N < 5 \cdot 10^3$  CFU g<sup>-1</sup>) for vegetable spreads after 2 weeks. Coliforms were not present in any samples, *Enterobacteriaceae* count was  $< 10^1$  CFU g<sup>-1</sup>.

*Sous vide* treatment and HPP demonstrates improvement in pea spread shelf life compared to control sample. HPP at 700 MPa is suitable for pea spread shelf-life extension; however, long-term shelf-life research is required.

It is critical to store processed pea spreads at refrigeration temperatures, because microbial contamination of pea spread samples SV and HP 700\_10 which were stored at room temperature ( $+20 \pm 0.5$  °C) was not significantly different ( $p = 0.341$ ) and exceeded admissible TPC in 8 days ( $\geq 3.7$  log<sub>10</sub> CFU g<sup>-1</sup>).

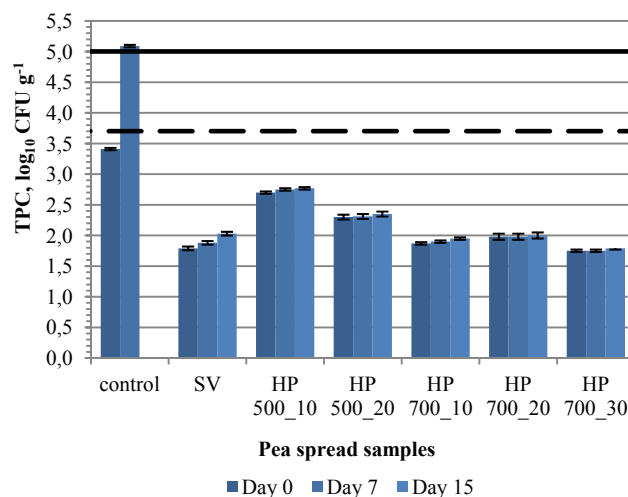


Figure 2: The influence of different treatments on TPC dynamics in maple pea spread during storage at  $+4.0 \pm 0.5$  °C temperature. The straight line indicates TPC ( $< 10^5$  CFU g<sup>-1</sup>) for ready-to-eat spreads [7] and the dashed line indicates TPC ( $< 5 \cdot 10^3$  CFU g<sup>-1</sup>) for vegetable spreads [8].

Bacteria found in all pea spread samples showed similar morphological characteristics. As *sous vide* and HPP are suitable for destroying vegetative cells [3, 10], these microorganisms were thought to be potential spore forming bacteria. Gram staining proved them to be catalase positive gram positive bacteria of *Bacillus* spp. API biochemical identification showed two different bacteria species – *Bacillus subtilis* and *Bacillus licheniformis*. *B. subtilis* and *B. licheniformis* are spore forming bacteria commonly found in many spices [5], and spores can withstand pasteurization and pressure up to 1500 MPa [14].

Peas cooked in a pressure cooker are practically sterile, therefore another ingredient – seasonings – were subjected to microbiological testing (before and after decontamination treatment) as possible source of contamination with spore forming bacteria.

UV-C treatment is performed at low temperatures and classified as a non-thermal process, which does not leave any residue in the treated products. Erdogdu and Ekiz [6] reported that spices (cumin seeds) maintained their colour, and no significant weight and volatile compound losses were observed after UV-C treatment.

UV-C treatment established over 2 log reduction for salt and citric acid (Fig. 3). Contamination in herb spice 'BRUSCHETTA' was maintained at a high level after UV-C treatment, therefore sterilization was carried out. Sterilization reduced bacterial load to  $2.01$  log<sub>10</sub> CFU g<sup>-1</sup>; however, organoleptic evaluation showed significant



losses of colour, flavour and appearance, as heat treatment affects the sensitive flavour components [5].

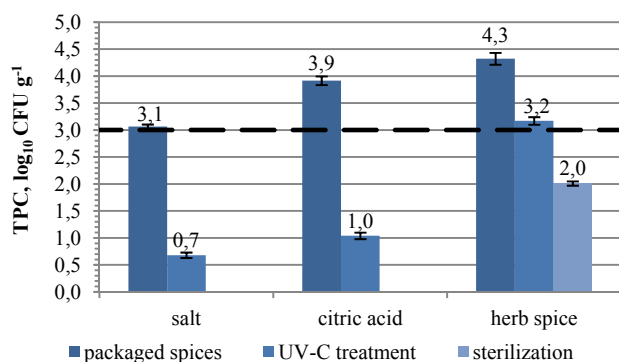


Figure 3: Decontamination influence on microbiological load in seasonings. The dashed line indicates the recommended TPC ( $<10^3$  CFU g<sup>-1</sup>) for seasonings [5].

Deák and Farkas [5] reported that plate count per g of aerobic mesophilic bacteria in seasonings are generally between 3.5–8.4. log<sub>10</sub> CFU.

Overall, UV-C treatment showed significant reduction compared to the initial microbial contamination in salt and citric acid ( $p=0.009$ ), and herb spice ( $p=0.033$ ).

Spores of *B. subtilis* and *B. licheniformis* were found in herb spice samples after UV-C treatment and sterilization.

### 3.2 Colour analysis

Significant colour changes ( $p=0.008$ ) between pea spreads with different treatments (Fig. 4) were observed. Untreated pea spread had the lightest colour.

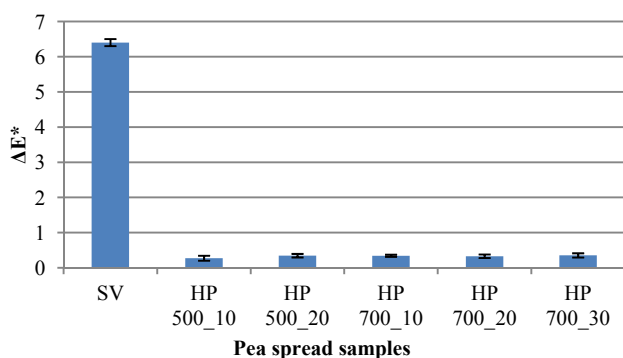


Figure 4: Influence of treatment on total colour difference of pea spreads.

Differences in perceivable colour ( $\Delta E$ ) can be classified analytically as not noticeable (0–0.5), slightly noticeable (0.5–1.5), noticeable (1.5–3.0), well visible (3.0–6.0), and great (6.0–12.0) [1]. Pasteurised (*sous vide*) pea spread showed a well visible change (6.40) when compared to untreated pea spread, while HPP samples showed not noticeable differences ( $\leq 0.36$ ). Andrés *et al.* [1] reported similar findings on total colour difference after HPP. Food colour is critical in the acceptance of products, therefore HPP is preferable to *sous vide* processing for maple pea spreads.

### 4. Conclusions

1. HPP demonstrates improvement in pea spread shelf life compared to untreated sample and thermal processing, and is suitable for pea spread shelf-life extension (at 700 MPa).
2. Microbiological contamination of HPP samples at 700 MPa was below 2.00 log<sub>10</sub> CFU g<sup>-1</sup> during two week storage at  $+4.0 \pm 0.5$  °C temperature.
3. Spores of *B. subtilis* and *B. licheniformis* were found in all pea spread samples; source of these bacteria was herb spice.
4. UV-C treatment showed considerable reduction in microbiological load of seasonings. Sterilization did not destroy bacteria spores in herb spice.
5. HPP did not influence pea spread colour ( $p>0.05$ ) contrary to *sous vide* processing.

### Acknowledgements

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### References

- [1] Andrés, V., Villanueva, M.J., Tenorio, M.D., *Food Chemistry*, Vol. 192, pp. 328–335, 2016.
- [2] Asgar, M.A., Fazilah, A., Huda, N., Bhat, R., Karim, A.A., *Comprehensive Reviews in Food Science and Food Safety*, Vol. 9, No. 5, pp. 513–529, 2010.
- [3] Balasubramaniam, V.M., Farkas, D., *Food Science and Technology International*, Vol. 14, No. 5, 413–418, 2008.
- [4] Baldwin, D.E., *International Journal of Gastronomy and Food Science*, Vol. 1, No. 1, pp. 15–30, 2012.
- [5] Deák, T., Farkas, J. *Microbiology of thermally preserved foods: canning and novel physical methods*, Lancaster, DEStech Publications, 2013, 318 p.
- [6] Erdogdu, S.B., Ekiz, H.I., *Journal of Food Science*, Vol. 76, No. 5, pp. 284–292, 2011.
- [7] Gilbert, R.J., de Louvois, J., Donovan, T., Little, C., Nye, K., Ribeiro, C.D., Richards, J., Roberts, D., Bolton, F.J., *Communicable Disease And Public Health*, Vol. 3, No. 3, pp. 163–167, 2000.
- [8] <http://likumi.lv/doc.php?id=268347>
- [9] Kirse, A., Karklina, D., *Agronomy Research*, Vol. 13, No. 4, pp. 956–968, 2015.
- [10] Knockaert, G., De Roeck, A., Lemmens, L., Van Buggenhout, S., Hendrickx, M., Van Loey, A., *Food Chemistry*, Vol. 125, No. 3, pp. 903–912, 2011.
- [11] Mudryj, A.N., Yu, N., Hartman, T.J., Mitchell, D.C., Lawrence, F.R., Aukema, H.M., *British Journal of Nutrition*, No. 108, pp. 27–36, 2012.
- [12] Patras, A., Brunton, N. P., Da Pieve, S., Butler, F., *Innovative Food Science & Emerging Technologies*, Vol. 10, No. 3, pp. 308–313, 2009.
- [13] Rastogi, N.K., Raghavarao, K.S., Balasubramaniam, V.M., Niranjana, K., Knorr, D., *Critical Reviews in Food Science and Nutrition*, Vol. 47, No. 1, pp. 69–112, 2007.
- [14] Zhang, H., Mittal, G.S., *Food Reviews International*, Vol. 24, No. 3, pp. 330–351, 2008.



**SURVIVABILITY OF SELECTED BAKER'S YEAST STRAINS DURING FREEZING AND STORAGE IN -75°C**

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**Abstract:** Obtaining new yeast strains possessing desired industrial properties is time- and labour consuming. This fact forces researchers to look for an effective methods of valuable strain preservation. Cryopreservation with use of freezers (-60 to -90 °C) or storage in liquid nitrogen is sometimes used. Aim of this research was to establish the survivability of selected baker's strains of *Saccharomyces cerevisiae* yeast stored at -75 °C. Influence of dimethyl sulfoxide, glycerol and trehalose on cell survivability during freezing and storage was also examined. The most significant drop in viable cells amount was observed just after freezing. Viable cell amount after freezing ranged between 46-85% of the initial viable cells. Further storage at -75°C resulted only in small decline (up to 12% points) in the number of viable yeast cells after thawing and cultivation. Mixtures containing 15% of DMSO or 10% of trehalose were the most effective cryoprotectants in this study. Results shown that freezing and storage baker's yeast cells at -75°C may be an effective way to bypass laborious cell passaging from slant to slant.

**Keywords:** cryopreservation, dimethyl sulfoxide, trehalose, glycerol, baker's

## 1. Introduction

*Saccharomyces cerevisiae* yeast may be considered as first "domesticated" organism. From ancient times to the present, baker's yeasts are employed in bread-making processes in the whole world. New strains are still obtained by means of screening, sexual hybridization and genetic modifications to obtain cell lines exhibiting strong ability to rise the dough prepared from grain flours. It is crucial then to choose the proper method of storage these valuable strains. Many methods of microbial strain storage is used in the laboratories. One of the oldest is simple strain cultivation on the surface or in liquid media, such as malt or YPD wort. The biggest disadvantages of this method is time-taking media preparation and the laborious strain passaging, every two to six months. Frequent streaking leads, to contamination with bacteria or even worse, to cross-contaminations with other yeast strains. All negative features of this method force researchers to look for other ways of strains preservation. One of such method is freezing and storage of the valuable cells at temperatures -60 to -90°C or in liquid nitrogen (at approx. -196°C). There are some crucial factors influencing effectiveness of yeast cells cryopreservation, like: strain features, cell dimensions, growth phase, osmotic pressure, pH, composition of freezing medium, freezing and thawing temperatures. Many complex or simple compounds and natural substances were tested as a cryoprotective agents: honey, milk, peptone, yeast, glycerol, ethanol, dimethyl sulfoxide (DMSO), polyvinylpyrrolidone, glycol, lactose, sucrose, maltose, trehalose, ethylenediaminetetraacetic acid and many other. For yeast strain preservation during freezing and storage in low temperatures, the most widely used compounds are: trehalose, DMSO, glycerol and yeast extract [1-7]

The aim of this study was to establish the survivability of selected baker's strains of *Saccharomyces cerevisiae* stored at temperature of -75°C. Dimethyl sulfoxide, glycerol and trehalose influence on cells survivability were also tested.

## 2. Materials and methods

Two strains (BK22 and BK31) of baker's yeasts obtained by means of sexual hybridization in the Institute of Fermentation Technology and Microbiology (Lodz University of Technology) were employed as a biological material. Strains were stored on YPD slants. To activate yeast were cultivated for 48h at 30°C with use of YPD medium (10g/L yeast extract, 20g/L of peptone and 20g/L of glucose, pH 4,8± 0,2; sterilized in autoclave 120°C/21min) in flasks aerated with use of laboratory, orbital shaker. After cultivation yeast cells were collected from post-cultivation medium with use of centrifugation (5000G) or were used directly as post-cultivation suspension of the cells in YPD medium. Yeast cells, suspended in sterile saline (0,85% NaCl w/v) or in YPD medium were combined, with use of laboratory vortex, with an appropriate amounts of sterile glycerol, DMSO or trehalose to obtain desired final concentration of this substances as follows: DMSO (15% w/v); glycerol (25% v/v) and trehalose (10% w/v). Cell and cryoprotectant mixtures were dispensed into 5ml cryovials, then were immediately put into the freezer (-75°C). Living yeast cells were assayed with use of plate method (viable cells expressed as Colony Forming Units - CFU) after 1 day; 2 weeks; 2, 6 months and 1 year storage time at -75°C. To assay cell survivability samples were taken out from the freezer and left out to thaw in +4°C. Appropriate decimal dilutions of yeast suspensions from cryovials were prepared before transferring cells on plates with YPD

medium with 2% of agar content. Plates were then incubated at 32°C for 48-72h and the number of viable cells, able to form single colony, was counted. Results were compared to initial cell number obtained for samples before freezing. As a reference (REF) survivability of yeast cell in saline or YPD medium was also tested. Survivability was expressed as percent of cells able to grow after thawing samples stored for a given period in -75°C. All assays were carried out for three cryovials. CFU was calculated from results obtained for at least eight separate plates. Statistical analysis (analysis of variance, determination of SD, Student's T test at the significance level  $\alpha = 0.05$ ) was carried out by using Origin 7.5 computer program.

### 3. Results and discussion

Survivability [%], after given time of the keeping of the cells suspensions at -75°C was shown in the figures 1- 2.

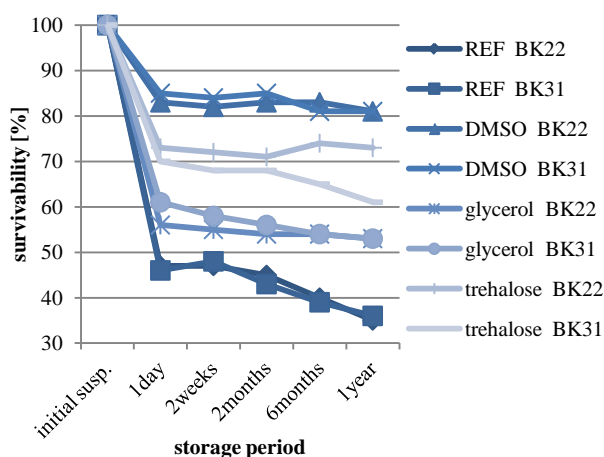


Figure 1: Survivability of yeast cells suspended in saline with cryoprotectants stored at -75°C

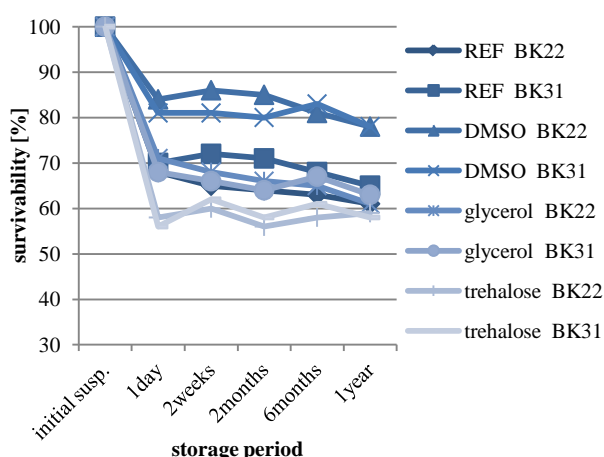


Figure 2: Survivability of yeast cells suspended in YPG medium with cryoprotectants stored at -75°C

It can be clearly seen from the figures that the most significant drop of viable cells of tested strains was

observed during freezing. Depending on the strain and medium composition, viable cell count dropped to 46-85% of the initial viable cell number observed in the suspension before freezing. This may be elucidated by cell damages during freezing process (disruption of cell structures during forming of ice crystals, but also effect of significant liquid water losses from cytoplasm and, as an effect - the denaturation of enzymes as a result of osmotic shock. Mechanism of cell death during freezing was described in many works [1,2,4,8,9]. Longer storage (up to one year) in -75°C resulted only in slight decline (to 12 percentage points) in the number of colony forming units after thawing and cultivation of freeze-stored yeast cells. Similar phenomena were described in papers [2,4,9] and may be explained by the fact that during storage in -75°C kinetics of all negative biochemical and chemical changes is very slow [1,4].

Only slight differences between strains' survivability were spotted. It may be elucidated by slight differences in cell membrane permeability [1,3,8]. More visible differences were observed during comparison of specific cryoprotectant influence on cells survivability. The most significant drop in the number of survived cells was observed during freezing of the both strains' cells just in saline solution, with any cryoprotectant presence. Better survivability was observed when glycerol (25%) was added to the cell suspension. The highest percent of the living cells was recorded for samples containing 15% of dimethyl sulfoxide. Low recovery of living cells when glycerol was added may be the result of fact that glycerol is relatively big-sized molecule and it may take time to migrate inside the yeast cell. Glycerol cryoprotective action requires diffusion of this molecule through cell membranes to decrease the freezing point of water and biological fluids in the cytoplasm [3,10]. Up to 26% points higher survivability of the cells suspended in YPG medium, in comparison with the samples containing only yeast cells suspended in saline was also observed. Preventive properties of the YPD medium were also spotted. It may be useful because preparation of the yeast suspension before freeze-preservation is, in such case, limited only to dispensation of post-cultivation mixture into freezing vials. From the scientific point of view YPD medium protective action may be connected with the presence of cryoprotective substances in YPD medium like glucose, yeast extract and peptone. These compounds may be considered, maybe not the best, but still freeze-protective agent, and there are papers mentioning this [8,11].

### 4. Conclusions

Purpose of this study was to establish the survivability of bakers' yeast cells stored at temperature of -75°C. Influence of dimethyl sulfoxide, glycerol and trehalose on cells survivability was also tested.

It was found out that two strains of *S.cerevisiae* may not differ significantly when comparing their recovery ratio after long-term storage at -75°C. Much significant differences in survivability, depending on the cryoprotective agent were spotted. Results proved

cryoprotective ability of YPD medium. If high survivability ratio is expected during long-term storage in low-temperatures, it's very important to pair the proper kind of freeze-preventive agent with the specific yeast strain, also proper freeze – thawing profile should be set.

## References

- [1] Pegg DE. Principles of Cryopreservation. In: Day JG, Stacey GM.: *Methods in Molecular Biology*, vol. 368: *Cryopreservation and Freeze-Drying Protocols*, Second Edition, Humana Press Inc., Totowa, NJ 2007:39-58
- [2] Bond Ch. Cryopreservation of Yeast Cultures. In: Day JG, Stacey GM.: *Methods in Molecular Biology*, vol. 368: *Cryopreservation and Freeze-Drying Protocols*, Second Edition, Humana Press Inc., Totowa, NJ 2007:109-118
- [3] Hubalek Z, Protectants used in the cryopreservation of microorganisms, *Cryobiology* 2003; 46: 205-229
- [4] Heckly RJ. Preservation of microorganisms, *Adv. Appl. Microbiol.* 1978, 24:1–53.
- [5] Hubalek Z, Kockova-Kratochvilova A. Liquid nitrogen storage of yeast cultures, *Ant. Leeuwenhoek* 1978, 44: 229–241.
- [6] Coutinho CEB, Felix D, Panek AD. Trehalose as cryoprotectant for preservation of yeast strains, *J. Biotechnol.* 1988, 7: 23–32.
- [7] Daily WA, Higgins CE. Preservation and storage of microorganisms in the gas phase of liquid nitrogen, *Cryobiology* 1973, 10:364–367.
- [8] Meryman HT, Williams RJ, Douglas MStJ. Freezing injury from solution effects and its prevention by natural or artificial cryoprotection, *Cryobiology*, 1977, 14: 287–302.
- [9] MezaRA, Monroy AF, Mercado M, Poutou RA, Rodríguez P, Pedroza AM. Study of the stability in real time of cryopreserved strain banks. *Universitas Scientiarum, Revista de la Facultad de Ciencias Pontificia, Universidad Javeriana* Vol. 9, No. 2, 35-42
- [10] Jochem M, Korber C. Extended phase diagrams for the ternary solutions H<sub>2</sub>O-NaCl-glycerol and H<sub>2</sub>O NaCl hydroxyethyl- starch (HES) determined by DSC, *Cryobiology* 1987, 24: 513–536.
- [11] Packer EL, Ingraham JL, Scher S. Factors affecting the rate of killing of *Escherichia coli* subjected to repeated freezing and thawing, *J. Bacteriol.* 1965, 89: 718–724.

## EFFECT OF ACETIC ACID CONCENTRATION ON ETHANOL PRODUCTIVITY BY *SACCHAROMYCES CEREVISIAE*

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**Abstract:** In this paper the influence of acetic acid on the course and yield of fermentation was examined. Commercial distillers yeast (Ethanol Red and Thermosacc dry) were employed in our experiments. Acetic acid in the doses: 0; 1; 2; 5; 7 and 10 g/L was added to the glucose-based medium, then dynamics of fermentation and its yield was examined during 180h of fermentations conducted at 30°C. Ethanol Red yeast were distinguished by faster start of exponential fermentation phase and highest resistance to inhibitor concentration. The highest tested concentration of acetic acid (10 g/L) was strongly repressing factor for both, Ethanol Red, and Thermosacc Dry yeast, and they were entirely unable to carry fermentation in such conditions. Ethanol yield was in the range from 68,4 to 92,2% and was strongly dependent on yeast strain and acetic acid concentration in the fermented wort.

**Keywords:** acetic acid, *Saccharomyces cerevisiae*, lignocellulosic hydrolysates, inhibition

### 1. Introduction

During pretreatment of lignocellulosic materials, not only the simple sugars are formed but also a broad range of by-products, which can be toxic to fermenting microorganisms and reduce ethanol yield and productivity. Formation of these compounds is strictly dependent on used raw materials, as well as on type and conditions of pretreatment method. Inhibitory compounds can be organized into three major categories: furaldehydes, weak acids, and phenolics. Commonly found furaldehydes in the hydrolysate include furfural and 5-hydroxymethylfurfural (HMF), weak acids include acetic acid, formic acid, and levulinic acid, and phenolic compounds such as vanillin, syringaldehyde, and coniferyl aldehyde, all of which can negatively impact the fermentation process [1,2,3]. Acetic acid is formed especially by hydrolysis of acetyl groups of hemicellulose, and its toxicity is related to undissociated form, which enters the cell through diffusion over the cell membrane and then dissociate due to the neutral cytosolic pH [4]. The dissociation of the acid leads to a decrease in the intracellular pH, which may lead to cell death [3]. Technology of bioethanol production from lignocellulosic biomass is still based mainly on acid-involved pretreatment, which lead to formation of high levels of acetic acid and other inhibitory compounds. Therefore, a detailed investigations on the effect of these inhibitors on ethanol yields and production rates is very important for development of new microorganism and cellulosic ethanol commercialization. The goal of present study was to determine the effect of acetic acid at different concentrations on the glucose fermentation by *S. cerevisiae* industrial yeast strains. The effects of acetic acid on biomass growth, substrate consumption rates, and ethanol production rates were reported.

### 2. Materials and methods

#### 2.1. Yeast strains

Fermentations were conducted with use of two commercial yeasts strains: Ethanol Red (ER) (Lesaffre Ltd., France), which are resistant to high ethanol concentrations and temperature of fermentation; and Thermosacc Dry (TD) (Lallemand Ethanol Technology, Canada) dedicated to biofuels and alcoholic beverages production.

#### 2.2. Fermentation experiments

Batch fermentations were carried out in 2 L flasks, containing 1 L of modified YPD broth each (100 g/L glucose, 3g/L yeast extract, 5 g/L peptone). The acetic acid concentrations examined were 0 (control sample), 1, 2, 5, 7 and 10 g/L. These concentrations were selected to represent the range of concentrations that can be found in hydrolysates from different biomass types. After inoculation with yeast (0,5 g/L), which was preliminarily rehydrated, the flasks were closed with stoppers equipped with fermentation pipes filled with glycerol. Fermentations were performed at 30°C for 180 hours.

#### 2.3. Analytical methods

The course of the fermentation was followed by weight loss due to CO<sub>2</sub> production during the fermentation. After the fermentations were complete, the worts were analyzed for real extract, ethanol concentration (using a hydrometer) and residual sugars content (DNS method). The intake of total sugars (the percentage yield of sugar consumption during fermentation) was calculated as a ratio of sugars used during the fermentation to their content in the wort prior to this process, and expressed in percent. The yield of ethanol was calculated according to the Gay-Lussac equation and expressed as a percentage of the theoretical yield.

### 3. Results and discussion

#### 3.1. Effect of acetic acid on the course of fermentation

In order to verify the impact of lignocellulose degradation products on the course of alcoholic fermentation process, the impact of acetic acid at different concentrations on the growth and fermentation activity of two commercial distillers yeasts. Figure 1 and Figure 2 show the percent loss of carbon dioxide during fermentation of model worts by Ethanol Red and Thermosacc Dry yeast, which correspond to the formation of ethanol.

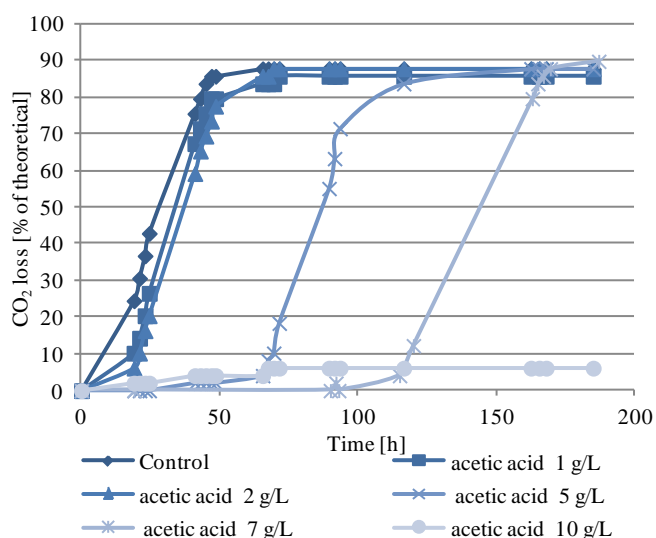


Figure 1: CO<sub>2</sub> loss in fermentation of model worth by *S. cerevisiae* Thermosacc Dry yeasts strain

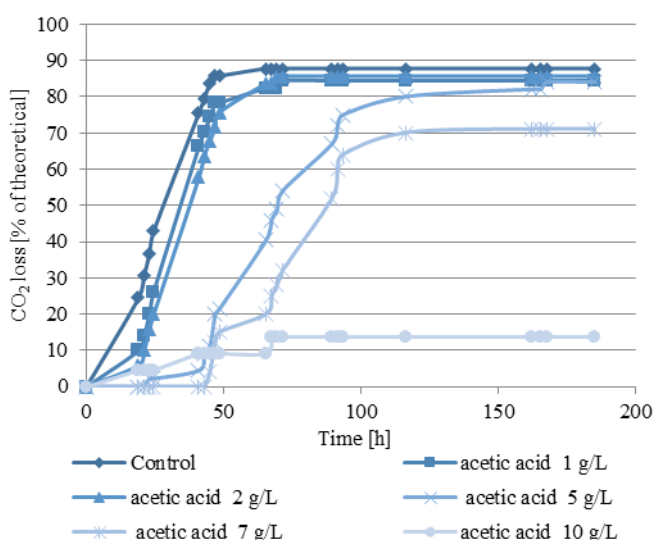


Figure 2: CO<sub>2</sub> loss in fermentation of model worth by *S. cerevisiae* Ethanol Red yeasts strain

As it is shown in figures 1 and 2, both of tested yeast strain responded similarly on the presence of inhibitor in fermentation media. Acetic acid in concentrations 1-2 g/L did not caused any significant inhibition of fermentation process, only a slight delay in the start of adaptive phase.

The use of acetic acid at a concentration of 5 g /L, resulted in a significant extension of the adaptive phase, in this case turbulent phase of fermentation by ER and TD has started as late as at approx. 48 and 65 hour of fermentation, respectively. Increasing the dose of the tested inhibitor to 7 g /L, resulted in a further prolongation of the adaptive phase and the start of the turbulent phase respectively at approx. 65 and 120 hour. A dose of 10 g of acetic acid /L leads to complete inhibition of the fermentation process. Except of the sample with the highest concentration of inhibitor (10 g /L), the amount of evolved CO<sub>2</sub> did not decrease in relation to the control sample. Moreover, it has been shown that ER yeasts were able to adapt to difficult conditions much faster than TD starting turbulent phase much earlier, but finally they produced less amount of ethanol. The obtained results are consistent with those by with acetic acid present in lignocellulosic hydrolysates reduces yeast growth rate but also may positively influence the specific ethanol productivity. The presence of acetic acid has been reported to be beneficial for improving the ethanol yield, as long as its concentration does not exceed the lethal threshold [5,6].

#### 3.2. Effect of acetic acid on fermentation parameters and efficiency

After fermentations were completed, worts were evaluated on basic parameters such as alcohol content, extract and residual sugars after fermentation (the initial content of sugars in broth was 100 g/L). Results are shown in tables 1 and 2.

Table 1. Extract, alcohol content and residual sugars left after fermentation conducted by Thermosacc Dry yeasts strain with addition of different concentration of acetic acid

Sample	Extract [% w/v]	Alcohol content [% v/v]	Reducing sugars concentration [g/L]
0 g/L (control)	1.38	6.19	9.57
1 g/L	1.38	6.15	10.71
2 g/L	1.84	6.10	16.36
5 g/L	3.57	4.97	31.83
7 g/L	4.31	3.28	40.85
10g/L	9.97	0.00	92.10

Table 2. Extract, alcohol content and residual sugars left after fermentation conducted by Ethanol Red yeasts strain with addition of different concentration of acetic acid

Sample	Extract [% w/v]	Alcohol content [% v/v]	Reducing sugars concentration [g/L]
0 g/L (control)	1.52	5.38	8.32
1 g/L	1.58	5.35	9.31
2 g/L	1.61	5.30	14.23
5 g/L	2.95	4.32	27.68
7 g/L	3.97	2.85	35.52
10g/L	9.36	0	85.3

Based on obtained results, the intakes of sugars and efficiency of fermentation processes were calculated. Results are presented in table 3 and 4.

*Table 3. The efficiency of fermentation and sugar intake by Thermosacc Dry yeasts strain with addition of different concentration of acetic acid*

Sample	Fermentation efficiency [%]	Sugars intake [%]
0 g/L (control)	84.25	99.34
1 g/L	83.83	99.04
2 g/L	81.97	97.92
5 g/L	75.39	85.36
7 g/L	52.64	61.78
10g/L	0	7.90

*Table 4. The efficiency of fermentation and sugar intake by Ethanol Red yeasts strain with addition of different concentration of acetic acid*

Sample	Fermentation efficiency [%]	Sugars intake [%]
0 g/L (control)	83.91	98.91
1 g/L	81.64	98.78
2 g/L	80.17	97.96
5 g/L	64.08	72.55
7 g/L	44.74	52.51
10g/L	0	6.71

The results presented in Tables 3 and 4 indicate that regardless of the kind of yeasts used, with increasing dose of acetic acid, the alcohol content in the fermented wort decrease. In case of an extract, there were an inverse relation. With increasing doses of the inhibitory compound, increasing the value of the real extract. This is directly associated with the amount of alcohol, obtained after the fermentation. The highest fermentation efficiency (80-83%) was obtained while acetic acid was added in low concentrations (1-2 g/L). Addition of tested compound at higher concentrations, e.g. 5 g/L and 7 g/L, resulted in decreasing the fermentation yield by about 45-55%. Fermentation of control samples (without any addition of acetic acid) resulted in efficiency at high level (84%).

#### 4. Conclusions

By analyzing the obtained results, it can be concluded that the main impact on the course of fermentation, have a variety of yeast used in the process. Presence of acetic acid is a consequence of the essential step of II generation bioethanol production - a pretreatment of lignocellulosic material, due to a fact that they contain hemicelluloses which reinforces the plant cell wall [7]. Regardless of the lignocellulosic material, a structural component of hemicellulose is that some of the pyranose subunits are substituted for acetyl groups, upon treatment for the liberation of monomeric sugars acetic acid is generated from the degradation of acetylated sugars [8]. Most lignocellulose hydrolyzates contain acetic acid at concentrations between 1 and 10 g/L, depending on the type of used raw material. Dilute-acid softwood hydrolyzates usually contain around 5 g/L acetic acid [9], while those prepared from hardwood, corn stover, wheat straw or sugar

cane bagasse mostly contain higher amounts of this inhibitor (9–10 g/L) [10–13]. The inhibition performance by acetic acid is a serious problem to the utilization of many lignocellulosic raw materials, so this is so important to determine the sensitivity of individual yeast strains on this compound.

#### References

- [1] Palmqvist E, Hahn-Hagerdal B., *Fermentation of lignocellulosic hydrolysates. II: inhibitors and mechanism of inhibition: review*. Bioresource Technology, vol. 74, pp. 25–33, 2000
- [2] Mussatto S.I, Roberto I.C., *Alternatives for detoxification of diluted-acid lignocellulosic hydrolyzates for use in fermentative processes: a review*. Bioresource Technology, vol. 93, pp. 1–10, 2004
- [3] Jönsson L.J., Alriksson B., Nilvebrant N-O., *Bioconversion of lignocellulose: inhibitors and detoxification*. Biotechnology for Biofuels, vol. 6, no. 16, pp.1-10, 2013
- [4] Pampulha M.E, Loureiro-Dias M.C., *Combined effect of acetic acid, pH and ethanol on intracellular pH of fermenting yeast*. Applied Microbiology and Biotechnology, vol. 31, pp. 547–550, 1989
- [5] Palmqvist E., Galbe M., Hahn-Hägerdal B., *Evaluation of cell recycling in continuous fermentation of enzymatic hydrolysates of spruce with Saccharomyces cerevisiae and on-line monitoring of glucose and ethanol*. Applied Microbiology and Biotechnology, vol. 50, pp. 545-551, 1998
- [6] Ylivero P., Franzen C.J., Taherzadeh M.J. *Continuous Ethanol Production with a Membrane Bioreactor at High Acetic Acid Concentrations*, Membranes, vol. 4, pp. 372-387, 2014
- [7] Scheller H.V., Ulvskov P., *Hemicelluloses*. Annual Review of Plant Biology, vol. 61, pp. 263-289, 2010
- [8] Sjöström B., *Wood polysaccharides*, Academic Press, USA, 1993, 2: 51-70
- [9] Larsson S., Palmqvist E., Hahn-Hägerdal B., Tengborg C., Stenberg K., Zacchi G., Nilvebrant N.O., *The generation of fermentation inhibitors during dilute acid hydrolysis of softwood*. Enzyme and Microbial Technology, vol. 24, pp. 151–159, 1999
- [10] Taherzadeh M.J., Eklund R., Gustafsson L., Niklasson C., Lidén G., *Characterization and fermentation of dilute-acid hydrolyzates from wood*. Industrial & Engineering Chemistry Research, vol. 36, pp. 4659–4665, 1997
- [11] Van Zyl C., Prior B.A., du Preez J.C., *Acetic acid inhibition of d-xylose fermentation by Pichia stipitis*. Enzyme and Microbial Technology, vol. 13, pp. 82–86, 1991
- [12] Chen X., Shekiri J., Elander R., Tucker M., *Improved Xylan Hydrolysis of Corn Stover by Deacetylation with High Solids Dilute Acid Pretreatment*. Industrial & Engineering Chemistry Research, vol. 51, pp. 70–76, 2011
- [13] Moreno A.D., Tomás-Pejó E., Ibarra D., Ballesteros M., Olsson L., *Fed-batch SSCF using steam-exploded wheat straw at high dry matter consistencies and a xylose-fermenting Saccharomyces cerevisiae strain: Effect of laccase supplementation*. Biotechnology for Biofuels, vol. 160, pp. 1–10, 2013

## Session: Earth Sciences, Biology

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## STATISTICAL DEPENDENCE ON THE MEASUREMENT RESULTS OBTAINED WITH NON-DESTRUCTIVE METHODS AT EARTH QUALITY CONTROL

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**Abstract:** This article is focused on the quality of earth structures in terms of possibilities of using alternative methods. These methods are beneficial to engineering practice with respect to speed and smart testing. Methods described in the article are not yet included in the Slovak technical standards and their application is very rare as they are not verified in practice yet.

**Keywords:** Light dynamic deflection, geogauge Humboldt H4140, Clegg Hammer

### 1. Introduction

Today there are many methods for obtaining information about subsoil carrying capacity based on various theoretical approaches. In order to ensure consistency between these methods, it is necessary to determine conditions for measurements, accurately perform comparative measurements using the selected methods, to compare the obtained values, and to determine relationships between them by the statistical method of correlation. If correlations are determined responsibly, it is possible to apply these methods. This would be beneficial for the contractor and the employer due to simple and easy handling, fast results and problem free transport.

### 2. Measuring equipment used in experiment

At our experiment we have used the device Humboldt H4140 and Clegg Model CIST882. For comparison we have used the Light Dynamic Plate LDD100 device - commonly used in the Slovak Republic.

#### 2.1 Clegg Impact Soil Tester

Clegg impact soil tester Model CIST 882 (version with 4.5 kg hammer) is a device suitable for continuous quality assurance monitoring at earth structures - embankments, which can be implemented quickly without interrupting advancing works [3].

The device (Figure 1) consists of falling hammer with in-built compaction sensor, guiding cylinder with integrated base plate and auxiliary handle, measuring instrument with digital display and connecting cable.

The parts are assembled into an easily portable measuring unit. Compacting hammer rises and falls in the vertical guiding cylinder. It falls directly onto the tested material without any pad. The extent to which the soil retards the hammer is defined by the power dependent on compaction of the tested material. On the falling hammer is located the accelerometer, which is connected with the digital display. The display shows the speed of the hammer descent in the CIV units (Clegg Impact Value).



Figure 1: Clegg CIST 882

In order to obtain reliable CIV values it is necessary to perform 5 hammer blows at each tested location. Regardless the tested material, the following measurement procedure must be maintained:

- the tested location must be free of roughness and larger stones (impact hammer falling on the stone can damage the accelerometer),
- prior to testing check if position of the guiding cylinder is vertical. The device is supported by the inner side of the foot. The hammer is elevated up to the line and the button on the screen is pressed. Check whether the first reading shows zero,
- Make sure that the cable connecting accelerometer and the display is not captured by the falling hammer and watch the value displayed,
- without moving the guiding cylinder and pushing the button on the display 4 hammer blows are repeated, in order to obtain final count of 5 blows,
- 5 measurements are assessed. The first 2-3 blows should even out small roughness caused by the release of material under the hammer. Further should increase slightly and determine the stiffness of the compacted layer. The device is sensitive to the surrounding shocks, therefore it is necessary to make sure that during the whole process of testing there is no source of vibration or shocks in the radius of at least 15m from the device, which could adversely affect the final result.



## 2.2 LDD 100 – dynamic load test

The main point of the test is to determine the size of the response (vertical deflection) of the tested half-space to the load by the blow. Deflections are determined from the size of acceleration detected by the accelerometer. In accordance with the User manual [5] from the retraction of plate is calculated the deformation modulus  $M_{vd}$  according to the formula:

$$M_{vd} = \frac{F}{d \cdot y_{el}} \cdot (1 - \mu^2) \quad (1)$$

where:  $F$  – power [N]

$\mu$  – Poisson's ratio [-]

$y_{el}$  – size of the elastic deflection under the middle of the loading plate [mm]

$d$  – diameter of the loading plate [mm]

Measuring by the Light dynamic plate is performed as follows:

- measuring plate is placed on the surface of the tested soil which must be flat and the plate shall touch down on its entire surface. If there are small unevenness it is required to smooth the tested location by the sand.
- connecting cable is connected to the plate by the connector,
- impactor is installed on to the plate and the locking pin locks off the weights. Weights are lifted and are latched,
- at the beginning there is one impact, which secures the plate touch down on the surface. After the rebound, the weight is retained in the raised position and locked,
- evaluation unit is switched on (and the printer) and the measurement is prepared,
- 3 measuring impacts are performed, after the rebound the weight is always retained in the raised position and locked,
- connector is disconnected from the plate, weights is locked in the bottom position and the device can be moved to the next tested location.

## 2.3 H-4140 – geogauge Humboldt

The fundamental of the test is to determine the mechanic impedance of the tested layer. It measures the pressure transmitted to the layer surface and the resulting surface speed as a function of time [4].

The device during one measurement cycle generates electromagnetic energy at the level of 25 frequencies (range 100 Hz to 196 Hz). Measuring interval lasts 75 seconds and the gauge conducts 7400 measuring cycles (Fig. 2). Output parameters for each measurement interval are:

Modulus of elasticity - in the original literature referred to as a Young's modulus in accordance with Hooke's law for isotropic, linear elastic material. For the resolution referred to as  $E_H$ .

Stiffness - measured in the range from 3 MN.m<sup>-1</sup> to 70 MN.m<sup>-1</sup>

The  $E_H$  value is determined according to the formula:

$$E_H = \frac{F}{1,77R \cdot \delta} (1 - \mu^2) \quad (2)$$

where:  $E_H$  - the dynamic modulus of elasticity of the soil determined by the Humboldt device at one phase of the test [MPa]

$\mu$  - Poisson's ratio [-]

$R$  - outer diameter ring-shaped foot [mm]

$\delta$  – deflection [mm]

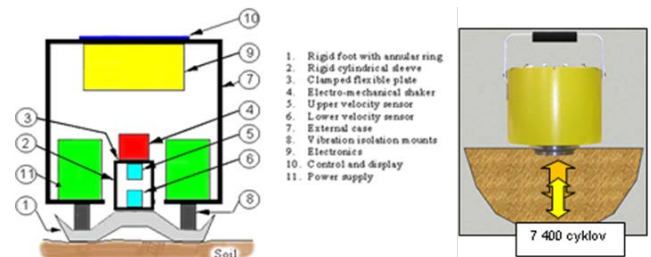


Figure 2: Device scheme and measuring principles by geogauge H-4140 [3]

Measurements by the geogauge H-4140

- the tested location shall be adjusted to be even. If we want to obtain reliable output values, it is necessary to ensure the 100% contact between the measuring cylinder and the tested material.
- in case the tested location is uneven, it shall be smoothed out by the slightly moist sand,
- geogauge is placed on the prepared location; softly pushed and turned in order to obtain the best contact with soil,
- measurement is commenced by pressing the button measure, geogauge begins to create vibrations transmitted up to 300 mm depth. Throughout the measurement process, the probe shall not be moved, there shall be no shocks and vibrations in the surrounding which may affect measurements,
- after measurement the value of Young's modulus of elasticity and stiffness is taken from the digital display. The probe can be moved to further testing location.

## 3. Testing field

The testing field is located in the Zilina University Campus behind the laboratories. The top soil layer was removed /depth 0.3-1.2m/ to even the terrain. The soil sample (100 kg) was taken and laboratory analysis was performed at the Geotechnical Department Laboratory. In the testing field corners were constructed footings, carrying beams which are arranged in the longitudinal direction of the testing field. On beams were placed moving cross-beams. Corner footings served to outset the testing field. The size of the tested field was measured. Its parameters are 11x5m. Prior to commencing experiment it was necessary to adjust minor unevenness of the testing field. Larger stones were removed, depressions were filled, upraised locations were aligned and adjusted locations

were compacted. Visual inspection during the works determined that the test field is not homogeneous, and the middle part is located more coarse material, therefore the initial measurements were carried out by using the apparatus LDD 100 and Clegg CIST 882.

On the testing field was marked the grid with the square size 50 cm and were performed measurements at each square. In total 220 initial measurements were taken with each device. From the measured data, we created a surface graph for each of the apparatus used, and from the results we determined that the most homogeneous part is the upper third (Figure 3), with the dimensions 3.5 x 5 m. Further measurements were conducted only on this part. Laboratory analysis was performed on sample taken from the upper third of the testing field.

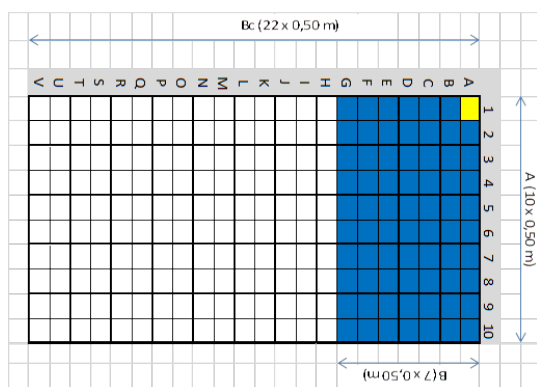


Figure 3: Determination of the most homogeneous third of the testing field

Clay with medium plasticity F6 - CI is quite frequent in Slovak geology. In some cases unsuitable soil is replaced, or subsoil improvement is applied. Such soil can be also used at layered embankments.

Measurements procedure:

- prior to commencement we sampled the soil from which we determined the laboratory humidity (dry top layer, we have removed at thickness of about 2 cm to avoid distortion of the actual value of humidity),
- as the first were performed measurements by the Clegg CIST 882. At measurements by this device there are clear imprints in soil. When using the next apparatus the exact tested location was easily determined. Thus it was possible to statistically evaluate a pair testing. The device was placed on the testing location according to the grid, the distance between measuring points was approximately 50 cm,
- further measurements we carried out by the Humboldt H4140, the device was placed as close as possible to the imprint of the Clegg device (or imprint of Clegg was located in the middle of the Humboldt ring), in a way that the imprint would not interfere into the measuring ring of the device,
- last measurements were performed by the device LDD 100, because at measurements by the H4140 it was necessary to fill the cavities under the plate by sand in order to achieve better contact with the measured material. The LDD was placed on the same spots.

- After completing the measurements, we aligned the minor surface soil disruptions incurred by measurements, particularly from devices Clegg CIST 882 and LDD100, in order to create ideal conditions for the next day measurements.

#### 4. Conclusion

At evaluation was taken into account the impact of climate and soil conditions. Comparative measurements had to be carried out always within the interval of several hours in order not to alter the consistency and the moisture content of soil, which has a great impact on the soil behavior. Obtained values were evaluated statistically for both devices. (Tab.1 – Humboldt H4140, Tab. 2 Clegg CIST 882)

Table 1 Humboldt H4140

Consistency/ Moisture interval		Formula	Correlation
Hard consistency	8- 9,99%	$E_{vd} = -0,0007E_H^2 + 0,3192E_H - 2,4842$	R = 0,8254
	10- 11,99%	$E_{vd} = 0,0004E_H^2 + 0,2309E_H - 2,3927$	R = 0,8091
	12- 13,99%	$E_{vd} = 0,0038E_H^2 - 0,2597E_H + 11,896$	R = 0,9127
Firm consistency	14- 15,99%	$E_{vd} = -0,0029E_H^2 + 0,8185E_H - 31,701$	R = 0,8691
	16- 17,99%	$E_{vd} = 0,0051E_H^2 - 0,5027E_H + 21,048$	R = 0,819
	18- 19,99%	$E_{vd} = 0,0006E_H^2 + 0,062E_H + 4,6911$	R = 0,8963

Table 2 Clegg CIST 882

Consistency/ Moisture interval		Formula	Correlation
Hard consistency	8- 9,99%	$E_{vd} = 0,0301CIV^2 + 1,7836CIV - 3,1223$	R = 0,7972
	10- 11,99%	$E_{vd} = 0,3982CIV^2 - 5,5153CIV + 32,927$	R = 0,879
	12- 13,99%	$E_{vd} = 0,0751CIV^2 + 0,0629CIV + 7,1015$	R = 0,777
Firm consistency	14- 15,99%	$E_{vd} = -0,046CIV^2 + 3,6876CIV - 12,543$	R = 0,8962
	16- 17,99%	$E_{vd} = 0,2697CIV^2 - 2,634CIV + 14,6$	R = 0,8437
	18- 19,99%	$E_{vd} = 0,1683CIV^2 - 0,8741CIV + 9,4097$	R = 0,8916

The results show that it is possible to consider the interchangeability of these devices in practice, which would lead to more efficient quality control.

Obtained correlations are suitable basis for the introduction of alternative methods in to the quality assurance process in Slovakia. Their use in combination with the static loading test will simplify, speed up and enhance the quality assurance process at earth structures.

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Implementation of new diagnostic measurements for the project of the optimize life of roads.

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## References

- [1] Decky, M.; Drusa, M.; Zgutova, K.; Vangel, J.; Trojanova, M.; Benc, G.; Starsi, B. 2009. Design and Quality Control of Earth Structures at Civil Engineering Projects. Scientific monograph. University of Zilina. Zilina: BTO print. 479 p. ISBN 978-80-970139
- [2] STN 73 6133 - Road Building - Roads embankments and subgrades - Slovak Standards Institute, 2010
- [3] Manual of Clegg Impact Soil Tester - CIST/882
- [4] Zgutova, Decky, Sramek, Durekova: Non-destructive method of controlling compaction of earthworks using device Humboldt, Conference Testing and Quality in Civil Engineering, 2012
- [5] LDD 100 Light Dynamic Plate. User manual, ZBA GeoTech, Nové Mesto nad Metují.

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## THE RIDDLE OF THE THREE PENNIES INSIGHT INTO THE LIFE OF PAVOL DOBSINSKY THROUGHT FOLK TALE "THE RIDDLE OF THE THREE PENNIES"

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**Abstract:** Pavol Dobšinský is a phenomenon of the Slovak literature und culture. There might not exist a child or an adult who would not know his name. The masterpiece of Slovak folk tales he created is our first contact with beauty, truth and justice. The man, who in the times when bread was breaking understood that if a nation wants to survive in terms of culture, it needs to protect its culture and morality from unfavourable influences. Object of the paper is to present the life and work of this great man to the Slovak people through one of the tales by Pavol Dobšinský "Three Coppers".

**Keywords:** Pavol Dobšinský, fairy-tale, three coppers, life, work

### 1. Introduction

Tales have accompanied each man in our culture since childhood. As early as in the great-grandfather's times, the tales were used to pass the moral principles and traditions. They bring not only joy, but mostly morale. Especially, our Slovak folk tales, because they always end up with victory of the good over the evil and their message is the old human truths and values a man should be supported by in his life. The tales had been spreading by word of mouth for many centuries. The true characteristics of private Slavic heritage have been preserved thanks to him and helped the nation to last in the same form until today. Every narrator has left an imprint of their living and understanding of the story in his or her narration. The tale is magic, full of fantasy, exactly what children need. The traditional story Sunday in our families was after the Mass next to the radio, where the voice signalized the folk tales by Dobšinský. The Sunday ones were the nicest fairy-tale book in children's lives. "As for me, it is like with the Slovaks: we do not know if we like poetry of the tales and victory of the good in them, or vice-versa, if the tales form us in our childhood, so that we are accompanied by desire for justice and the good during our whole life. Until today, I find fairy-tale to be the peak of art. Its composition reminds me of Gothic building with its richness and climax in the punch line" said Mária Jančová. (Marčok, 1978).

It is not possible to create a fairy-tale base, from which wisdom can be drawn later on through the simplified version of classical fairy tales, which are so widespread nowadays. It is not enough to know only Hanzel, Gretel and the gingerbread house, but what must be known is the reason why the children happened to be alone in the woods. Therefore, we should be careful not to deprive our children of the fairy tales in their full beauty and power and not to offer them the simplified versions, which by far do not rival the original versions. Also, we should not let our children alone with the pictures, their questions and feelings which the tale might evoke. There is no doubt about the psychological significance the reading or narrating the fairy tales to children has. The question remains to what extent these positives and negatives are

perceived mainly by parents who choose and mediate the fairy tale to their children as the first ones.

### 2. Three Coppers by Pavol Dobšinský

The fairy tale about three coppers brings a bright morale. Not to eat everything a man earns, but to put some money aside for oneself, to use some money for living and to use some money for one's objectives; in short, to plan and think ahead. The tale is about a poor man who was digging a trench next to the main road. The king was passing by and asked the poor man what payment he gets for such hard work. "Well, Your Majesty, three coppers" (Dobšinský, 2012, p. 124). The king was wondering how it was possible and how can one live from such little money. "Huh, Your Majesty, if only to live! I give the first copper back, lend the second one and live on the last one." (Dobšinský, 2012, p. 124). The king wondered how that could be possible, but he figured out nothing. "Well, Your Brightest Majesty - the poor man says, I give back to my old and feeble father for having raised me. I lend to my small son to give me back when I'm old, and with the third copper I farm for ordinary day. That's how it is with my three coppers. (Dobšinský, 2012. p. 124).

The life of Pavol Dobšinský may be described like in a fairy-tale, because he gave the first copper back to those who had shown him how to raise in himself the beauty of Slovak fine literature, he lent the second copper to the generations in order to pass the good through the fairy-tales to other generations and he lived from the third copper – his life in relation to Slovak fairy-tale.

#### 2.1 First Cooper

Phenomenon of the Slovak literature and culture Pavol Dobšinský, master of Slovak language, which is sworn in his tales, found his shelter, his solemn and best times at the very frontier of the Slovak origin, directly on Hungarian - Slovak ethnic border. It is exactly his essential gift of eternity. Slovak Homer, the man who had been narrating – and how he had been narrating! – inner stories of his people, who had lived in the middle of solemn nature that was aware of finiteness of his times but guesses something also about his duration. On March 16, 2013, the Slovak

radio broadcasted a session concerning the 185<sup>th</sup> anniversary of this man's birth, whose name has been connected with Slovak fairy-tales forever. Pavol Dobšinský is a paradoxical personality. There might not exist a man in Slovakia who would not know Pavol Dobšinský. Many know his numerous tales from their childhood. And actually, our knowledge of Dobšinský, our esteem to this author, phenomenon of the Slovak literature ends thereby. I do not know a creator who would express our national identity more suggestively than Pavol Dobšinský. He was struck by one life crisis after another. A tragedy of his personal life... He held the opinion that the fairy-tale is a proof of creative abilities of narrator. It did not originate to put children to sleep, but to wake up adults. He wanted to provoke adults through a tale. He wanted to remind them a different value system that they have professed. Actually, it is the meaning or message of his tale for today. Because we do not salt how it used to be – with the salt. We salt with the gold. From such messages and Slovak fairy-tales, the picture of the culture, which was very contact and had its logic also in metaphors, is shown. If we take the life of Dobšinský from retrospective, we would find out how he had been worried about the collected Slovak fairy-tales, because as he wrote in one of his letters to a respected man Škultéty "They must be hidden from human stupidity and evil" and he recommended to transport them to the shelter in the sacristy of Jasenov church. As early as before October 22, 1885, when he died before midnight, the tales were hidden because he wanted to keep them for his grandchildren and great grandchildren. Emotive national, but also human devotion to keep the texts of the fairy-tales was so connected with the life of Pavol Dobšinský that he was afraid that the tales might die through his own death as well. It might have been a justified worry, it might not have been only fear of the man who was dying and realizing finality of things and finality of his life and activities. He hid the tales in the sacristy of a church, among chalices, pictures of saints, Scripture. Thus, he wanted to pass us the message that we should devote our time to word and language and absorb it.

## 2.2 Second Cooper

Slovaks like fantasy. Mysterious creatures, magicians, witches, princesses, etc. The world they can escape to when their one does not seem to be so magical. However, the world in a fairy-tale by Dobšinský is not ideal. There is violence, blood, tragedies. Maybe, it is influenced by the fact that he himself did not live a life as if in a fairy-tale, and therefore he escaped to the stories of our ancestors. Stepmother kills her stepson, lets his father eat him and the planted bones grow into a bush, on which a bird is sitting who kills the stepmother by throwing a stone. A TV horror from 21<sup>st</sup> century? No, one of the fairy-tales by Dobšinský. Original stories, which he had collected, are not exactly what parents would like to read to their children before sleep. But he did not want that. The tale did not originate to put children to sleep, but to wake up adults. The tale could not exist without any horror scenes. Dobšinský did not want to send children to the kingdom of secrets. He

wanted to prove how rich the Slovak production was and that even ordinary people had literary jewels in their heads.

## 2.2 Third Cooper

Dobšinský vent his personal tragedies in the tales. He vaccinated us against evil, although he himself lived a catastrophic life. The stories in his books are cruel, but they have magic in them. All heroes come to life in a Slovak fairy-tale. The cruelty is not done by people. Exactly the heroes go against it and finally everything ends up well. Supernatural creatures like a dragon, a witch, a devil are punished. The good always wins over evil. The ethnograph had always been searching for any means for publishing collections of stories but everybody turned their backs on him. At that time, his masterpiece of Slovak folk tales was ordered only by three Slovaks. Nevertheless, Dobšinský kept looking for other subjects for their publication. He used to say that they were like milk, by which he wanted to feed the starving Slovak nation. He wanted to teach Slovaks how to read. Finally, he published a collection of Slovak fairy-tales. However, there was no return. At that time, people were not interested in the collection, not in the published ones. Dobšinský was curing his difficult times through a wedding with Paulína Schmidtová and moving house to Drienčany, one of the most remote parishes of Gemer to become an evangelical preacher. A moment of happiness, when his daughter Olinka was born, was immediately replaced by sorrow at his wife's death and in a few months Olinka also died. He was curing the loss of his two dearest persons by collecting the fairy-tales among people and in a few years later also by a wedding with a widow of his friend – writer Ján Čajak. The life story of the most famous Slovak fairy-tale narrator was not easy at all, and might start like this: "*once upon a time, there was a village in Gemer ...*"

## 3. Conclusion

A Saturday winter evening. They used to let us from school at five o'clock. We were almost running from school with a fairy-tale book in the bag, knowing what to expect at home. Smell of polished floor and laid carpets, smell of fresh bread, sparkling hot stove and bubbling water in those moments when it starts to boil. It should be Sunday tomorrow. It was not necessary to prepare for school, not to think of work. It was the evening of fairy-tales. Many generations of Slovak children have grown up on fairy-tales by Pavol Dobšinský. Even though his life was not easy, because he was poor, it was still rich, because he has left the masterpiece which enriched not only him, but also next generations. Slovak Homer, the man who had been narrating - and how he had been narrating inner problems of his people, was living in the middle of solemn nature that was aware of finiteness of his times but guessed something also about his duration. He was a man of persistence and faithfulness, not explosive, not hasty, not hot-headed, but the one staying in peaceful work. He was preaching and teaching, raising and supporting the young and the old, he was farming, keeping bees and his garden, he was a worker among workers. Only in the evening, he used to become someone else. In

the evening, as some witnesses say, he used to sit at the fireplace and narrate his stories, while the oak wood was sparkling. Nowadays, we would say that he was editing them aloud. He was faithful to his people, his language, his nicest reminiscences of himself, his games and stories, his morale. Exactly this faithfulness was victory of Pavol Dobšinský. It is also our victory, because this faithfulness has created an indestructible masterpiece. Simply, he was a man of three coppers.

### References

- [1] Dobšinský P, *O troch grošoch*, Prostonárodné Slovenské povesti, sošit 2, Turčiansky Sv. Martin, 1928, p. 115-119
- [2] Marčok, V, *Pocta Pavlovi Dobšinskému 1828-1885*, Bratislava, Mladé letá, 1985, p. 15-25.
- [3] Rúfus, M, *Sobotné večeri*, Pocta Pavlovi Dobšinskému 1828-1885, Bratislava, Literárne informačné centrum, 2008, p. 11-14
- [4] Sliacky, O, *Živá a mŕtva voda Pavla Dobšinského*, Pocta Pavlovi Dobšinskému 1828-1885, Bratislava, Literárne informačné centrum, 2008, p. 26-29

## TEACHING PHONETIC ASPECTS OF THE SLOVAK LANGUAGE IN SLOVAK SCHOOLS WITH SLOVAK AS A MEDIUM OF INSTRUCTION IN ROMANIA

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**Abstract:** The article focuses on a question of teaching phonetic aspects of the Slovak language in Slovak schools with Slovak as a medium of instruction in Romania. It is primarily centered on school documents, which are a crucial base for the teaching process. Based on their complete analysis a picture of the scope dedicated to phonetic aspect of language in the teaching process is created. Acquired knowledge is confronted with a recent situation, which has long evolved in terms of dialects and bilingualism. Last but not least it also addresses the art of standard language and the ability of its development in the researched area.

**Keywords:** phonetic aspect, bilingualism, Standard Slovak, dialects, Slovak minority in Romania,

### 1. Introduction

The Slovak language as a mother tongue is crucial in Slovak schools as a medium of instruction in Romania. This argument does not need to be proven, but an eye should be kept on its application in practice. In this context, Anoca (2012) draws attention to the communicative and cognitive function of the Slovak language in the teaching process, where these functions are implemented fully, and even developed purposefully. Teaching process in Slovak schools in Romania can not be managed without the Slovak language as a "carrier", because the Slovak lessons lay the foundations not only of language culture, but of the ability of acquisition. It creates a sense of value and one could say that the Slovak language is a medium that every Slovak is „born“ into Slovak culture and at the same time he opens up new possibilities to enter into a universal culture [1].

The importance of the Slovak language is thus given by serving the learning and communication process among participants in school life as a means to implement the objectives of lessons in other school subjects as well. "That situation also affects the courses in the Slovak language and literature, which acquires particular importance in the system of courses and in the learning process, since these functions outside schools can be , in the case of minority existence, substituted very poorly [2].

### 1.1 Slovak language and bilingual environment

The status of the Slovak language is also determined by informal factors such as family which has had mostly a positive impact on Slovak language in Romania so far. Naturally there are also families that do not lead their children to participate in optional lessons of the Slovak language. Furthermore, Slovak classes are affected by non-institutional social factors as well as linguistic contacts that accompany bilingualism. It lies in multicultural conditions for coexistence of Slovak minority with the Romanian majority and other minorities where bilingualism becomes a natural phenomenon, which usually leads to crossings and creolization of codes in communication. In terms of

linguistics and research this is acceptable, however it is unbearable in terms of identity, existence and school system.

### 1.2 Slovak schools in Romania

In 2004 a comprehensive census of educational institutions in the Slovak language in Romania was recorded. There were "32 educational units with Slovak as a medium of instruction: 2 lycées from IX. to XII. class (Nadlak and Bodonoš), four primary schools from I. to VIII. class (Nová Huta, Stará Huta, Gemelčička, Saran), 16 elementary schools from I. to IV. class and 10 nurseries[3].

What played an important role in the historical context of the development of education in the Slovak language was the establishment of lectureship (1944) at the University of Bucharest and later (1949) and the establishment of the Department of the Slovak Language and Literature where most Slovak teachers working in Slovak schools in Romania studied. At present, as shown in Table 1, number of schools is drastically decreasing proportionally with the number of participants of the Slovak language.

Table 1: Number of students in Slovak schools in Romania during the academic year 2012-2013

Institute of education	Full number	Nursery	Primary school		Grammar school
			I. - IV. class	V. - VIII. class	
Škôlka Butin	14	14	0	0	0
Škôlka Harasov	10	10	0	0	0
ZŠ. I - VIII Gemelčička, 1	90	24	23	43	0
ZŠ. I - IV Gemelčička, 2	28	13	15	0	0
ZŠ. I - IV Gemelčička, 3	8	0	8	0	0
ZŠ. I - IV Varzaľ	21	11	0	0	0
ZŠ. I - VIII Šarany, č. 1	64	12	0	0	0



ZŠ. I - IV Šarany, č. 2	4	0	0	0	0
ZŠ. I - VIII Nová Huta	71	12	22	37	0
ZŠ. I - VIII Stará Huta	31	11	5	15	0
ZŠ. I - IV Chrabčín	4	0	4	0	0
ZŠ. I - IV Šastelek	7	0	0	0	0
ZŠ. I - IV Čerpotok	34	16	18	0	0
ZŠ. I - VIII Alešd	19	12	5	0	0
ZŠ. I - IV Raturi	4	0	4	0	0
ZŠ. I - IV Valea Lupului	4	0	4	0	0
Teoretické lýceum J. G. Ta-jovského, Nadlak	344	104	81	85	100
Teoretické lýceum J. Kozá-čeka, Bodonoš	219	27	41	47	104
<b>The full number of students:</b>	<b>1 031</b>	<b>266</b>	<b>276</b>	<b>273</b>	<b>220</b>

ZŠ – primary school; I – VIII – The number of class

## 2. Curriculum – historical overview

In the school environment there is an evident pursuit of standard Slovak in terms of building competencies and encouraging performance in all language levels as prescribed in curriculum of the Slovak language and literature. Curriculum for teaching the Slovak language in schools with the Slovak language as a medium of instruction were first approved by the Ministry of Education in 1989.

It was drawn up by the National Council for Curriculum composed of working groups, whose members were Slovak teachers who teach Slovak in Romania. In retrospect these curricula were altered, but the text for the first and second level of primary schools remains in the original language mutation, namely Romanian. The curiosity is that the curriculum for the secondary level is written in the Slovak language but like the curriculum for primary schools it replicates a Romanian model of curriculum.

## 3. Standard pronunciation and curricula

Curricula of the Slovak language in Romania for all years of the second grade in primary schools consist of the following topics: The sound of language and orthography, lexicology, morphology and syntax. "Based on the curriculum each teacher draws up a plan in which he realizes the teaching process throughout the school year. The number of teaching hours of the Slovak language in individual years is the same as the number of hours allocated to the Romanian language [4]".

Under Regulation. 3638 / 11.04.2001, the Ministry of Education defines two hours of Slovak literature and three hours of the Slovak language for the fifth grade weekly and for the sixth, seventh and eighth grade two hours of Slovak literature and two hours of the Slovak language [5].

Within a thematic section focused on the phonetic aspect of language and spelling curricula [6] for the Slovak language in Romania contain the following general objectives:

- Developing the ability to perceive spoken speech
- The development of verbal skills
- Developing the ability to perceive written forms
- The development of verbal skills in writing.

### 3.1 Educational standards

Educational standards closely follow up the standards of the Romanian national language both in the content and structure. The phonetic aspect of language is the focus of the research, and therefore our attention will be centered only on the segmental and suprasegmental phenomena. The standards of content define the system of cognitive and speech competencies and a set of language terms. A set of linguistic terms also includes all the linguistic terms that were standardized for the first grade of primary schools.

The emphasis is placed on cognitive and speech competencies. Cognitive and speech competencies include the following requirements - memory, classification and application skills, analytical and systematic skills, creative and ICT skills. "In oral speech follow the proper usage of breathing, articulation, standard pronunciation and correctly applied suprasegmental phenomena. In oral speech apply adequately extra-linguistic means. In a written form apply spelling rules [7]". Within the phonetic aspect of language following linguistic terms are defined during the second stage (following the terminology of the first stage):

- hyphen, dash, spelling
- linked pronunciation, insertion, mutation
- Syllable pronunciation of *de/di, te/ti, ne/ni, le/li* in foreign words
- Voiced - voiceless - voiced unpaired consonants
- Pause, strength of voice, key word stress, stress, speech rate
- clause melody (exclamatory, wish)
- addressing, abbreviation, punctuation

A teacher in the fifth grade of primary school focuses on pronunciation and writing of consonantal groups and double consonants. He practices and consolidates the knowledge of sounds and mutation. He emphasizes the proper adoption and subsequent application of selected words. According to the curriculum he devotes one hour to the rhythmic rule of syllables. During the whole process of teaching the teacher points out to the students the distinctions of correct and incorrect pronunciation of the phenomena.

In the sixth grade a teacher focuses one hour on the revision of curriculum from last year. Additional hours are centered on acquiring knowledge of voiced and unvoiced consonants, pronunciation and spelling of double consonants, pronunciation and spelling of double consonantal groups and on the material of selected words. From suprasegmental features accent is included in the learning process.

In the seventh grade students become familiar with the exceptions of rhythmic cuts, grammar, and pronunciation

of foreign words, and last but not least with spelling and pronunciation of *s, so, z, zo, vz* prefixes. In the eighth grade of the Slovak language teacher draws their attention to the suprasegmental features such as melody clauses, word stress, sentence stress, pause, pace, strength (intensity) of voice, rhythm.

The method of creating curriculum in each grade is a cyclical curriculum. Thematic units or only topics are repeated in each upper grades, and following repeated topics they are extended to other topics of the same area. The material creates thematic cycles that are concentrically developed. New topics are always associated with previous ones in order to refresh, revise and consolidate students previous knowledge.

### 3.2 Performance standards

In the teaching process a performance standard is a secondary educational document drawn up on the basis of the content of educational standards. It consists of a text, in which standardized content elements are arranged on the basis of individual language communication competences in consideration of systemization of language curriculum. Romanian public education program lists within the recommended topic *"Communication, the phonetic aspect of language"* the following performance standards for competence areas:

- "pupil is able to readily orient in a particular communicative situation and accurately react to listening comprehension with a clear, comprehensive answer or question with correct intonation
- Pupil in his/her language competences articulates correctly, follows the rules and requirements of Slovak pronunciation (in his/her own speech he/she can apply the rules of assimilation)
- Pupil can distinguish between standard and nonstandard speech and in public speeches he/she tries to use standard pronunciation (follows semantic and physiological pauses, has reasonable pace of speech, correct phrasing of the statement and an appropriate voice modulation)
- Pupil can properly begin, conduct and end communication [8].

### 4. Standard pronunciation and dialects in school practice

Teaching of the Slovak language in Romania takes place in the dialect area. In school practice we often find an opinion that dialect is an anachronism in today's society, even a kind of obstacle in meeting the communication tasks of standard language in modern society. In literature (Betáková - Jacko - Zelinková 1984) we find a statement that this view is wrong. Despite the fact that from a genetic point of view there are two formations of the national language they should be seen in mutual unity and conditionality as two partners who do not compete but complement each other [9].

For all students of Slovak schools in Romania a native dialect fulfils its function of communication means. At the same time it is a foundation for speech, on which can be built later on because not only differences but particularly

common elements of dialects and standard language enable them to adopt a standardized form of language. By highlighting specific dialectal features from Bihorska area as well as from Arad area a teacher can motivate the students, inspire them with respect and love not only for their native dialect, but also for standard language.

It would be a big mistake if teachers approached the issue of acquiring standard language, particularly the phonetic aspect of it pessimistically. Despite the daily use of a native dialect a student has the potential to learn standard language. One of the possible ways to achieve the acquisition of standard language and standard pronunciation of pupils in dialect environment is that the teacher first uses everything from the dialect that helps students understand and adopt a system of standard language.

### 5. Conclusions

At present spoken language is of great significance in standard Slovak. The ability to speak publicly is determined by the degree of mastering standard phonetic system of language. Pronunciation in schools with Slovak as a medium of instruction in Romania is largely influenced by dialects. In Bihor area mixed dialects are characteristic. This fact describes that "after almost two hundred years of coexistence of these dialects from various regions of Slovakia they succumbed to reciprocal influence, they mixed up and gave rise to such dialects that can not be identified with any of today's dialects in Slovakia [10]."

In Nadlak, as in other areas of Arad there are typical "Central Slovak dialects of southern type, which means that they are very close to standard Slovak [11]". Naturally these dialects have been influenced by various language effects, recently mainly by Romanian. In previous periods German and Hungarian had a major impact on these dialects. Partially this influence "also affected phonetic aspects of these dialects, but did not affect their word system and grammar structures [12]."

Speech education is important for students in these areas whose primary objective is good intelligibility of spoken and standard speech from grammatical as well as from a phonetic and orthoepic perspective. Another condition related to standard pronunciation of Slovak students in Romania is the need of acquiring correct grammatical forms and orthographic standards, in particular in morphology.

The basic condition is to master the rules of standard pronunciation and good articulation. As the articulation is a complex exercise which is a subject to many influences and is dependant on many circumstances great attention should be paid to it. Therefore, teachers should care about student's Slovak articulation, the way a student talks, pace of speech, voice and last but not least teachers should focus on the fact that the pupil does not swallow sounds or even whole syllables.

When we confront the critical evaluation of youth education at Slovak schools in Romania, we face the fact that the Slovak language teachers address these issues only marginally following the structure of the curriculum of

individual grades. At the same time there is to a great extent insufficient language culture among teachers. Their speech is often influenced by dialectal elements. Hence, it is necessary to point out the reason for using dialectical elements. As we might have noticed during the observation period teachers in classes use dialectical elements in order to make the material comprehensible for students according to their language skills. This fact helps to better understand a topic which is discussed.

As it is apparent from the above mentioned fact teacher's language culture and an orthoepic level of his/her speech in front of students is extremely necessary. According to Abel Král' precisely "speech contact between teacher and pupil performs the function of practice, which verifies and strengthens the theory of speech education. If we want to improve education in the culture of standard language and distinctively culture of pronunciation of standard language we must be concerned about the fact that Slovak teachers, but also other teachers dominate and fully respect orthoepic standard of the Slovak language in school practice. This task, of course, can not be completed only by education- it must be also provided by institutions and social support [13]". There should be more emphasis on the distinction between standard language and nonstandard forms in schools. The role of the teacher in class is to clearly distinguish various communication situations, he/she must be able to give students space for the transition from standard language to non-standard forms. In the learning process it is necessary to make students use standard language. However, they should be familiar with the fact that in private communication they can systematically use a lower style of standard pronunciation. Such guidance is important for students for the automation of stylistic transition from one level to another, for better distinction between standard and non-standard language and for the strengthening of standard norms without "the language becoming a kind of obligatory and oppressive social straitjacket of the individual [14]".

Despite much political and social discord Slovak community in Romania has been able to maintain their native language in a form which they could keep. Nowadays we can say that the effort to preserve the mother tongue has been fulfilled not only by past generations but also by their descendants.

During nearly 250-year-old co-existence with other ethnic groups some more or less visible changes in culture and traditions but above all in language have been made. Due to the influence of different cultures on language communication area the majority of Slovaks living in Romania is bilingual or trilingual. "The linguistic contact situation of our ancestors transformed inevitably into so-called asymmetric model [15]".

In asymmetric linguistic speech situation of Slovaks in Romania there is a triple substantial and relevant interaction:

- Local dialects (In Nadlak they are more marked by language elements from other languages - Hungarian and Romanian. The situation is similar in Bihorska area. Villages that have been more isolated retain an original dialect.);

- Standard Slovak which is taught mainly in schools and improved by other cultural forms;
- Standard Romanian as the official language.

Those language-speech contacts and "asymmetry is most apparent in the lexical area: in colloquial, technical lexis and in the phraseology [16]". Linguistic-speech situation nowadays leads gradually into a process of linguistic creolization. The result is reflected both in primary lexis from dominating major as well as the state language - Romanian, both in lexical, phraseological and morphological and morpho-syntactic calques. The greatest degree of creolization speech and language expressions manifests itself in young users of the language. This process has been present more intensively and it is practically unstoppable.

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### References

- [1] Anoca, D.M., *Slovacica miscellanea*, Nadlak, Ivan Krasko, 2012. 161 p.
- [2] ebd., p.8
- [3] Štefanko, O., *O Slovákoch v Rumunsku*, Nadlak, Ivan Krasko, 2004. 95 p.
- [4] Šomráková, L., *Osnovy a vyučovanie slovenského jazyka a literatúry v Rumunsku*, *Slovenčinár*, Vol. 8, No. 8, pp. 19-21, 2008
- [5] Available from: [http://www.calificativ.ro/index.php?module=materialeDidactice&id\\_categorie=6&id\\_clasa=8&id\\_material\\_didactic=1749](http://www.calificativ.ro/index.php?module=materialeDidactice&id_categorie=6&id_clasa=8&id_material_didactic=1749) [cited 11-10-2015]
- [6] Available from: [http://www.calificativ.ro/lista-Programa\\_scolare/Slovaca-2-mid77.html](http://www.calificativ.ro/lista-Programa_scolare/Slovaca-2-mid77.html) [cited 11-10-2015]
- [7] ebd. p.6
- [8] Available from: <http://www.calificativ.ro/articole/program+educational-p1> [cited 11-10-2015]
- [9] Betáková, V. – Jacko, J. – Zelinková, K., *Teória vyučovania slovenského jazyka*, Bratislava, SPN, 1984, 243 p.
- [10] Benedek, G., *Slovenské nárečia v stolicách Salaj a Bihor v Rumunsku*, Martin, Matica slovenská, 1983, 216 p.
- [11] Rozkoš, P., *Archaické prvky v stredoslovenských nárečiach v Rumunsku*. in: E. Tučná (ed.) *Slovenčina a slovenská kultúra v živote zahraničných Slovákov*, Nitra 2002, pp. 24.
- [12] ebd. p. 25
- [13] Král', Á., *Pravopis a výslovnosť v škole*, *Kultúra slova*, Vol. 8, No. 2, pp. 38-39, 1974
- [14] Král', Á., *Zvuková rovina spisovnej slovenčiny: Kapitoly o slovenčine*, Bratislava, SPN, 1976, p.32
- [15] Kerďo, J., *K reči nadlacksých Slovákov pri 200. Ročnom jubileu ich prvej orby a sejby*. in: O. Štefanko (ed.) *200 rokov života Slovákov v Nadlaku*, Nadlak 2003, s. 126
- [16] ebd. p. 126 – 127

## RESOURCES OF TERTIARY VIOLENCE PREVENTION

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**Abstract:** *In our paper is devoted to the issue of child abuse and the importance of filial therapy in influencing the relationship of mothers and children with the syndrome CAN. The aim of this work is to emphasize the importance of filial therapy in creating space for building healthy family relationships and tertiary prevention of violence against children.*

**Keywords:** *the filial therapy, syndrom CAN, the tertiary prevention*

### 1. Introduction

Social-psychologic and sociological approaches bring many points of view on abuse. For example, they refer to the relationships between a family and the outside world, the family subsystem and reactions inside the family, or the influence of the family's socioeconomical status connected with the appearance of abuse and neglect of children. Within this issue, great significance is attributed to how children are raised. If the child is in contact with violence during its childhood, this increases the risk of them being aggressive once they become an adult. This aggressivity can show in the relationships with their classmates, friends, or later in life with their partner or their elderly parents. There also is a significant risk that, as a parent, they will be aggressive to their own children in the process of raising them. One of the ways to resolve this situation is the application of filial therapy, which allows the parent to improve the relationship toward their children and take a peek into their world.

### 2 CAN syndrome

CAN syndrome is described by Dunovský, Dytrych and Matějček (1995, p. 24) as follows: "Any incoincidental, preventable, conscious or unconscious actions of the parent, guardian or other person towards the child, which is unacceptable in the given society and damages the corporal, mental and social status of the child and their development, or causes death.

According to the aforementioned authors, CAN syndrome includes physical and mental abuse, sexual abuse, neglect. Among said syndrome's special forms, belongs systematic abuse, organized abuse, ritual abuse, sexual tourism or the Münchhausen syndrome.

#### 2.1 Consequences of CAN syndrome

We can view the CAN syndrome consequences from a short- or long-term point of view. Looking at the former, this is represented by small injuries, scratches, bruises, swells and similar. The latter, more serious injuries, fractures, corporal problems like chronic food intake disorders or chronic sleep disorders. Into this group, we also include disturbances in the child's mental state with a significant influence on their future, like worsening in their school performance, aggressive behavior, clinging to strangers, or in some cases the torturing parent

themselves, distrust, rancor, the inability to create a sincere relationship, fear, anxiety. Very frequently, a feeling of inferiority appears in the child, or an absence of social competence. Another consequence is the inability to be empathic, compassionate and willing to help.

The personality of a child that has been the victim of any form of abuse, is in almost every case marked for life. It is possible to minimalise or remove the aforementioned syndrome's consequences, mainly by recognising abuse victims on time and immediate therapy application.

### 3 Filial Therapy

Filial therapy was started to be applied by Bernard and Louise Guerney in the 6<sup>th</sup> decade of the past century, while they based it on client-oriented therapy. (Van Fleet, 2009). Landreth (1991), one of the pioneers of filial therapy in the USA, states this therapy to be a method through which an expert helps parents become a therapist for their children. *It's a training program for the parents who want to improve the relationship with their child, want to understand them better and improve the way they raise them.*

*Filial therapy* is designed for a parent and their child, who they want to improve the relationship toward. If the parent-child relationship changes, this means the parent partially changes, as well as the child. Due to this, sources mention the therapeutical goals for parents and children separately. Van Fleet (1994) mentions the following as therapeutical goals:

*For children:*

- give the children the possibility to know and express their feelings,
- give the children the opportunity to be heard out,
- help the children find effective ways to solve problems,
- increase the childrens' self-confidence and self-worth,
- increase the childrens' confidence toward their parents,
- reduce the current problems,
- help the children develop a more active behavior,
- support an open and collective atmosphere inside the family, which adds to the child's healthy and balanced development in all the spheres, social, emotional, intellectual, behavioral, physical and mental.

*For parents:*

- increase the parents' understanding of the child's development specifics,
- increase the parents' understanding of their own child,
- help the parents understand the importance of playing and emotions in their child's life, as well as in their own,
- lower the parents' frustration toward their child,
- help the parents develop abilities which could bring better results in raising their child,
- increase the parents' confidence in their parenting abilities,
- improve the communication with their child,
- enable the parents to work better together, as a team,
- increase the feelings of fervor and confidence toward their children provide a safe atmosphere, where they're not afraid to stand up to their own problems related to the raising of their children.

Abused mothers and children come to the crisis centers from an ambiance, where the children were either victims or witnesses of abuse, because of which their relation toward their mother may be weakened. The reason behind this weakening is mainly the mother's inability to protect the child from physical or mental suffering. For filial therapy to be successful in these cases, individual therapy must be realized with the mother and the child before starting with filial therapy itself. The goal of this is for the child to rebuild their confidence toward their mother, and consequently the mother to create, during the playing half-hour, a safe and understanding ambiance for the child. Filial therapy can therefore be applied if the mother and child have had the opportunity to process the trauma they had lived. Filial therapy is not crisis intervention, instead, it represents help toward the renewal or creation of a positive relationship between the mother and child. The abilities the mother learns needn't be used throughout the day, just during the play half-hour. This gives the mother the feeling that although she's not applying the learned abilities all the time, she has not failed. The effective element is the child seeing that the mother's efforts go exclusively towards them. (Manuál pre trénerov, 2008.) When the parent performs the play meet-ups, they become more empathetic, and this improves the relationship between a mother and her daughter. Both the parent and the child grow and develop. (Kraft, Landreth, 1998).

#### 4 Conclusions

The children affected by CAN syndrome do not have a firm relationship established with their parents, in consequence they do not know the feeling of safety, while distrust, fear and anxiety and other influences prevail, destructively influencing the child's development. The children's emotional needs often are dissatisfied due to their parents not knowing about them. The abilities necessary to effectively raise a child are gainable applying filial therapy. Although we have pondered mainly upon tertiary prevention of violence through filial therapy, this way of influencing a parent-child relationship is very well applicable on the fields of primary and secondary

prevention, too. We don't only see it in crisis centers only, but also in a wider spectre of application as in specific courses for parents with children or expecting couples. The aforementioned therapy could represent a guideline to raising children and conserving healthy relationships inside a family. Then there are future consequences. If young people learn to raise children without violence, its line will weaken and an ambiance of acceptance, understanding and affectionate relationships.

#### References

- [1] DUNOVSKÝ, J. – DYTRYCH, Z. – MATĚJČEK, Z. *Týrané, zneužívané a zanedbávané dítě*. Praha : Grada, 1995. 248 p. ISBN 80-7169-192-5
- [2] KRAFT, A. – LANDRETH, G. *Parents as Therapeutic Partners*. London : Jason Aronson, 1998. 262 p. ISBN 0-7657-0106-5
- [3] LANDRETH, G. L. *Play Therapy: The Art of the Relationship*. Muncie : Accelerated Development, 1991. 390 p. ISBN 1-55959-017-3
- [4] Manuál pre trénerov. Naše poslanie. [online]. 2008, [cit. 2014-03-01]. Dostupné na internete: <<http://www.centrumslniecko.sk/poslanie.html>>
- [5] VAN FLEET, R. *Filial Therapy: Strengthening the Parent-Child Relationships through Play*. Florida: Professional Resource Press, 1994. 77 p. ISBN 978-1-56887-007-6
- [6] VAN FLEET, R. *How to Set Up a Filial Therapy Playroom*. [online]. 2009, [cit. 2014-03-06]. Dostupné na internete: <<http://www.play-therapy.com/professionals.html>>

VEGA no. 1/0462/14: *Youth delinquency of the Slovak Republic in the context of selected factors – self report study*.

## APPLICATION OF E-LEARNING TECHNIQUES IN EDUCATION IN THE OPINION OF EDUCATION TECHNOLOGY AND INFORMATICS STUDENTS AT CRACOW PEDAGOGICAL UNIVERSITY

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**Abstract:** *The article describes the role of e-learning techniques in achieving better results by students. It also shows the impact of e-learning techniques on teaching effectiveness. The paper presents Education Technology and Informatics (ETI) students' opinions on the distance learning as a method of gaining knowledge and qualifications. Furthermore, it describes ETI students' experience in creating interactive educational software and provides examples of supporting the development of skills and knowledge of students using modern teaching techniques. Analysis of results refers to the knowledge of future teachers and students and the possible use of interactive educational software on technical subjects.*

**Keywords:** *e-learning, modern teaching techniques, students' opinion.*

### 1. Introduction

E-learning is increasingly recognized as the mechanism of multimedia communication, transmission of information via computer networks, including virtual classrooms, and the integration of teacher and student [1, 3, 4, 8]. The success of distance learning methods is due to the use of technical possibilities by teacher equipped with software and students who aim at gaining knowledge. Their mutual, effective cooperation provides possibilities for the construction of new educational process, directed not only to the pupils of school age, but for anyone interested in gaining knowledge. E-learning changes the shape of teaching, reorganizing the architecture, the acquisition and transfer of knowledge [2, 5, 6, 10]. E-learning does not replace school classes but may extend their functionality. This method presents powerful possibilities of linking technological opportunities and economic benefits and starts to play an important role in education addressed to selected group.

### 2. Methodology of study

E-learning is a collaboration between teacher and student and the system administrator teaching platform. As a method of education this is not considered as dominant [7, 9, 11]. The technical ins and outs of constructing e-learning systems and materials for distance learning are not sufficiently understood and mastered even by pedagogical university students.

The aim of this study is to analyze students' knowledge of the techniques of e-learning and to determine the effect of e-learning in the teachers' education of the 21st century. The study involves third year part-time students of Educational Technology and Informatics at Pedagogical University in Cracow. The conclusions are based on analysis of the results of the survey. During the analysis authors attempted to identify and describe intervening variables in the process of learning using modern techniques. Also, the aim is to explain the regularities that occur in the process. 40 completed questionnaires were collected. Researchers took care to create the same work

conditions and atmosphere to all respondents during the study.

### 3. Students' opinion on e-learning

Questions in the test are divided into three thematic groups, aimed to illustrate knowledge of e-learning, students' attitude towards modern teaching techniques and their knowledge of software and techniques of creating materials. Questions form two blocks: the open-ended questions and multiple choice tests. In the open-ended questions students themselves constructed answers and defined some concepts.

#### 3.1 Knowledge of e-learning issues

Correct definition of e-learning determines the proper use of this teaching technique. Students had to answer an open-ended question "How we define the concept of e-learning?" by providing a few proposals. The analysis of replies showed that the students as most important factors that define e-learning recognize the use of electronic media (100% of respondents) and lack of direct teacher - student contact that is replaced by indirect contact provided by devices connected to the network (100% of students). At the same time, every respondent was able to correctly translate and decode the acronym: e-learning. An important issue affecting the use of e-learning techniques is to identify advantages and disadvantages of this form of knowledge transfer. All respondents pointed out many benefits of e-learning techniques as well as flaws (Tab. 1).

*Table 1 Advantages and disadvantages of e-learning in the students' opinion*

<i>Advantages</i>	<i>Disadvantages</i>
<i>Monitoring effects of work</i>	<i>May affect your health</i>
<i>Speed, quality, flexibility</i>	<i>No contact with tutor</i>
<i>Comfort</i>	<i>Internet connection required</i>
<i>Only computer is needed</i>	<i>No classmates</i>
<i>Repetitiveness</i>	

Two questions concern history of e-learning. One of these questions is: "When the concept of distance learning using the Internet came into existence?". Majority of respondents think that e-learning came into being in the 20th century (Fig. 2). They also consider the USA as the homeland of this teaching technique (Fig. 1).

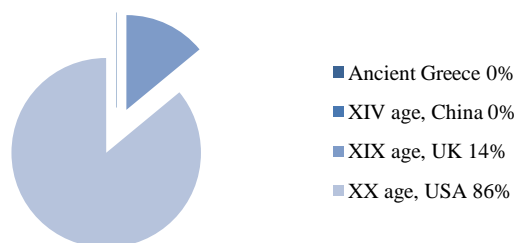


Figure 1: Origin of distance learning in students' opinion



Figure 2: Time of e-learning coming into existence in students' opinion

Among examined students as much as 43% know that one can find lists of websites, web portals etc. on the Internet. 25% of respondents were able to identify such concepts as: m-learning, e-learning, distance education. The concept of interactive learning in real time is understood for nearly half of the respondents.

The advantages of mobile training start to be noticed by future teachers of technical subjects. E-learning reduces training costs (according to 43% respondents), increases business efficiency (14% of students).

### 3.2 Attitudes towards modern teaching techniques

Individual opinions of students on e-learning indicate the diversity of their ideas about this technique. Only 30% of the students have ever had contact with e-learning.

In order to obtain the students' opinion on the use of e-learning methods on technical subjects students were asked "What are the possibilities of using e-learning methods on technical subjects?". Responses can be classified in three groups: for computer simulation (50%), to retrieve information and access information, in art (30%), for graphical and design programs (20%).

Another question concerned the most popular forms of work during the lesson. Students' responses show that the most common forms are: use of audiovisual media (45%)

and talks (33%). These answers reflect the polarization of views on the process of education (Fig. 3).

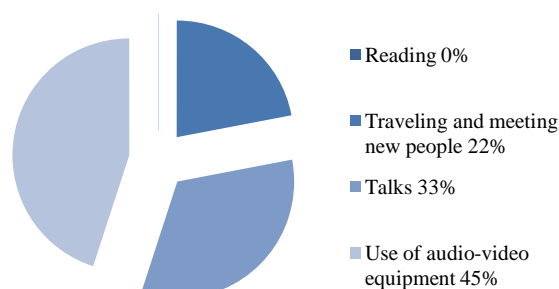


Figure 3: Most popular forms of carrying out lessons in students' opinion

Next analyzed question was: "In your opinion e-learning is: distance learning using computer technology and the Internet; a teaching method, which uses all sorts of multimedia and electronic resources; or conducting education through technical means without the direct contact between teacher and student?". The most common response was that e-learning takes into account all proposed answers (Fig. 4).

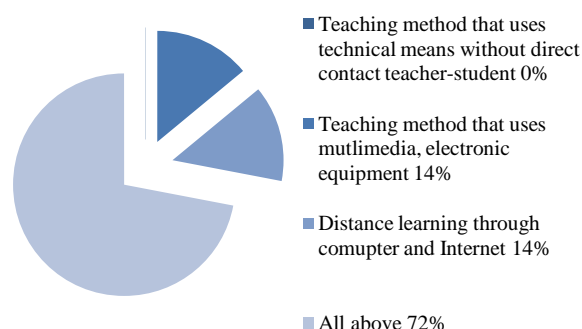


Figure 4: Definition of e-learning as indicated by students

Students' opinions on the mechanisms of distance learning were gathered by asking: "What are the ways of realization teaching in a distant learning?". Majority of respondents chose all provided answers. Of those who decided to choose only one option no one selected: "seeking advice" (Fig. 5).

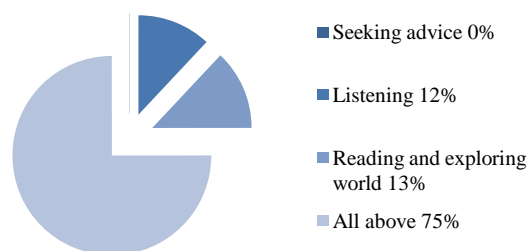


Figure 5: Mechanisms in distance learning in students' opinion



A major problem associated with success in the teaching process is the use of modern technical equipment. From the replies preferred frequency of multimedia use is "As often as possible" (91%). It shows the need for rapid adaptation of the learning process to the latest technical achievements (Fig. 6).

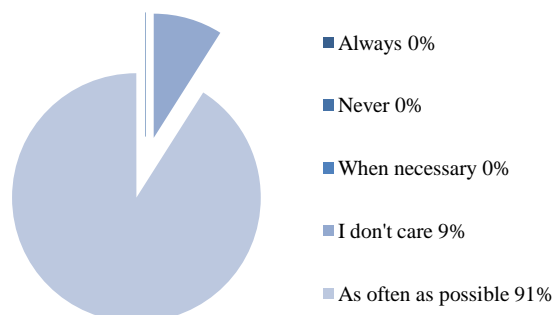


Figure 6: Preferred frequency of multimedia use in teaching process according to students

Students' attitudes towards modern methods of knowledge transfer are very positive. Although knowledge of issues related to the design of courses is not common – only half of the students (55%) can identify LMS, and not much more is able to identify standards of e-learning courses performance. 17% is not able to identify any platforms for e-learning applications. But most students with a little help from a teacher could create the correct courses.

### 3.3 Knowledge of: e-learning software techniques, creating materials techniques and e-learning methods of work

Answers to the question about the software revealed that each of the respondents had beliefs or experiences associated with the creation of e-learning courses. To the question "What kind of software can be used to prepare the e-learning course?" every respondent gave a different answer. Answers also show that actually every person is able to prepare a training in a more or less professional way.

Another question relates to the tools used in the e-learning: "Please point tools used in e-learning: computer programs, web sites, discussion forums, e-mail, chat, videoconferencing?". Half of the respondents chose all of the proposed answers. Of all people, 33% treats chat and videoconferencing as the only tools in distance learning. 83% of respondents considered synchronous teaching method as the only one acceptable.

Next question concerns working methods of e-learning. Out of the four answers students selected those that take into account the synchronous mode of learning (73% of respondents). Asynchronous mode is not always treated as an appropriate form of working during class. The necessity of self-control, self-learning and self-assimilation of information has not been yet rooted in consciousness of students (Fig. 7).

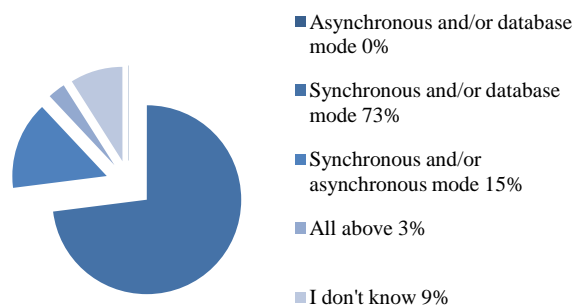


Figure 7: Methods used in e-learning in students' opinion

When it comes to questions about the asynchronous method largest discrepancies were observed in the responses. 32 % of respondents marked the answer that indicated student as the one who is responsible for arranging a learning process. 17 % of students marked other options (17% each) (Fig. 8).

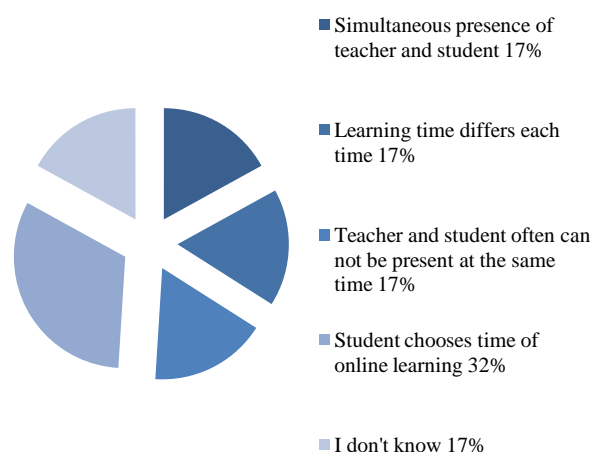


Figure 8: Factors determining the qualification of the chosen method as asynchronous teaching

When asked what method of learning includes the method of synchronous, the responses suggest that this method would probably be the dominant (Fig. 9).

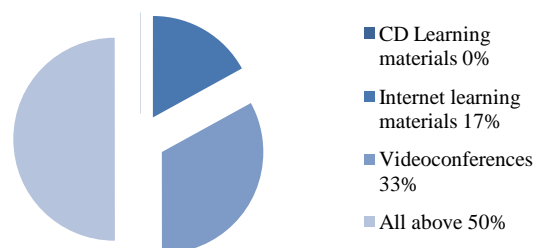


Figure 9: Factors determining the qualification of the teaching method as synchronous

The next question is: "Is e-learning a compilation technology that uses: printed materials, technologies, audio - visual, computer technologies or all proposed here?".



Responses to that question are related to the e-learning definitions given by students. Students understand it as a computer technology, or audio – visual technology. Printed materials were not marked as the way of teaching in the e-learning process (Fig. 10).

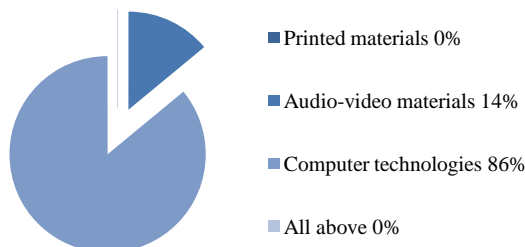


Figure 10: Technical means that could be used in e-learning in students' opinion

#### 4. Conclusions

Study shows students' knowledge of e-learning techniques. Students believe that e-learning enables innovative approach to the process of education in the 21st century. Presented analysis is exploratory, the results need further verification, since the student population is one of the most diverse in terms of personality, aspiration level and achievement orientation.

#### References

- [1] J. Bednarek, E. Lubina, *Kształcenie na odległość. Podstawy dydaktyki*, PWN, Warszawa 2008.
- [2] J. Depešová, "Ľudové remeslá v zahraničí", in *Zborník Technické vzdelanie ako súčasť všeobecného vzdelania*. FPV UMB, B. Bystrica, 2005, pp. 89 – 92.
- [3] J. Dostál, *Multimedia, hypertext and hypermedia teaching aids – current trend in education*. *Journal of Technology and Information Education*, 2009, nr 3.
- [4] A. Kných, H. Noga, J. Depešová, "Information Technologies Used on Technology Lessons as Important Teaching Aid Supporting Child's Development", in *Educational Technologies in the Information and Knowledge-Based Society*, XXVI. DIDMATTECH, International Scientific and Professional Conference, V. Stoffová (ed.), Komarno, 2013.
- [5] T. Kozík, *Prečo učiť techniku na základných školách a gymnáziách*. In: *III. InEduTech 2007: tretí ročník videokonferenčného podujatia - Inovácie v edukácii technických odborných predmetov s ústrednou témou : Kľúčové kompetencie a technické vzdelávanie*. Prešov : Prešovská Univerzita, 2007.
- [6] S. Kuruliszwili, *Technologie informacyjne a zmiany współczesnej edukacji*, Wyd. Impuls, Kraków 2014.
- [7] H. Noga, "Przydatność do pracy absolwentów szkół zawodowych – doniesienia z badań", in *Technika – Informatyka – Edukacja*, XVII DIDMATTECH, W. Furmanek, W. Walat (eds.), Rzeszów, 2004, pp. 368 -377.
- [8] V. Tomková, "Grafické vyjadrovanie žiakov základných škôl", in *Trendy ve vzdelávaní 2006. Edukační technologie a inovace technického vzdělávání*, Olomouc, 2006, pp. 178-181.

[9] A. Waszek, *Edukacja informatyczna w polskim szkolnictwie podstawowym i gimnazjalnym w latach 1990-2007*, Wyd. Adam Marszałek, Toruń 2012.

[10] M. Vargová, "Pracovné vyučovanie ako povinný predmet na I. stupni základnej školy", in *Teoretické i praktické problémy edukacji technicznej*. Zborník. 1. vyd. Rzeszow: Uniwersytet Rzeszowski, 2006, pp. 47- 51.

[11] Z. Zieliński, *E-learning w edukacji. Jak stworzyć multimedialną i w pełni interaktywną treść dydaktyczną*, Wyd. Helion, Gliwice 2012.

## STRATEGIES OF SOCIAL WORK IN FAMILIES WITH AN ADDICTED MEMBER

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**Abstract:** Nowadays, the strategies of work with an addicted client lack an adequate social work intervention, which should supply the missing portfolio of services offered to addicted people. The missing context of social work reflects in a lack of adequate intervention and work on the addicted client's environment, thus negatively influencing success rate of the treatment. This contribution deals with the possible strategical bases for solving this condition in the family of an addicted client.

**Keywords:** addiction, family, strategies, social work

### 1. Introduction

The approaches toward solving addictions go through various phases, starting at the moral and medicinal point of view we progressively reach integrative models, which allow that

- there's no universal cause for all the problems related to the use of addictive substances
- probably, more causes act at once
- different specimens show different mutual correlations of different factors
- Although the cause is not precised, treatment is possible.

Although there are quite many approaches to solving addiction-related problems, from repressive to liberal ones, Ciutti, In Burrows [1] states that every one of them contains five basic components: prevention, treatment, reduction of risks and negative events related to drug use, repression and research in the area. In all these areas, there is an ability to implement social work. Therefore, addiction should be perceived by a social worker as a problem influencing and affecting all the elements of the family system. The social worker, while solving the difficulties resulting from addiction, should give up the vision of a clear, unambiguous way or solution at every client.

Regarding the addicted person's family we are confronted with much information, often not sufficiently backed by research findings, and with tendencies to downplay everything happening in a client's family. We incline toward the opinion of Bartoňová, Matoušek [2] who point out that addiction can be considered a "family disease" so it is possible to find a problematic context, where addiction can be considered a solution. This context is essential to us in considering effective strategies working with a family with an addicted member. Despite the fact that the professionals' prevailing opinion puts treating the addiction/addicted person as a primary necessity and only link therapeutic work with the family to it only as a recidive-preventing measure, we cannot agree. The changes in a family with an addicted member are so extensive they cannot be downplayed. Kliment [3] also points out that it isn't sufficient to only work with the

addict, thus supports the development of work with the addicted person's family. He states these findings as needing to be respected while working with an addict's family:

- The addiction problem should be understood by the helper as a problem that affects and influences every part of the family system
- Solving the difficulties, the helper should give up the notion of an unambiguous algorithm leading him in the helping process (as every family system is unique)
- respecting the fact that in the communication of a problematic system, the existing self-concept of the addicted person is doubted, as it goes against the natural human setting to hold onto an uniform self-concept even if it is questioned by the closest members of the family system.
- the topic of addiction should not be carried over to other family topics. It is necessary to watch what unites the family, not separates it
- Respect, that even after successful therapy, a problematic family system can be replaced by another otherwise problematic one. The addicted should not have the notion that after therapy is over, the family situation will significantly and rapidly change compared to the past, help should be focused on loosening up the communication within the family system in the after-treatment process.
- The topic springing up around addiction won't disappear until it loses its urgency, but this will not come in days nor weeks.

Despite the fact, that according to Rogers [4] family system models significantly influenced the area of alcoholism treatment worldwide, in our conditions we perceive this area of work with an addicted client to be insufficient.

### 1.1 Social work with a family before the start of the addicted member's treatment

We consider working with the family in pre-treatment guidance, as in, before the addicted member enters treatment, absolutely necessary. Family is just the right element in the addict's life to influence their decision on

the topic of treatment. However, the family must know how to do this, and must have enough support in their doubts. Individual, or group guidance meetings of family members tend to be a rarity, which is why the addicted don't enter treatment soon enough and often abandon it soon after starting. According to Matoušek [5] the advisor should carefully observe any marks of the client's effort to change and support them. Ideally, a contract between the helping worker and the client should be signed. Before starting treatment, it is necessary to have the addicted know and be ready for the demands his task, during intensive treatment, will bring. At the same time, it is good if the worker is in contact with the addicted person's family members. This enables, for the family, a better orientation in the changes the client is planning, or conducting. From experience we can tell the process of working with an addicted client as a whole is more effective if the family is sufficiently informed and included in the process. Nešpor, Csémy [6] also show one of the options to get a partner into treatment, this approach came up in the USA and its codename is "power play", long-term pressure from more sides is the important part. This means long-term pressure from friends, colleagues, family, expressing in clear formulation their expectatives and implementing certain measures in case the addicted does not show will or effort to change. It is also a more adequate help to the addict's partner than just closing one's eyes, pretending all is right, while it's clear it isn't. It is one of the possibilities that can have an effect on the addict's decision to undergo treatment.

*We consider these strategies essential in the support of a family that wants to help its addicted member:*

- The taking into account of the situation and their rights.
- Processing a strategy of not supporting the addiction.
- supporting motivation toward treatment.
- Pressure on the addict's decision to enter a healing process.

The creation of ambulant guidance centres is an essential part of the healing process in our conditions. According to Matoušek [4] guidance before entering treatment, which together with the treatment itself create a so-called effective treating continuum, is an important factor with positive influence on the success of the treatment.

## 1.2 Social work with a family during the addicted member's treatment

Social workers can also be useful working with the addicted while in residential treatment provided at psychiatric hospitals and therapeutic communities. The social worker together with the rest of the team members help the clients in talking openly about their problems, to discern and understand the scheme of their own drug use and its trigger mechanism, [7] Despite the fact that the social worker is perceived as a part of primary and tertiary prevention, and nobody obstructs his work in these areas, Balážiová [8] is persuaded that their place is also in psychotherapy, and that they can cover the lack of interest for this work. Of course, respecting the personal and professional criteria required to do this job. During treatment, an important part also is constituted of working

with the entire family system, which shows many unresolved problems, different expectations and insufficiently open communication within the family. This is within a social worker's competence. The family itself needs professional help, which it only sporadically gets. The family should also cooperate with different institutions considering problems with the use of controlled substances, as in with the addict's school, employer, the office of social affairs, resocialization facilities, or others within social and legal protection or health protection.

*We consider these strategies indispensable supporting a family which wants to help an addicted member at this stage:*

- Transmission of information about the process and the changes
- Work with the initial euphoria, when the family relaxes.
- Maintaining the pressure in case of extortion by the addicted family member
- Work with unrealistic expectations and the assumption that the situation will be solved quickly.
- Supporting the addict's motivation with clearly determined boundaries and expectations.
- Turning the vision and perspective of the future around
- Transmitting information about the necessity of continuing with the healing process.

## 1.3 Social work with a family in the after-treatment process

*In case treatment has been successfully absolved and the addict is motivate toward abstinence, what follows is ver hard work on themselves, in the family, and with their patner in a relationship. A long time after the addict has entered treatment or is abstaining, the partner is incapable of calming down because their life with an addict had greatly influenced their stress tolerance threshold, which is consequently surpassed by every unplanned, sudden change in a schedule, every time the partner comes home late, or is excessively happy or sad. This is natural, and the cause are the lies, repeated uncountable times, past conflicts and fear of the future. It is necessary to pay attention to this. Too much pressure forcing the partner to repress their feelings or hide them ( as abstinents often expect) can have a reverse effect on the healing process. The stress and tension stacked up over the years can't be removed aggressively. The partner's feelings sway from joy because of their partner's sobriety through doubt whether they'll make it to outright incredulosity. It's important to give the partner their time, field activities of well-functioning sociotherapeutical clubs, where they can openly express their feelings together with other codependent partners, learn to work with them and finally become themselves with their visions of their own life, desires and their fulfilling [9].*

*We consider these strategies essential in supporting a family that wants to help the addict at this stage:*

- work on intrafamilial relationships
- supporting new behavioral schemes

- pressure toward maintaining the whole family in the after-treatment process
- supporting new activities, so in the addict as in the entire family.

The after-treatment process will fasten the client's decision and their motivation toward abstinence, change his behavioral schemes and those of the family. In the first year after the treatment has come to an end, we recommend its obligatory continuation so in psychiatric ambulant conditions as in sociotherapeutical clubs.

## 2. Conclusion

Focusing attention on the entire family system of an addict we are able to make the healing process more effective. This assumes the entrance of social work into working with addicted clients and their families and the widening of the offered intervention portfolio, in the direction of complex and professional services.

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## References:

- [1] BURROVS, D. *Ako začať program výmeny ihliel a striekačiek? Príručka pre krajiny strednej a východnej Európy a štáty bývalého Sovietskeho zväzu*. Bratislava : Eterna Press, 2002, 123 s.
- [2] MATOUŠEK, O., PAZLAROVÁ, H., GARDINER, T., VACULÍKOVÁ, K., CANDIA-MUNOZ, A., HULOVÁ, K., LINKOVÁ, M., PALME, K., LANDISCHOVÁ, E., WUNSCHOVÁ, P., VRABCOVÁ, D., BARTOŇOVÁ, A., UHLÍKOVÁ, Š., UHLOVÁ, S., ŠABATOVÁ, H., *Podpora rodiny*. Praha: Portál. 2014, 394 s.
- [3] KLIMENT, P. *Rodinný systém so závislým od alkoholu*. In: Sociální práce/ Sociálna práca, 3/2007 ISSN 1213-6204 s.61-67
- [4] ROTGERS, F., KELLER, S.D., MORGENSTERN, J., WALLACE, J., NOVINSKI, J., LEEDS, J., McCANDY, B., EPSTEIN, E. McKAY, J., MORGAN, J.T., SAUNDERS, B., WILKINSON, C., TOWERS, T., BELL, A., ROLLNICK, S., CARROLL, K., *Léčba drogových závislostí*. Praha: Grada Publishing, 1999. s. 264.
- [5] MATOUŠEK, O., KOLÁČKOVÁ, J., KODYMOVÁ, P. *Sociální práce v praxi*. Praha: Portál, 2005. 352 s.
- [6] NEŠPOR, K. – CSÉMY, L. *Léčba a prevence závislostí. Příručka pro praxi*. Psychiatrické centrum: Praha, 1996, s. 199.
- [7] KALINA, K. *Základy klinické adiktologie*. Praha: Grada. 2008, 392 s.
- [8] BALÁŽIOVÁ, P. *Postavenie sociálneho pracovníka v zdravotníctve*. In: Dni sociálnej práce, Zborník príspevkov z vedeckej konferencie s medzinárodnou účasťou. FSVaZ, Nitra, 2008, 307 s.
- [9] PAVELOVÁ, Ľ. *Dlhodobé spolužitie s alkoholikom ženy mení*. In: Čistý deň, IV. 2006. č- 3. s. 10-11. ISSN 1336-4243

## SATISFACTION OF CLIENTS WITH HEARING DISABILITY REGARDING CZECH SIGN LANGUAGE INTERPRETERS

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**Abstract:** This contribution offers information connected to the notion interpreter for people with hearing disability and an overview of types of interpreting. Principles of communication with an interpreter for people with hearing disability are outlined. Professional requirements on an interpreter for people with hearing disability are mentioned. On the whole, the contribution is elaborated from the point of view of interpreters for people with hearing disability. Twenty-eight respondents took part in this research. The research sample was created by professional interpreters for people with hearing disability from the whole Czech Republic, who were addressed via quantitative research strategy – a questionnaire in an electronic version containing identification, closed and open questions. The analysis of chosen results of the research follows together with conclusion.

**Keywords:** interpreter, Czech sign language, principles of communication

### 1. Introduction

The aim of this contribution is to outline basic information on specifics of interpreting for people with hearing disability. Moreover, principles of communication with people with hearing disability at the presence of an interpreter are defined. There were questions chosen from the research, which provide an insight into satisfaction of clients with hearing disability regarding interpreting from the point of view of interpreters themselves.

#### 1.1 Interpreter for People with Hearing Disability

An interpreter of Czech sign language uses Czech sign language while interpreting; Czech sign language is considered to be a primary communication means by the majority of people with hearing disability. Czech sign language has its own grammar and rules. It is also possible to meet an interpreter of signed Czech, when interpreting of Czech language occurs and the grammar of Czech language is followed and the signs are matched to it. This type of interpreting is used by hearing-impaired or deaf people. People with hearing disability preferring lip-reading may use transliterator who makes lip-reading easier by clear articulation. This type of interpreting may be expected by people with lighter hearing disability [1]. Czech sign language is considered a basic communication system of people with hearing disability in the Czech Republic [2].

#### 1.2 Principles of Communication with an Interpreter for People with Hearing Disability

To achieve the required effect of the reciprocal communication of an interpreter and a person with hearing disability, there are requirements not only on the profession of an interpreter but also on all the participated parties. Principles, which ought to make the reciprocal communication easier, were elaborated:

- Do not stand or sit with the source of light behind you

- Address the person with hearing disability not the interpreter
- Do not leave in the course of communication
- Make it possible for the person with hearing disability to ask questions
- Speak in a common pace
- At the end of communication, ask whether the person with hearing disability does not need to make anything clear or wants to ask about anything
- The interpreter should always be next to the person who is speaking, not next to the person with hearing disability [3].

An interpreter for people with hearing disability is in a difficult situation when he has to bring the mistakes in communication with a person with hearing disability of the speaker to his attention in a tactful way so that the reciprocal communication could proceed without problems. It cannot be expected that layman public would know these principles and follow them. A frequent misdemeanour of the intact society is an interview carried out with the interpreter and ignoring the person with hearing disability and especially incorrect position of the participants of communication. In some cases, for example in a bank or at the post office, it is not possible for an interpreter to stand next to the hearing person who is speaking as the interpreter cannot have access behind the counter. The correct position of participants during interpreting should be as follows:

**Sender -**  
Hearing participant of communication,  
speaker

**Interpreter**  
of Czech  
sign  
language

Chosen results are analysed, processed graphically and commented on

**Receiver -**  
Person with  
hearing  
disability

[4].

## 1.2 Requirements on an Interpreter for People with Hearing Disability

There are considerable requirements on an interpreter for people with hearing disability, as it is a very demanding and financially not duly appreciated activity. There is a lack of interpreters for people with hearing disability at the moment regarding the number of people with hearing disability.

Not only should an interpreter know the culture of the world of people with hearing disability but also have a wide range of other character features, which would define him as a professional interpreter. These are professionalism, empathy or respect [5].

An interpreter must be able to self-evaluate himself, control the skill to accept feedback and at the same time to provide the person with hearing disability with it. He cannot lack social skills, in particular the skill to plan and organize [6].

Not each interpreter for people with hearing disability possesses these skills. As well as not each interpreter for people with hearing disability possesses professional qualification. Non-professional interpreters often provide interpreting services for people with hearing disability in everyday situations. People with hearing disability are not often aware of the fact that they do not have a professional interpreter next to them; mostly they are glad to have at least some interpreter regarding the extensive lack of them.

## 2. Methodology

The aim of the questionnaire was to establish from the point of view of interpreters for people with hearing disability whether clients are satisfied with their services. The secondary aim was to establish how the possible dissatisfaction is manifested and possibly how interpreters for people with hearing disability deal with such situations or how they approach them.

A quantitative research strategy was used to reach final data. The basic technique of data collection in this case was a questionnaire in an electronic version. The sample was selected from the professional interpreters from the whole Czech Republic. Education or accreditation in the area of interpreting and professional interpreting experience was taken into consideration. Interpreters lacking sufficient qualification to perform professional interpreting were not covered by the questionnaire. The total number of twenty-eight answers was collected. The respondents were of average age of thirty-three, more than 85% from the total number were women.

## 3. Analysis of Chosen Results of the Research

### 1. Have you ever met a dissatisfied client?

*Table 1 96.43% of professional interpreters have met a dissatisfied client within the performance of their profession. Only one respondent has not met dissatisfaction from the part of his client yet.*

YES	27	96,43%
NO	1	3,57%
I DON'T KNOW	0	0,00%

### 2. How was the possible dissatisfaction manifested?

From the evaluated open answers, it follows that:

- The most frequent reaction of a dissatisfied client with hearing disability is a complaint to the superior, which was stated identically by 11 respondents.
- The second most frequent reaction to the risen situation is not ordering the interpreter, who the client was not satisfied with, for the second time, when he is needed, this was stated by 10 respondents.
- The third repeated answer was recorded by 3 respondents, who stated that clients with hearing disability react by maligning.

Among other answers, which react to possible dissatisfaction with interpreting and are repeated, belong:

- The client openly says what he did not like about the interpreting (missing information, improper behaviour, inaccurate interpreting...), sometimes he requests explanation on the part of the interpreter
- The client shows his dissatisfaction by his facial gestures, possibly withdrawal; however he does not deal with it anyhow
- The client is angry with the interpreter; the respondents stated that these are mostly problematic clients

### 3. According to what do clients with hearing disability choose an interpreter?

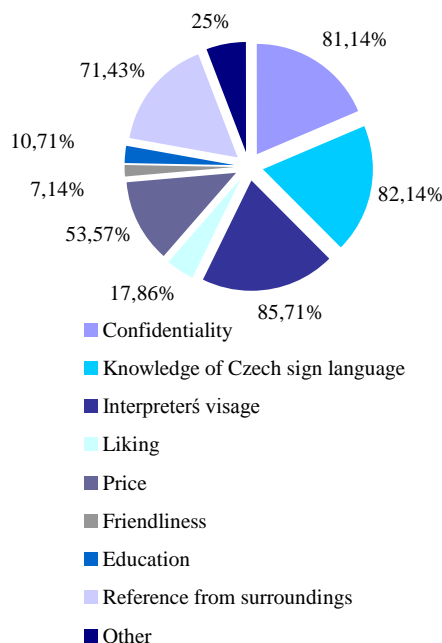


Figure 1: According to interpreters for people with hearing disability, clients choose an interpreter on the basis of his knowledge of Czech sign language, which was answered by 85.71% of respondents. 82.14% answered that they choose an interpreter on the basis of confidentiality. Reference from surroundings is considered to be a significant criterion of choice by 71.43% of respondents. Reciprocal liking according to the respondents plays role by 17.86%. Other aspects, which may play role in the choice of an interpreter, were stated by 25.00% of respondents. 17.86% of respondents stated that the choice of an interpreter is influenced by the visage of the interpreter. Friendliness was stated by 10.71% of respondents and 7.14% of respondents stated that the choice of an interpreter is influenced by price and the same number 7.14% of respondents stated education.

4. What is the most important for the client according to your opinion?

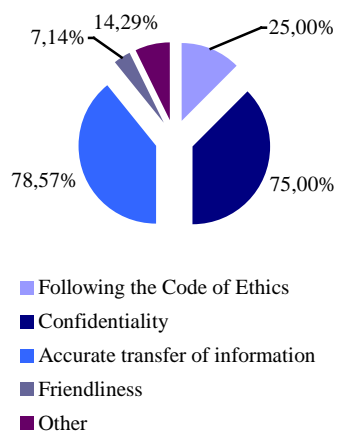


Figure 2: Accurate transfer of information by the interpreter is considered to the most important aspect by interpreters for people with hearing disability according to 78.57% of

respondents. 75.00% of respondents stated as the most important aspect by an interpreter confidentiality. 25.00% of respondents stated following the Code of Ethics for Interpreters. Other aspects considered to be important by interpreters for people with hearing disability were stated by 14.29% of respondents and 7.14% of respondents consider friendliness the most important aspect by an interpreter.

#### 4. Conclusion

The result of the research is that every time a client who is dissatisfied with the work of an interpreter can occur. It does not follow from the results that interpreters would perform wrongly, on the contrary, the results shows demandingness of the profession.

Each client with hearing disability is different. He believes in different values, uses different way of communication, has certain cultural habits, and requires certain skills on the part of the interpreter, for example louder speech or clearer articulation. Clients also require time flexibility, confidentiality, trust and following the Code of Ethics for Interpreters. The most important factor when interpreting for people with hearing disability is accurate transfer of information and confidentiality on the part of the interpreter. It cannot be expected that one person could achieve all the qualities and fulfil such strict criteria. A professional interpreter must manage not only the language itself, be empathic and be able to judge the situation but the most important is to know and respect the culture of people with hearing disability. He may often meet dissatisfaction as each client is different and each situation requires different solution. A fact that cannot be denied is that interpreters are forced to keep their professionalism by attending seminars, courses and various examinations of their qualification and to broaden their knowledge. I suppose that interpreting profession for people with hearing disability is not appreciated duly; not only financially but also from the human point of view as it requires maximal interest and efforts on the part of an interpreter to keep a status of a professional interpreter and to keep trust of his clients with hearing disability. This may be the answer why there is a lack of interpreters for people with hearing disability in the Czech Republic.

#### References

- [1] Doležalová, L., *Terciární vzdělávání studentů se sluchovým postižením v České republice*, Brno, Masarykova univerzita, 2012, s. 65. ISBN 978-80-210-5993-1.
- [2] Zákon č. 155/198 Sb., *o komunikačních systémech neslyšících a hluchoslepých osob*, ve znění zákona č. 384/2008 Sb., (v úplném znění vyhlášen pod č. 423/2008 Sb.).
- [3] Doležalová, L., *Terciární vzdělávání studentů se sluchovým postižením v České republice*, Brno, Masarykova univerzita, 2012, s. 66. ISBN 978-80-210-5993-1.
- [4] Horáková, R., *Sluchové postižení. Úvod do surdopedie*, Praha, Portál, 2012, s. 115. ISBN 978-80-262-0084-0.
- [5] Horáková, R., *Sluchové postižení. Úvod do surdopedie*, Praha, Portál, 2012, s. 117. ISBN 978-80-262-0084-0.
- [6] Horáková, R., *Sluchové postižení. Úvod do surdopedie*, Praha, Portál, 2012, s. 117. ISBN 978-80-262-0084-0.

## ART, THERAPY AND DEPRESSION CHILDREN

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**Abstract:** According to the report of World Health Organization (WHO), until 2020, depression may become the second largest – apart from cardiovascular diseases – health risk. Depression is a serious problem not only for the adults. Depression in children and young people is even more alarming because statistics show a constant growth in the number people suffering from this disease. In this article, I present different perspectives of depression. Art therapy is an alternative form of work with children suffering from depression and a method supporting process of psychotherapy.

**Keywords:** Arteterapy, Depression, Psychoteraphy

*Depression intrudes us and disappears unexpectedly. Being depressed, we defends against going under the water, so a hand must appear which takes us down. Differently, when we are grief-stricken; we decide to drown.*

/Robert Bly/

### 1. Introduction

Depression is a serious problem, not only in adults. Depression in children and young people is even more alarming because statistics show a constant growth in the number people suffering from this disease. Specialists say that depression will soon become the second largest health risk in the world.

A term depression is used in everyday language to call many experiences, barely noticeable and temporary depressed mood and very deep disorders, even life-threatening. "Applied to describe mood, this term means temporary state of dysphoria, which can last a few moments, hours or days. In this sense, a word depression is often used to define normal reaction to difficult moment in life, and even to add colour to normal events.

#### 1.1 Psychodynamic model of depression

A term „depression” means a set of experiences, including not only mood, but also physical, mental and behavioural experiences which describe long-lasting, harmful and serious condition, which can be clinically diagnosed as depressive syndrome. Psychodynamic model says that depression (and other disorders) has its origin in unresolved conflict from the past. The first theoretical models of depression in the psychoanalytical perspective were presented in an article "Mourning and melancholy" by Karl Abraham (1911) and Sigmund Freud (1917). Freud thought that the cause of depression is the fact that a person directs his/her aggression inwards which causes low self-esteem, self-accusations, or even suicide. Depressive person in childhood directed his/her love towards another person and has become disappointed. As a result, a person identifies with a lost object, "includes" it to his/her own ego. Anger felt initially at the lost object is then directed towards himself/herself. Another experiences of loss and rejection activate emotions related to the loss of the initial object. Unsatisfied child's emotional needs play

a particular role in development of childhood depression. Most of child's emotional needs is satisfied by mother. Psychoanalytical research emphasize, above all, the role of deprivation with relation to disturbances in child-mother relationship and its triggering meaning in a genesis of depressive disorders in child. In their research, Lewkovitz and Tisane have shown a connection between motherly rejection, marital problems and depression in children. Abraham has shown a connection between orphanhood and depression in children. He focused mainly on the „loss of parents” as objects of love and meaning of such loss in etiology of childhood depression. Many psychoanalytical researchers indicate the meaning of loss in etiology of depression in children. These losses can be become a cause of genous depressions, mainly reactive. They may become real or symbolical. According to Bron, Harris and Copeland, we can distinguish a few types of losses which may lead to childhood depression, for example, loss of mother and father due to death or separation of parents, especially if a child was separated with parents before he/she turns 17. Death of siblings between the age of 1 and 17 or loss of self-esteem or loss of sense of security. According to the authors, deaths of members of the family and separation may cause both endogenous and neurotic depression.

According to Melania Klein, quality of mother-child relationship in the first year of age decides about future tendencies to depression. According to the author, every child, before the first year of life, experiences a period, in which he/she intensely feels anger – response to frustration in his/her contact with mother, and fear, being in turn, a response to anger (the so-called depressive position). If anger and fear in relationship with mother are stronger than experienced love, pathological ways of solving "depressive position" may appear, and an individual can return to it in his/her adult life.

#### 1.2 Types of depression in children

Specialists who deal with the issue of mental health suggest that there are different subtypes of depression in children. McConville, Boag, Purohit claim that there are three types of depressive disorders in children:



Affective type, which is typical for children at the age between 6 and 8. Main symptoms include: sadness, sense of helplessness, sense of hopelessness. Another type of depression is cognitive, in which fundamental symptom of depression is low self-esteem and often suicidal thoughts. This type of depression often occurs in children who have less than eight years old.

The last type of depression is depression with a sense of guilt, which occurs only in children who are more than eleven years old.

Clinical picture of depression in children at the younger school age.

Children with a diagnosis of major depression manifest one or two fundamental symptoms and at least four associated symptoms. Clinicians show that, in many cases, these children manifest many more symptoms. It is estimated that about 50 per cent of children with a diagnosis of major depression have seven or more symptoms of depression. Dysphoric mood, often associated with depression in children, due to its presence in different psychopathological syndromes, is treated as non-specific symptom in depression in children, therefore, not all children with a diagnosed depression have a depressed mood. Mood disorders in children can have different form than only sadness. Some may show aggressive behaviours, anger or irritation. Children have more often different symptoms than a depressed mood, which is often associated with depression.

Neurotic depression is very often connected with major depression. However, in comparison to major depression, children with dysthymia do not have so many absences from school and they less often withdraw from social contacts, or have sense of guilt and concentration impairment. Whereas, neurotic depression is characterized by depressed mood, sense of not being loved. Anxiety, disobedience, tendency to resistance reactions and symptoms showing emotional deregulation have also been observed.

Many research's authors refer to Beck's theory of depression. This theory says that depressive disorder is rather a disorder of thinking than emotions. Dominant way of thinking in depression is a cognitive attitude, which deforms reality and leads to negative image of self. A concept which partially refers to Beck's theory is a Seligman's theory of learned helplessness, which says that symptoms of depression occur due to positive and negative events. Helplessness as relatively durable state appears when a person feels that, regardless of his/her efforts, he/she has no influence on the results of his/her actions and attitude of others towards him/her. Growing number of negative experiences causes that they expect their own helplessness in the future. Assumptions of interpersonal approach are similar to psychodynamic approach and social and environmental Lewinsohn's model, which says that depression is caused by deficits of social skills. In the interpersonal concepts, the key factor describing health of an individual is social and interpersonal ties. Depression occurs in the social context and it is defined by interpersonal relationships

between a depressive person and significant other people. They are relationships in a family of origin and generational, romantic relationships, friendships, relationships at work and other communities. Very important for the occurrence of symptoms of depression are: impact of emotional ties, weakness of current social relations, sense of loneliness (felt both in family and peer environment) and problems in social functioning (e.g. problems in communication with other people). Protective impact that prevents depressive disorders has close relationships and high quality of social ties. Connection between negative events in life and received social support which would reduce the risk of depression is not empirically confirmed. Lack of support and rejection in social relations have serious theoretical implications as well as clinical, showing the risk of chronicity of disorder and the need of using different methods of psychotherapy, e.g. trainings of interpersonal skills and system family therapy.

## **2. Art therapy and childhood depression - psychodynamic perspective**

Nowadays, art is more and more often used in therapeutic, diagnostic or educational activities. Art is equated with the need of expressing ourselves, our emotions, it allows us to share our own thoughts and experiences. Creative activity is sometimes an effective way of communication with the world, allows us to believe in ourselves and to find the meaning of life. Irena Wojnar claims that the world of art is a real environment of human existence, in which each human work expresses sensations, experiences, ideas, everything that his/her „individual creative personality consists of, as well as elements of the outside world, which reach to the artist through his/her senses, intellect, sensitivity. Therefore, art can be a link connecting the outside world with inner world” Therapy through art is a particular type of activity oriented towards human and environment, in which he/she functions. Its goal is restoration or enhancement of health, whereas, its superior goal is improvement of quality of life. Art therapy triggers creative activity and is useful in acceptance of himself/herself and the others. It triggers creative expression, expression of emotions, leading to positive changes in behaviour of a child with anxiety disorder. L. S. Wygotski emphasizes that participation in a creative process has a healing power. Art works cathartically – its active experiencing [...] allows to find deep and truly humanistic truths about human life, which intensifies spiritual human powers. Art should be a way to build life because it helps us live, makes life better and gives life a meaning”. Psychotherapeutic influence of art on human can be either passive or active. Passive influence is an active communing of an individual with art, that is, the fine arts, music, theatre, film. It takes under the supervision of psychotherapist who decides about the type and form of art with reference to a given patient. It must be emphasized that it can't be accidental work of art, because goal to be achieved must always be taken into consideration. Therapist has to prepare a patient, discussing with him/her and explaining the meaning of a

given work of art as well as encourage to active reception. Whereas, in active influence, having greater therapeutic effects, patients create specific works of art (mainly artistic: painting, sculpting, modelling, weaving), play the instruments, create plays. It is also important to learn patients how to use given artistic techniques as well as discuss and analyse a created work. In psychodynamic perspective of art therapy, artistic activity can be a form of expression of conscious and preconscious contents. Therefore, creating spontaneous artistic works (together with interpretation) is a key to understand a child by a therapist, and also to understand himself/herself (insight). This process is analogous to using a technique of free associations. Such spontaneous creation is of non-directive character. Art therapist asks a person to draw, model or create anything he/she wants. In this way, it helps him/her, in symbolical way, to express less or more realized fears. It is believed that this activity is particularly useful when a person goes through a very important event in his/her life, such as emotional crisis, physical illness or process of dying. Apart from spontaneous expression, partially directed techniques such as e.g. projection drawings or „technique of scribble” facilitate the access to this what is unaware. Important element in a process of art therapy is a phenomenon of transference, which is a basis for analysis and treatment. „Transference is a phenomenon characterized by unconscious redirection of feelings from one person to another.” In art therapy, an object of projection is often the very process of creation and an artistic work. Projection nature of creative expression and relationship between a child and an art therapist cause that phenomenon of transference always occurs during therapy. In a process of art therapy, we also deal with analytical method of amplification and active imagination. Amplification is, in this activity, a method of analysis, but also interpretation of images. Amplification also refers to dreams. In this case, analysis with interpretation is a reflection on symbolizing contents, through associations and putting symbols in the historical and cultural context (comparison with these symbols in the area of religion, history, culture). Each element of picture can have personal meaning and represent child’s experiences and archetypal symbols. In turn, active imagination is a way to trigger creativity in child undergoing therapy through fantasies and images, being a main treating factor. It is about creating and observing internal images and drawing them in a form of e.g. artistic work and reflection on its meaning. The most important assumptions of art therapy in object relations theory include the concept of temporary space and temporary object as well as Mahler’s development stages. Object relations theories assume that people have inner need to establish ties with other people and these ties shape human personality. Robbins, who is one of the most famous representatives of this current of art therapy, has observed that creation can reflect and organize internalized relationships and these taking place between therapist, child and work. In this current of psychodynamic art therapy, the area of artistic creation can be treated as temporary space, that is, such area of experiencing, in which there is no clear distinction

between external and internal reality. It allows to connect subjective reality with objective reality. Created works can fulfil functions of transitional objects, that is, objects which are important because they represent something significant, which is connected with any relation. Works created by a child can also be treated as reflection of old, internalized relationships and revealing interpersonal communication and problems in relationships. Whereas, creation in the context of relationship with an art therapist is a support in going through different phases of relationship development. Therefore, artistic classes with therapeutic elements can be an alternative form of therapy of children with anxiety, depressive disorders. Artistic work is often an „image” of child’s personality. Drawing, in its simplest dimensions, doesn’t require any formal preparations or priming the canvas – nothing that is required to make a picture or sculpture. Thanks to simplicity of this technique, there are no indirect stages between the concept of a person drawing and materialization of his/her vision. A hand that keeps a tool can directly respond to each tremble of emotions, change of mood, train of thought. Close relationship between drawing and biological mechanisms causes that it has a very personal character, and each drawing is a unique work, one of a kind. Drawing is particularly important in patients who do not want or who can’t express their feelings. It concerns mainly children who have problems with control of their own emotions. For example, when we try to describe passion or pain, words are not enough and artistic activity can be useful here. Lack of verbal labels describing emotions may cause uncertainty. Therefore, we may use a drawing/art in order to find a meaning, which is difficult to express in words, and then use words, and then find a meaning included in the art/artistic activity. Drawing can be treated as an agent between the content (of experiences) difficult to verbalize (e.g. connected with strong, unpleasant emotions) and verbalized content. Verbalization of this „secondary” content can reduce anxiety or fear resulting from the lack of category defining state/experiences etc. It is particularly important in the case of therapy of children who have problems with describing their emotions using words.

Goodman compares therapeutic value of a drawing to therapeutic value of writing, referring to Pennebaker’s concept. Writing about own experiences can enhance child’s ability to reveal and express traumatic experience.

### 3. Conclusion

A phenomenon of artistic works of people suffering from depression results from, above all, the need of visualization and materialization in artistic techniques „the images of subconsciousness”, which are symbols of the authors’ internal experiences. They result from a deep, often characterized by huge pain of experiencing himself/herself in a contact with the world of own imagination, which doesn’t fit in with the standards of reality. To a large extent, they are also symbols of a state of mind of a modern man. These works are often not „good”. As a matter of fact, the meaning of word „good” has evolved many times over the centuries. It is also

happening now. Danger of disintegration, destruction, loneliness or death often appear in these images. However, there is also the truth of individual experiences, fates and the light which works as a catharsis. Although, these images are not easy, they force people to personal reflection. The very image is often a reflection on external reality around us and inner world. It brings up a problem of eternal dualism, of which origin can be seen in primeval transformation of light and darkness. It can be a „tale” about lost dreams, or about rift between them and reality. It is sometimes an attempt to describe changes in the life of the very authors. Collision of absurd reality with structured world born in our psyche is very interesting, world of dreams, fantasies and myths. Art therapy can also be applied as a method supporting process of psychotherapy of children suffering from depression, but also as a form of direct work with them.

## References

- [1] Barker, Basic Child Psychiatry, Blackwell Science Ltd, Oxford 1995
- [2] Collados Zorraquino Jose, Depresja u dzieci i młodzieży. Wydawnictwo: eSPe, 2009
- [3] Goodman, R., Williams, K, American Journal of Art Therapy Talk, talk, talk, when do we draw? , No 37, 1998
- [4] Jarosław Rola, Depresja u dzieci, Impuls, Kraków, 2001
- [5] Klein, M, Miłość, poczucie winy i reparacja. Pisma tom I. Gdańsk: Gdańskie Wydawnictwo Psychologiczne, Gdańsk, 2007
- [6] Konstance Hammen, Depresja, Gdańskie Wydawnictwo Psychologiczne, Gdańsk, 2006
- [7] Melchiodi C, The handbook of art therapy. The Guilford Press, New York, 2003.
- [8] Oster, G., Gould, P, Rysunek w psychoterapii, Gdańsk, GWP, 1991
- [9] Popiel A., Pragłowska E, Psychoterapia poznawczo-behawioralna. Teoria i praktyka. Wydawnictwo Paradygmat, Warszawa, 2008
- [10] Pużyński, Depresje, PZWL, Warszawa, 1988
- [11] P. Rubin J.A, Approaches to art therapy: Theory at technique, Brunner- Routledge, New York, 2001
- [12] Słowik, Sztuka jako możliwość...,dz. cyt., s. 404-406
- [13] Radziłłowicz W, Czynniki ryzyka oraz różnorodność obrazu klinicznego depresji u dzieci i młodzieży, SWPS Sopot, 2013
- [14] Skrzyński W, Wybrane zagadnienia psychologii klinicznej, Warszawa 2011
- [15] Wojnar, Teoria wychowania estetycznego, Żak, Warszawa 1997
- [16] E. Turska, Profilaktyczno - terapeutyczna funkcja sztuki [w:] Estetyczny wymiar edukacji, red. nauk. J. Szulakowska – Kulawik, Wyd. Kolegium Nauczycielskie, s. 42, Bytom 2007
- [17] Wawelska K., Pawlik J, Depresja ujęcie psychoanalityczne, PWN, Warszawa 1992

## THREE FACES OF PSYCHOPATHY IN A ROMANCE: TRIARCHIC CONCEPTUALIZATION OF PSYCHOPATHY AND THE USE OF INFLUENCE TACTICS IN CLOSE RELATIONSHIP – PRELIMINARY STUDY

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**Abstract:** *This study has examined the manner in which people high on psychopathy may function in relationship contexts. In a sample of 131 people (70 women, 61 men), we correlated three facets of psychopathy: disinhibition, boldness and meanness with relationship satisfaction and the use of influence tactics in a close relationship. There indeed exist significant correlations of aspects of psychopathy with satisfaction and the use of influence tactics in intimate relationships. Disinhibition and meanness are associated with lower level of satisfaction in close relationship and stronger tendency to use hard and indirect tactics of influence with lower tendency to use soft tactics focused on positive relations with partner. Boldness in men shows associations with stronger tendency to use soft tactics of influence, which may indicate its positive adaptations. Results are discussed on the basis of triarchic conceptualization of psychopathy and its potential utility in understating different manifestations of psychopathy.*

**Keywords:** *triarchic conceptualization of psychopathy, influence tactics, close relationships*

### 1. Introduction

Psychopathy is a construct describing a personality that manifests in anti-social behaviors, emotional coldness and difficulties in establishing deep interpersonal relationships. It is the first personality disorder described in psychiatry and it's a pragmatic construct used in numerous studies [1]. Its long tradition in clinical and research fields is however associated with numerous controversies concerning the definition, nature, etiology and measurement of that concept [2]. Despite the disputes and differences in conceptualization, construct of psychopathy is still commonly used among researchers and practitioners, because of its usefulness in predicting of aggressive behaviors and crime. Most classical papers consider psychopathy in the context of crime and focus on clinical and criminal groups [3,4]. However there is growing interest in research of psychopathy in nonclinical samples - it's estimated that clinical psychopaths are 1% of general population when subclinical psychopaths are around 5 to 15% of general population [3] and that psychopathic traits are associated not only with criminal behavior but - among others - with functioning in close relationship [5].

#### 1.1 Triarchic conceptualization of psychopathy – implications for subclinical psychopathy research

Patrick, Fowles and Krueger [6] presented the triarchic conceptualization of psychopathy, which describes psychopathy as a configuration of three aspects: disinhibition, boldness and meanness. Disinhibition is a general tendency to impulsivity with low self-control and disability to delay gratification. Meanness manifests in a lack of empathy, cruelty, aggression, hostile relations with others and sensation seeking, including destructive behaviors. According to Patrick [6] meanness is a phenotypic manifestation of lack of fear, which may take a

different form and constitute a positive psychological adaptation - boldness. This aspect of psychopathy manifests in self-confidence in social situations, persuasiveness, stress resistance, courage and sensation seeking in non-destructive ways (eg. extreme sports). Triarchic conceptualization emphasizes the independence of the three aspects of psychopathy due to their different etiology in the development of brain structures, environmental conditions, and different ways of its development. That allows a new interpretation of types of psychopathy [6]. Because psychopathy can vary in the intensity of each of the three dimensions (boldness, disinhibition and meanness), it can manifest in different types, eg. charismatic type (high level of disinhibition and boldness), aggressive, antisocial type (high level of disinhibition and meanness), "successful" subclinical type (low disinhibition, high boldness) and other types [7]. The triarchic model was developed to integrate classical and contemporary theories of psychopathy and can be considered to be the key to understanding psychopathy and its various manifestations – e.g. criminal and subclinical, primary and secondary [6]. In a short time it has gained a significant position among the concepts of psychopathy, becoming important point of reference in many considerations [8,9,10,11,12].

#### 1.2 Psychopathy and close relationships

Psychopathy is associated with selfishness, impulsiveness, lack of empathy, sense of entitlement and a desire to cause fear in others [3,12]. Therefore psychopathy is associated with low level of relationship satisfaction, increased stress of partner and crises in relationship [13,14,15,16]. Psychopaths tend to fantasize about infidelity and betrayal [15], engage in casual sexual relationships and find it hard to stay committed to partner [16]. People high on psychopathy treat love as a game (*ludus*) – as a source of

risk and intense stimulation [17]. Psychopathy is associated with influence tactics involving violence and intimidation and the aim of manipulation is to dominate partner and also frequently to force partner to sexual intercourse [15,16,18].

## 2. Purpose of the study and main hypotheses

The main purpose of this study was to determine whether there is a relationship between three aspects of psychopathy, satisfaction and the use of influence tactics in a close relationship. The second purpose of this study was to determine what is the strength and direction of relations between individual aspects of psychopathy and those areas of intimate relationships. Based on the factors mentioned in the literature review we hypothesize that:

1. Disinhibition and meanness are associated with lower level of satisfaction in a relationship, while boldness is associated with higher level of satisfaction in relationship.
2. Disinhibition and meanness are associated with a stronger tendency to use hard tactics of influence in a close relationship, while boldness is associated with stronger tendency to use soft tactics of influence in a close relationship.
3. Disinhibition, meanness and boldness are associated with greater intensity of using influence tactics.

## 3. Method

### 3.1 Sample

The study was done on a sample of 131 participants (70 women and 61 men) from general public. All participated in the study voluntarily. The sample consisted of people from 18 to 78 years old (women Mean=30, SD=13; men Mean= 31, SD = 11). At the time the study was held there were 96 people staying in close relationships (53 women, 42 men) and 35 were single (18 women, 17 men). The duration time of relationships considered by participants in the study took from 1 month to 36 years (women Mean=82, SD = 107; men Mean=80, SD = 109, in months).

### 3.2 Measures

TriPM [19,20] - questionnaire designed to measure the general level of psychopathy and the three aspects that constitute it: disinhibition, boldness, meanness. For each statement responses were given on a four-point scale. The alpha reliability of inventory obtained in this study was 0,89.

KDM-2 [21] - questionnaire designed to measure the general satisfaction in intimate relationships and the four factors that constitute (not included in this study). For each statement responses were given on a five-point scale. The satisfaction rate was the sum of points scored. The alpha reliability of inventory obtained in this study was 0,93.

KWS [22] - questionnaire designed to measure the use of influence tactics in intimate relationships. Eighty one items of the questionnaire constitute three scales - strong tactics (violence, row, silent treatment, sulks, debasement, pressure), indirect tactics (pretending helplessness,

calculation, reciprocity-reward, social comparison) and soft tactics (dialogue, appealing to emotions, advertising, charm). The alpha reliability of inventory obtained in this study was 0,94.

## 3.3 Procedure

The study was held in a traditional - paper - way (85 respondents) and via the Internet (46 respondents). Both procedures provided anonymity to participants. All participants received instructions which explained the purpose of research and procedure. In the instructions, participants were informed that during answering items of questionnaires they are asked to refer to the current state of their relationship, or to consider the state of their last relationship (in case of currently being single).

## 4. Results

Table 1 provides descriptive statistics of variables used in this study shown separately for each gender. Table 2 (appendix) provides intercorrelations of variables used in this study. As shown by Table 2, there indeed exist significantly positive correlations between aspects of psychopathy and satisfaction and the use of influence tactics in intimate relationships. Disinhibition for both men and women shows negative correlation with satisfaction in relationship and for women with the use of dialogue tactic. More, disinhibition in both genders shows positive correlations with the intensity of using influence tactics, the use of hard and indirect tactics and the use of influence tactics such as violence, silent treatment, sulks, debasement, pressure, pretending helplessness, reciprocity-reward, bribe. Also in men the higher disinhibition the stronger tendency to use tactics: row, calculation, social comparison, ingratiation and charm. Boldness in women and men is correlated positively with the tendency to use charm tactic. In men, boldness is associated positively with the use of all soft tactics – charm, dialogue, appealing to emotions, advertising, and negatively with the use of violence, sulks and pretending helplessness. Meanness in women is correlated only with higher tendency to use the violence as an influence tactic in close relationship. In men, meanness is correlated positively with the tendency to use the violence and silent treatment tactics, and negatively with satisfaction in relationship, tendency to use soft tactics, and the use of tactics: dialogue, appealing to emotions and advertising.

## 5. Discussion

One aspect of this study was to determine whether there is a relationship between three aspects of psychopathy and intimate relationship satisfaction. Previous studies show that psychopathy is a trait associated with low level of satisfaction in relationship and people high on psychopathy are unable to build stable and deep relationships [14,15,16]. This study shows that there is an association between disinhibition and low levels of intimate relationship satisfaction among women and men and also between meanness and relationship satisfaction. There is no association between boldness and satisfaction in relationship. This results comply with previous studies

that describes classical psychopaths (often associated with disinhibition and meanness, see: [20]) as less satisfied with their relations. Another aspect of the study was related to psychopathy and the use of influence tactics in the intimate relationship. Disinhibition is the only aspect of psychopathy that is correlated with the intensity of using influence tactics, using all the spectrum of hard tactics, some indirect tactics and using charm, but not using dialogue as an influence tactic. This results are consistent with literature that describes disinhibition as associated with insistence on immediate gratification, tendency to impulsivity and lack of self-control [6]. This might occur in relationship situations when people high on disinhibition may use wide variety of strategies to obtain gratification as soon as it's possible, without considering the well-being of partner. Also impaired regulation of affect and urges might lead to stronger tendency to use hard tactics which might be seen as more effective and quicker as opposed to e.g. dialogue. Similar pattern can be seen in relation between meanness and the use of influence tactics. Meanness in men is associated positively only with the use of two tactics – violence and silent treatment, furthermore is associated negatively with all soft tactics except charm. Meanness in women is associated only with stronger tendency to use violence as an influence tactic. This shows the picture of person high on meanness as a person that only uses violence to get what she wants and avoids soft tactics, so definitely does not take into account feelings of her partner. It is consistent with literature that describes meanness as a lack of empathy, disdain for and lack of close attachments with others, exploitativeness, and empowerment through cruelty [6]. Opposite pattern can be observed for boldness. Boldness in men is associated with the use of all spectrum of soft tactics and avoiding using violence, sulks and pretending helplessness. In group of women, boldness is associated positively with the use of charm tactic. This result may partially confirm that boldness is a positive psychological adaptation of lack of fear - phenotypic style entailing a capacity to remain calm and focused in situations involving pressure or threat, high self-assurance and social efficacy [6]. Men high on boldness would achieve his goals by soft manipulation – with the ability to take perspective of his partner.

The obtained results show that when psychopathy is not treated as a homogenous construct, more can be found about the person's behavior in the field of close relationships. Different patterns of associations between three aspects of psychopathy are consistent with the theory and point to the fact that triarchic conceptualisation of psychopathy can be helpful with better understanding different manifestations of psychopathy. This study is only a small contribution to further research in the field of psychopathy and intimate relationships. The results of this study may inspire further research in fields such as the use of influence tactics while considering the level of motivation to achieve their personal goals, and the perceived utility of given tactics. It also appears to be very interesting to continue research related to triarchic conceptualization of psychopathy.

Table 1 Descriptive statistics

Variables	Descriptive statistics			
	Women (n=70)		Men (n=61)	
	Mean	SD	Mean	SD
Disinhibition	13,45	8,05	15,47	7,94
Boldness	23,31	5,44	28,01	6,23
Meanness	8,58	5,13	10,73	5,23
Satisfaction in relationship	116,58	22,04	118,50	17,18
Intensity of using influence tactics	204,82	33,81	197,14	36,30
Hard tactics	59,10	20,90	55,39	19,13
Indirect tactics	89,90	17,31	87,72	19,62
Soft tactics	55,82	8,42	54,03	9,91
Violence	7,12	3,74	6,96	3,15
Row	7,15	3,22	6,75	3,17
Silent treatment	10,92	4,55	10,01	4,11
Sulks	8,70	3,41	7,88	3,45
Debasement	9,90	4,62	9,77	3,65
Pressure	15,24	4,92	14,00	4,98
Pretending helplessness	4,51	1,95	3,98	1,97
Calculation	22,01	5,36	21,75	4,50
Reciprocity-reward	15,38	4,23	14,55	4,92
Social comparison	9,34	3,25	8,77	3,32
Charm	38,64	8,91	38,65	9,81
Dialogue	19,10	3,49	18,47	4,11
Appealing to emotions	17,07	3,48	16,21	3,75
Advertising	19,65	3,41	19,34	3,72

## References

- [1] Millon, T., Simonsen, E., Birket-Smith, M., Historical Conceptions of Psychopathy in the United States and Europe. In: T. Millon, E. Simonsen, M. Birket-Smith, R. D. Davis (Red.), *Psychopathy: Antisocial, Criminal, and Violent Behavior*, New York, The Guilford Press, 2003.
- [2] Pastwa-Wojciechowska, B., *Psychopaci. Sprawcy przestępstw seksualnych*, Gdańsk, Wydawnictwo Harmonia, 2013.
- [3] LeBreton, J. M., Binning, J. F., Adorno, A. J., Subclinical psychopaths. In: J. C. Thomas, D. Segal (red.), *Comprehensive handbook of personality and psychopathology*, vol. 1: Personality and everyday functioning, New York: John Wiley and Sons, Inc, 2006.
- [4] Neumann, C. S., Hare, R. D., Johnsson, P. T. The Psychopathy Checklist Revised (PCL-R), Low Anxiety, and Fearlessness: A Structural Equation Modeling Analysis. *Personality Disorders: Theory, Research, and Treatment*, Vol. 4, No. 2, pp. 127-137, 2013.
- [5] Jonason P. K., Koenig B., Tost J. Living a fast life: The Dark Triad and Life History Theory. *Human Nature*, Vol. 21, No. 4, pp. 428-42, 2010.
- [6] Patrick, C. J., Fowles, D. C., Krueger, R. F. Triarchic conceptualization of psychopathy: Developmental origins of disinhibition, boldness and meanness. *Development and psychopathology*, No. 21, pp. 913-938, 2009.
- [7] Hall, J. R. Interview assessment of boldness: Construct validity and empirical links to psychopathy and fearlessness, 2009. Online: [http://conservancy.umn.edu/bitstream/54181/1/Hall\\_umn\\_0130E\\_10612.pdf](http://conservancy.umn.edu/bitstream/54181/1/Hall_umn_0130E_10612.pdf).
- [8] Copestake, S., Gray, N. S., Snowden, R. J. A comparison of a self-report measure of psychopathy with the Psychopathy Checklist-Revised in a UK sample of offenders. *Journal of Forensic Psychiatry & Psychology*, No. 22, pp. 169-182, 2011.



- [9] Poythress, N. G., Lilienfeld, S. O., Skeem, J. L., Douglas, K. S., Edens, J. F., Epstein, M., Patrick, C. J. Using the PCL-R to help estimate the validity of two self-report measures of psychopathy with offenders. *Assessment*, No. 17, pp. 206–219, 2010.
- Sellbom, M., Ben-Porath, Y. S., Patrick, C. J., Wygant, D. [10] B., Gartland, D. M., Stafford, K. P. Development and construct validation of MMPI-2-RF measures assessing global psychopathy, fearless-dominance, and impulsive-antisociality. *Personality Disorders*, No. 3, pp. 17–38, 2012.
- [11] Sellbom, M., Phillips, T. R. An examination of the triarchic conceptualization of psychopathy in incarcerated and nonincarcerated samples. *Journal of Abnormal Psychology*, No. 122, Vol. 1, pp. 208-214, 2013.
- [12] Jones, D.N., Paulhus D.L. Differentiating the Dark Triad within the Interpersonal Circumplex. In: L.M. Horowitz, S.N. Strack (Red.), *Handbook of interpersonal theory and research*, New York, Guilford, 2010, pp. 249-267.
- [13] Ali, F., Chamorro-Premuzic T. The dark side of love and life satisfaction: Associations with intimate relationships, psychopathy and Machiavellianism. *Personality and Individual Differences*, Vol. 48, pp. 228-233, 2010.
- [14] Savard, S., Sabourn, S., Lussier, Y. Male sub-threshold psychopathic traits and couple distress. *Personality and Individual Differences*, Vol. 40, pp. 931-942, 2006.
- [15] Egan, V., Angus, S. Is social dominance a sex-specific strategy for infidelity? *Personality and Individual Differences*, Vol. 36, pp. 575-586, 2004.
- [16] Williams, K. M., Spidel A., Paulhus, D.L. Sex, Lies and More Lies: Exploring the Intimate Relationships of Subclinical Psychopaths. Poster presented at 1st conference of the Society for the Scientific Study of Psychopathy, Vancouver, BC, Canada, 2005. Access: [http://www2.psych.ubc.ca/~dpaulhus/research/DARK\\_TRIAD/PRESENTATIONS/SSSP05withAlicia.pdf](http://www2.psych.ubc.ca/~dpaulhus/research/DARK_TRIAD/PRESENTATIONS/SSSP05withAlicia.pdf)
- [17] Jonason, P.K., Kavanagh, P. The dark side of love: Love styles and the Dark Triad. *Personality and Individual Differences*, Vol. 49, pp. 606-610, 2010.
- [18] Jonason, P.K., Li, N.P., Webster, G.D., Schmitt, D.P. The Dark Triad: Facilitating a Short-Term Mating Strategy in Men. *European Journal of Personality*, Vol. 23, pp. 5-18, 2009.
- [19] Patrick, C. J. Operationalizing the triarchic conceptualization of psychopathy: preliminary description of brief scales for assessment of boldness, meanness, and disinhibition. Unpublished manual, Department of Psychology, Florida State University, Tallahassee, FL, 2010. Access: [https://www.phenxtoolkit.org/toolkit\\_content/supplemental\\_info/psychiatric/measures/Triarchic\\_Psychopathy\\_Measure\\_Manual.pdf](https://www.phenxtoolkit.org/toolkit_content/supplemental_info/psychiatric/measures/Triarchic_Psychopathy_Measure_Manual.pdf).
- [20] Pilch, I., Sanecka, E., Hyla, M., Atlas, K. (in press). Polska adaptacja skali TriPM do badania psychopatii w ujęciu triarchicznym. *Psychologia Społeczna*.
- [21] Płopa, M., Rostowski, J. Kwestionariusz Dobranego Małżeństwa. In: M. Płopa (red.), *Więzi w małżeństwie i*

rodzinie. Metody badań. Kraków, Oficyna Wydawnicza Impuls, 2006.

[22] Doroszewicz, K., Sijko, K. Kwestionariusz Wpływu Społecznego w bliskich związkach. *Psychologia Jakości Życia*, No. 7, Vol. 1-2, pp. 19-45, 2008.

## Appendix

*Table 2 Intercorrelations between variables.*

Variables	Disinhibition		Boldness		Meanness	
	Women	Men	Women	Men	Women	Men
Satisfaction in relationship	-0,390**	-0,333**	-0,059	0,100	-0,179	-0,349**
Intensity of using influence tactics	0,435**	0,468**	0,120	0,040	0,145	0,056
Hard tactics	0,418**	0,446**	-0,051	-0,218	0,078	0,205
Indirect tactics	0,360**	0,434**	0,222	0,087	0,174	-0,009
Soft tactics	-0,229	-0,034	0,045	0,386**	-0,212	-0,442**
Violence	0,407**	0,255*	0,146	-0,266*	0,274*	0,377**
Row	0,213	0,357**	-0,049	-0,181	-0,003	0,194
Silent treatment	0,417**	0,372**	0,007	-0,214	0,126	0,301**
Sulks	0,379**	0,266*	-0,113	-0,320*	0,003	0,119
Debasement	0,447**	0,450**	-0,038	-0,196	0,119	0,151
Pressure	0,333**	0,426**	-0,071	-0,016	0,098	0,093
Pretending helplessness	0,418**	0,300*	0,104	-0,355**	0,229	0,121
Calculation	0,183	0,411**	0,180	-0,106	0,162	0,113
Reciprocity-reward	0,419**	0,325*	0,026	0,095	0,033	0,071
Social comparison	0,235	0,331**	-0,109	-0,018	-0,079	-0,148
Charm	0,193818	0,326*	0,311*	0,288*	0,176	-0,087
Dialogue	-0,341**	-0,215	-0,089	0,287*	-0,232	-0,429**
Appealing to emotions	0,045	0,233	0,084	0,317*	-0,088	-0,295*
Advertising	-0,222	-0,075	0,120	0,360*	-0,154	-0,369**

## FINANANCIAL LITERACY AT PRIMARY SCHOOLS IN THE CZECH REPUBLIC

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**Abstract:** *Financial education has currently become an important topic of the whole society, even from the global perspective. The presented text comprehensively deals with the issue of financial education and financial literacy in terms of teaching at primary schools. It presents a specific approach to teaching financial literacy topics at primary schools including a description and analysis of the main findings of the research.*

**Keywords:** *financial education, financial literacy, primary school*

### 1. Introduction

The importance of financial education increases hand in hand with the changes in the market of financial products and services. It has also been influenced by social and demographic changes in the population. In the situation when a number of unhealthily indebted households have had a steadily upward trend, the issue of financial literacy of the Czech population has become a more and more frequent subject of discussion. Many people often neglect the possible consequences of the inability to pay their debts and are consequently more vulnerable to seizures or personal bankruptcies. Crucial importance in preventing these negative phenomena is attributed to financial education and financial literacy acquisition, which is an instrument for the effective protection of family management and personal finances.

Everyday reality people to constantly perceive changes in all spheres of life and adapt to them. It is equally challenging to find one's way in the financial world well because the situation in financial markets has been developing dynamically, it has been updated with new offers, products and services, changing laws, tax advantages of financial products and the consumer is exposed to great pressure. Only a financially literate person equipped with the necessary knowledge, skills and abilities can make informed decisions and counteract the unfavorable financial market products and, ultimately, prevent over-indebtedness.

### 2. Financial education vs. financial literacy

As presented by Hesová, Zelendová [1] financial literacy can be thought of as *"the sum of competencies applied in everyday life, which are necessary for active and responsible participation in the financial market. Financial education in the wider context supports the prevention of over-indebtedness and directs people to securing themselves for old age."* From this perspective, the basis for restriction of such problems with excessive indebtedness and inability to repay debts is to systematically increase the financial literacy of all age groups. Opletalová [2] states in this regard that financial literacy is an essential tool for the prevention of over-indebtedness, which contributes to defense against the

increasing rise in indebtedness, respectively over-indebtedness and thereby prevents social impacts resulting from over-indebtedness.

The concept of financial literacy can be found in programs that support the increase in the level of financial literacy of the population in various countries. The issue of financial literacy is also dealt with in the individual countries using the concepts of financial capability and financial education). Semantic differences of the concepts is dealt with in the study of the Austrian central bank Österreichische Nationalbank published in the quarterly Geldpolitik & Wirtschaft, where the concept of financial literacy is often associated with knowledge related to financial services and products and financial capability is seen as a person's ability to apply financial knowledge properly [3].

An important role in expanding global awareness of the importance of financial literacy and financial education is fulfilled by the Organisation for Economic Cooperation and Development, (hereinafter referred to as OECD). For the needs of the individual Member States, the OECD has developed universally acceptable definition of financial education, which is understood as a process through which the users of financial services and investors increase understanding of financial products and concepts, and at the same time through information, instruction and impartial advice create the ability to be aware of financial risks and financial opportunities. Financial Education also increases the ability to make informed choices, learn where to go for advice or assistance and helps to improve financial security "[4]. The above-mentioned definition was published as part of an international study of financial literacy of OECD which revealed that financial education is an essential means of obtaining the necessary financial literacy of citizens.

A comprehensive definition of financial literacy also results from the National Financial Education Strategy. *"Financial literacy is a set of knowledge, skills and value attitudes of citizens necessary to financially secure themselves and their families in today's society and to actively perform at the market of financial products and services. A financially literate citizen is well versed in the issue of money and prices and he/ she is able to*



*responsibly manage personal/ family budget, including the management of financial assets and liabilities with respect to changing life situations"* [5]. Financial literacy constitutes only one part of economic literacy. It is additionally concerned with e.g. the issues of future revenues, implications arising from the partial economic decisions, deciding on the labor market, the issue of taxes and transfers, etc. Kiyosaki [6] defines financial literacy as the sum of two components: information and education, without proper education in finance it is difficult for humans to use any information in practice.

Financial education of pupils in initial education is guaranteed by the state, which is very positive. Today's students will become involved in a few years in transactions on the financial markets and the need to be equipped with sufficient competencies for active and responsible decision-making in matters of personal and family finance. Financial education of pupils in initial education is defined by the document System of financial literacy in primary and secondary schools. It is a joint document of the Ministry of Finance of the Czech Republic, the Ministry of Education, Youth and Sports, Ministry of Industry and Trade established pursuant to the Government Resolution no. 1594 of 7 December 2005, which aims to increase the level of financial literacy of the population of the Czech Republic as part of a systematic financial education. This document includes the Financial Literacy Standards defining the target state of the level of financial literacy for primary education and secondary education. The level of financial literacy for secondary education also corresponds to the level of financial literacy of the adult citizen [7].

Financial education is becoming a very frequent topic at international level and it is at the forefront of most developed countries. This is evidenced, for example, by the implemented international PISA survey, which newly implements the issue of financial literacy among the target topics, for which it detects the current knowledge of young students of secondary schools.

An important and irreplaceable role at the international level has also been provided by the International Financial Education Network (INFE), its main objective is to disseminate and promote the importance of financial education through the development strategies of the individual Member States. In this context, the OECD also introduced a definition of the term financial education.

*"Financial education is the process by which financial consumers/ investors improve their understanding of financial products and concepts and, through information, instruction and/ or objective advice, develop the skills and confidence to become more aware of financial risks and opportunities, to make Informed choices, to know Where to go for help, and to take other actions Effective to Improve Their financial well-being"* [8].

The individual countries have processed or are currently working on their national strategies for financial education, which represent a systematic approach to strengthening the financial literacy of their citizens. The Czech Republic has this strategy processed in the updated version since 2010.

It is clear that the issue of financial education does have its place in school education in most countries of the world and it is therefore desirable to develop it in the Czech schools as well. The specific form and implementation of teaching of financial literacy in the Czech Republic is discussed in the next part of the paper.

### 3. Concept of teaching of financial literacy at primary schools

At our schools, the emphasis that this issue deserves has not been put to financial education yet. Teaching financial literacy can also be associated in the case of many teachers with anxiety, as in the past, teachers had not encountered financial education during their undergraduate training.

Fundamental and very important milestone in the implementation of financial literacy topics, however, becomes the fact that from the 1st September 2013, financial literacy has been a mandatory part of primary education. In accordance with the adopted documents System of creating financial literacy at primary and secondary schools and an innovative National Strategy for Financial Education, schools may teach financial literacy in primary education in the new setting of the concept on a voluntary basis.

Although schools have to teach financial literacy, it is up to them what form is selected, as well as the number of hours devoted to the subject. Some primary schools earmarked for financial education only ten hours in the whole four years the young students are to spend in the secondary level of education. On the other hand, an hour a week is dedicated to this issue at some schools, e.g. in the ninth grade. The final decision is usually based on recommendations of teachers to the school management. There is no single methodology how to teach financial literacy, observance of which the Czech School Inspectorate could follow. Recommended time allotment for Financial Education has not been stated either, nor in which subjects it will appear as it will probably not constitute a separate subject, it is usually incorporated into the Fundamentals of Social Sciences, Civics, Citizenship Education or through project-based teaching in these subjects. Financial literacy can be taught both through traditional forms of school teaching and through project-based learning. The resulting effect is that financial education within the framework of primary education is interdisciplinary in nature. Most often, it integrates social sciences, mathematics and ICT, as evidenced by the results of the international survey PISA 2012 [9].

The topics related to financial literacy are integrated into the existing subjects that already have their content and number of hours. In this direction, however, then is not too much room left for the expansion of educational contents of the topics of the above-mentioned literacy. The financial issue is not perceived as a comprehensive set of information. The use of teaching materials has not been mutually correspondent either, since each school progresses at its own discretion. New background materials are often not sought either and the schools work with the textbooks of the existing subject only, i.e. in the essence, the teaching of financial literacy is not developed,

while a large number of publications issued in accordance with the Standards of financial literacy appear at the market.

In the past, teachers had been afraid to teach topics related to financial and economic issues, as they did learn financial literacy within the framework of their undergraduate training. In February 2008, deans of faculties of education of universities were recommended by the Director of the Department of University Education of the Ministry of Education to include these topics in the undergraduate teacher training.

The OECD survey showed that teachers have the interest and initiative to supplement or expand their education, especially in the context of training courses within further education of teachers. Most of them (73%) have completed a course focused on financial education in the past 12 months, which shows their interest to systemically address this issue [10].

Specific research results explaining the qualification of a teacher who is put in charge of teaching financial literacy at a school has been presented upon the investigation of the Czech School Inspectorate. It states that at schools where they had been dedicated to the issue of financial literacy for over 5 years, the designated expert was the teacher of Mathematics in one-third of cases and nearly in one-third it was the headmaster or headmistress. In other schools, which had been focused on financial literacy for 5 years or less, most often the expert in financial literacy was the teacher of Mathematics (37%), teacher of other approbation than Mathematics or Civics or Fundamentals of Social Sciences (14%) and the headmaster (10%). In almost one quarter of the cases there was no school employee entrusted with teaching financial literacy. The teacher of mathematics was the most frequent expert in primary schools (51%), while in secondary schools it was the teacher of approbation other than Mathematics or Fundamentals of Social Sciences (38%) [11].

When teaching financial literacy, emphasis should be put on the educational aspects of teaching. Notably, this concerns the inclusion of various didactic games, situational methods, project teaching, activation methods and interactive features using modern ICT technologies and so on. The education should include the most practical elements, demonstrations and examples possible, providing for more efficient use of information in future. Financial literacy has a very close relationship with practice. For this reason, the methods and organizational forms of education that convey the young students to the world of finances through a model close to real life situations are applied the most. It rather strives to acquiring theoretical knowledge about the development of abilities and skills so the more suitable methods are connected with resolving problem situations, active involvement of young students and the application of creative and critical thinking.

#### **4. Research focused on the implementation of teaching of financial literacy at primary schools**

Currently, most primary schools have incorporated the issue of financial literacy in various forms into the school

education programs. The question then arises: What is the current concept of teaching financial literacy at primary schools?

The following part of the text presents the survey results, which were obtained through structured interviews with headmasters of primary schools, respectively their representatives. The aim of the survey was to determine the current concept of inclusion and implementation of the topic of financial literacy in the specific school education programs. A structured interview was made up of ten questions. It was a combination of open and closed questions with majority of open questions. Headmasters were interviewed as they are responsible for school education programs and generally have the most comprehensive knowledge of the topics taught. In addition to this, it is not possible to know which teachers provide financial literacy, which was, among others, a topic of the investigation.

The findings resulting from the survey carried out were analyzed in detail and just essential outputs the investigation are mentioned here. The contemporary approach to teaching of financial literacy at primary schools can be summarized in the following points.

- Teaching financial literacy at primary schools takes place mostly at primary and secondary level, which is a proof of positive attitude of the headmasters and headmistresses to this issue. It is one of the possible ways of prevention to avoid negative development of society within the financial sphere.
- The main fundamental source of information for primary schools regarding financial literacy and its teaching was the Ministry of Education, Youth and Sports. Other providers of information are the Ministry of Finance and the National Institute of Vocational Education. Relevant information is published via websites of the listed entities.
- Financial literacy is still not taught as a separate subject except for one school where the course is an optional subject. Financial issues have been integrated into the existing subjects with previous content and curriculum.
- The headmasters and headmistresses are not able to define a range of topics related to teaching of financial literacy, as these areas are not part of every lesson of the subject to which they are incorporated. The extent of teaching has only been specified by the headmistress of the school, where finance is listed in the form of optional subject. Therefore it is not possible to determine whether enough time is dedicated to the issue.
- The area of financial literacy is taught by teachers with professional focus on subjects such as Mathematics, Civics, Career Choice or Citizenship Education. The financial literacy has been included in these subjects. The teachers of the said professional background constitute a good prerequisite for ensuring individual teaching as they have involved financial issues in their subjects.
- Schools which have included training to obtain information focused on the topic of financial literacy

have minor advantage. There has been the effort to deepen their knowledge through self-study but the training conducted on the basis of expertise plays its specific role, which should not be underestimated.

- Respondents generally consider the amount of information and study materials for this field to be sufficient, except for one negative point of view. The amount of materials has been increasing, which corresponds to the fact that teaching financial topics in primary education is from the historical perspective a young area, which is thus constantly evolving and perfecting.
- The education itself is based on various documents and sources. Teaching according to the existing textbooks is prevailing, there are also materials from the website of the Ministry of Education, books directly related to financial literacy but own production is not lagging behind either. There occurs apparent inconsistency in attitude and approach to teaching of financial literacy.
- In 100% cases, the respondents are united in the negative attitude towards the definition of financial literacy as a separate subject. At first glance, this can be classified as an underestimation of teaching this area. The question is, however, of deeper nature, dealing with the temporal possibilities of teaching.

In the conclusion of this survey, it can be stated that teaching financial literacy at schools is conceived in different ways, but positive attitude towards its implementation in practice prevails.

## 5. Conclusion

The need for financial education in the field of financial concepts and skills is based on the fact that members of the modern society are often in a situation where they have to make decisions about their financial affairs and take responsibility for their decisions. Numerous wrong financial decisions of citizens have resulted in an increase in the indebtedness of individuals and households in the Czech Republic, which has neither the tendency to fall or slow down. The results of many research studies ascertaining the level of financial literacy have made it clear that Czech citizens do not have sufficient knowledge and skills within the world of finances and they are ultimately more vulnerable regarding the negative consequences of excessive indebtedness.

Financial education can currently be surely justified in the context of teaching at schools and it will be beneficial in the world of personal and family finances. The chance to eliminate the negative development in the society is the very education of the young generation in the issue of financial literacy. Improving the financial literacy of population by the means of education at schools is the only tool, but it, certainly in the future, will lead to a prevention of dealing with personal or family finances.

## References

- [1] HESOVÁ, Alena – ZELENDOVÁ, Eva. *Finanční gramotnost ve výuce: metodická příručka*. Praha: Národní ústav pro vzdělávání, školské poradenské zařízení a zařízení pro další vzdělávání pedagogických pracovníků (NÚV), divize VÚP, 2011, pp. 6.
- [2] OPLETALOVÁ, Alena. *Finanční vzdělávání z pohledu prevence proti vzniku a růstu nadměrného zadlužování domácností*. ACTA HUMANICA. 2012, č. 4, pp. 147.
- [3] [http://www.oenb.at/de/img/gewi\\_2007\\_3\\_gnan\\_tcm14-67338.pdf](http://www.oenb.at/de/img/gewi_2007_3_gnan_tcm14-67338.pdf).
- [4] OECD. *Improving financial literacy: analysis of issues and policies*. Paris: OECD, 2005, 177 p.
- [5] [http://www.mfcr.cz/cps/rde/xchg/mfcr/xsl/ft\\_strategie\\_financniho\\_vzdelavani.html](http://www.mfcr.cz/cps/rde/xchg/mfcr/xsl/ft_strategie_financniho_vzdelavani.html).
- [6] KIYOSAKI, Robert T. *Bohatý táta, chudý táta: co bohatí učí svoje děti a chudí a střední vrstvy ne*. Praha: Pragma, 2001, 214 p.
- [7] <http://www.msmt.cz/vzdelavani/system-budovani-financni-gramotnosti-na-zakladnich-a-strednich-skolach>
- [8] OECD. *Improving financial literacy: analysis of issues and policies*. Paris: OECD, 2005, pp. 26.
- [9] <http://dx.doi.org/10.1787/9789264190511-7-en>
- [10] <http://dx.doi.org/10.1787/9789264208094-en>
- [11] <http://www.csicr.cz/getattachment/af0099dc-1653-4f68-b01a-83a38b71d801>

## THE ARTISTIC-CREATIVE COMMUNICATION BETWEEN TEACHERS AND STUDENTS AS A MEANS OF IMPROVING THEIR RELATIONS

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**Abstract:** *The Presentation is a result of research, focusing on the artistic-creative communication as a specific kind of dialogue between teachers and students in the school environment. Artistic-creative communication also focuses on working with a wide range of painting techniques in the school environment. More compacts with the effect artistic-creative communications to improve communication between teachers and students/pupils (or even improving relationships in the classroom). It is also important in learning about painting techniques as a way of communication. At the same time we lead students to understand abstract art (form relationships of students to current trends in art) and to their own artistic expression. The process of artistic-creative communication contributes to the personal development of students in contexts today. We present there the results of research with the participation of smaller groups of students (10) in adolescence.*

**Keywords:** *artistic-creative communication, painting techniques, communication, creativity, student,*

### 1. Introduction

Quality-oriented project deals with the lack of communication between teachers and students that address supplementing verbal communication, artistic-creative communication. Artistic creation in the context of artistic-creative communication based on a broad range of painting techniques and penetration especially classical and contemporary techniques. We assume that properly working with painting techniques in the educational process will not only improve communication with young people in adolescence but can develop their creative thinking processes of self-knowledge and self-regulation. A teacher is able to by means of artistic-creative communications develop educational principles and focus on both quality education process and not of collecting quantitative information. New look should be concern in teacher development and into the mutual artistic communication, teacher and student/students create a common abstract work. Creation is seen as a particular way of dialogue relying on the language of artwork. The result of this dialogue allows link to current trends in art and better perception modern art, too.

### 2 Theoretical basis

Adolescence from the point of view education dealt with in the context of the educational process less than other periods of the development of student particularly because adolescence is the peak aged ending secondary school and the eventual transition to university or to employment. Just this great change in this period is very mentally challenging. However the school is focusing on collecting quantitative knowledge necessary for graduation and educational elements are moving strongly into the background. Adolescence by Turček [10] by Labáth [5] and by Vašutová [14] is between 15-16 years until 20-22 years, while individual can stretch up to 25 years. They are in the middle of the gap between adulthood and childhood

and this is manifested reluctance of adolescents to communicate with adult and child, too.

We are currently witnessing a later maturity of young people whose independence, starting a family, but inclusion in employment is moving in later stages of life as it was in the past. They lack accountability, the need to develop their personality. Social adaptation is conditioned emotional maturity, which is capable only for socially mature individual.

In practice, we regard the decrease of trust in adults, adolescents, especially in persons associated with state institutions such as teachers. They represent a world who asked not to be included, a world of restrictions and responsibility. Fine art is a means of communication through the acquisition of visual language that makes it possible to denounce the fact, internal relations and relations with the contemporary world [1]. Given that we consider the process of artistic-creative communications to be appropriate in establishing communication with young people in adolescence.

Young people are confronted with symptomatic features of the present, as the excess of visual stimuli [15], the lack of time [2], the loss of meaning in life [7], emptying the fact [6] that the focus on appearance [13] and preferences kitsch [4]. Knowledge of the arts and creativity are the way to express student acquires efficient tools for life in today's world. The student should learn to actively intervene in visual communication, which is now one of the main means of social action [11]. Artistic-creative communication so we get not only the means of communication in the school environment, but also provides opportunities for further work with image and its understanding/ability to actively perceive the image (to reflect the seeing). "Concentration focus is on a more stable adolescence precise than those of puberty is associated with the application of abstraction, cognitive broader life experience" [16]. Adolescence is the best time to work not only with visual perception of students

(especially abstract creation), but also with their preparation for adult life. The artistic-creative communication helps to student obtain relation to art and their creative expression, which can positively influence the quality of their lives. Painting techniques are only a means of creative expression, they are also a means of communication and provide a wide range of the most promising student creative expression and relaxed communication making process. It means communicating with other students or primary with teachers.

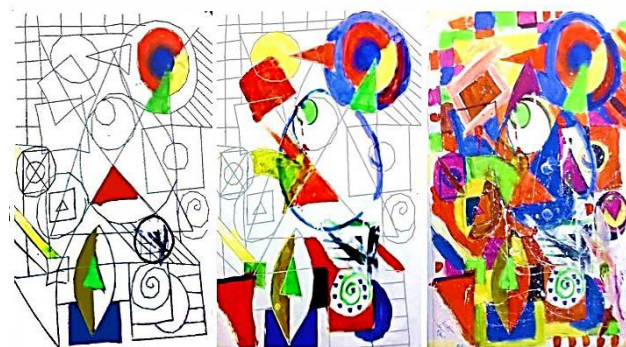
## 2.1 Objectives

The primary objective is to work with painting techniques as a tool of artistic-creative communication that will enable teachers to improve communication with students during adolescence. It may also lead to a better understanding of abstract art (as a first step to understanding the current tendencies in art).

Secondary objective is to personal development of student, the ability to work with their own emotions, finding ways of self-expression and self-knowledge, thus unconsciously learn to creatively solve problems and overcome symptomatic features of the present.

## 2.2 Project research methodology

Artistic-creative communication is expanding communication between students and teachers directly in the creation (in this case in a studio environment is one student and one teacher). They turn on the establishment of a joint work. The result of teachers and students co-work is a common dialogue about their feelings. The teacher should make sure before the formation of the students that no result is not bad and is an important process of creation. The student must make sure that during the formation is not rated. Teacher interventions should be directed student selection techniques also work with color should be the decision of the student, if the situation permits (e.g. material limitation). For multiple Creating alternate painting techniques we suggest that a student had the chance to find the most appropriate means for self-expression. During the artistic-creative communications, that of joint observes not only the process of creation, but also the nonverbal expressions of students. To end analysis of the final creation taking into accounts the results of observation during creation. During the artistic-creative communication, that of joint observes not only the process of creation, but also the nonverbal expressions of students. In the end analysis of the final creation taking into accounts the results of observation during creation. During the artistic-creative communication student is not only the creator but also the viewers of art and its critics, thus gradually learns to perceive and interact with the work of art in a broader context. "The viewer is in the final stage in exactly the same way as an artist through works also trying to formulate some of the previously overburden the contents of his mind" [12]



Picture 1: Process artistic-creative communications

### 2.2.1 Claims for teachers

Although the art of communication often works on art lessons and artistic subjects in general, it is not artistic-creative communications described above, in which the teacher creates a joint work with students. There are more reasons: the teacher is not always willing to work simultaneously with pupils before them and to work together; on the other hand, such communication presupposes a good command of the language of art (at least the same range of art techniques), great self-control and openness in communication with students (or pupils). On Teachers are given higher requirements currently in control of visual language through art techniques and also the knowledge of non-verbal communication as well as their own self-recognition and empathy. Despite several advantages of such communication, which allows communicating effectively, even with "difficult" students, or students during pubescence and adolescence in our schools and even institutionalized framework aimed at extracurricular activities almost completely absent. Both communicating parties thus losing the opportunity to lead each other and learn from each other.

## 3. The importance of art-creative communication for students and teachers

For young people (adolescents) it is important to create a relationship with the creative activity. "The creative process is a specific process of thinking in which one discovers a new way of dealing with it has not already general or individual unresolved problem" [9]. Formation of the active centers of the brain helps young people to more easily adapt to the adult world access to critical information such as media handling.

Art is a tool of communication, helping us to build our own emotions and subsequently reflect, gives the atypical form of communication through emotion, working with human intimacy, which leaves stand out experience and conscious being. Each "viewer translates emotions do their own work of art"[8]. Art assist to communication even if fall verbal attempts failed. Social networking through the arts helps to develop creativity to earn the tools with which young people face the contemporary world which would provide an opportunity to communications themselves and other like surroundings. The secondary should be able to learn to reflect on their own feelings changed his mind.



Communication arts, specifically communication work of art is perceived differently Kulka [3], or Šicková-Fabrizi [8]. Students express their thoughts and emotions by artistic communication, the teacher or therapist will interpret later. The communication of art work interacts on the both sides, so we gave her the name of artistic-creative communication. It combines elements of art, creative intervention and unusual way of communicating. Teachers will learn how to create joint work with their students and never restrict will the formation of pupils/students. This type of non-verbal communication level fosters mutual understanding, enhances non-verbal communication. Verbal communication is not absent, but it is shifted into the background. Joint programming is also possible with a larger group of students, allowing it to also assist in creating a friendly team of any other group work. Teachers help establish open and effective communication, which exceeds the timelines lesson.

#### 4. Results

Research has shown that joint can really free up the communication between teachers and students to open a new field for experimenting with painting techniques and get rid of the fear of creation. Students are no longer afraid of art and its critics. Communication between teachers and students stopped being an issue. The relationship of both is more open and widened.

Similar results in communication are shown by the involvement of several students. Micro-climate in the classroom enhances and improves the ability of students to work on joint projects. In the longer observation also it demonstrated the ability to influence the perception of abstract works. Attitude of students towards the creation of the result can be a good foundation for the improvement of their perception of contemporary art. Students who did not have a relationship to the modern expression, previously demonstrated in contact with an abstract self-development of better responsiveness and understanding for modern and contemporary art consequently.

##### 4.1 Results from interviews

From damage, most of the students were exposed to fear from production, largely due to the presence of a teacher. Very often occurs a fear of creation and its outcome. It turned out that the teacher consciously or unconsciously students act as a brake component. Particularly introverted students should begin creating a problem. Some were afraid to make mistakes so great that before the creation of extended interview about 10 minutes. Students were very afraid of making mistakes, even if the teacher had a good relationship. Students were very afraid of making mistakes.

In fact, when teacher had a good relationship with student, it pointed to the substantial difference in approach between introverts and extroverts. From interviews after the formation of the students to have a mild euphoria of his own creation as the greater the need to reflect the feelings of the process. Communication was through the creation of a more open and even with extroverts.

##### 4.2 Result from making process

At the beginning of creation it was for all students is considerable uncertainty first step. Extrovert students were released after three to five minutes; introverted students relax after ten minutes of work, reflected, highlighting gestures broader choice of colors and a comfortable position. Introverts students ranged known techniques, while the extrovert wanted to experiment more. Students in the course of formation verify whether management practices (although in the beginning it was explained that is not bad way to work). In the first part all the more recognized as a major area of access security. In the second part of policy making it has been spontaneous and for all students appeared greater need for verbal communication and reasoning about their feelings. In addition to the student were all positively surprised by the results.

##### 4.3 Results from Analysis of the products of artistic-creative communications

Older students ranged over more geometric shapes, a bit younger for amorphous and figurative themes, which officially certify within their means. A special feature will keep the folding of the main elements in the composition of the golden section. This phenomenon is sometimes lost under another painting, sometimes maintained.



Picture 2: Results artistic-creative communications

In the final stages of design they were often disrupted the original shapes. Often, streaks of colors. The surprise was that students carrying dark color clothes help elected a strong color scheme. The abstract works from the students was very low before. Based on the results is a clear shift

thanks to the joint creation of the work. They created a very interesting and very different abstract painting. Remarkably, none of the works was pronounced not appear handwriting teacher or style of his work outside the school environment.

## 5. Conclusion

Current world youth confronts a number of new challenges that limit their development. Company, education or react quickly to changes taking place in today's world and to respond to problems. The gap between the world of adults and children is expanding and adolescents are faced with major obstacles to overcome this gap. The problem is not only fear of adult (particularly in our area of high unemployment and thus uncertainty), but also a loss of communication with adults. In this age where communication is so important to us young person enters a teacher has only limited time available (due to overloading of the curriculum in schools) to build a full-fledged relations with students. Artistic-creative communications is deemed compliant supplement to at least partially restore communication between teachers and students and to help students process their emotions and easier to navigation going through a difficult period of adolescence. The image now has many features that we are at the beginning of postmodernism classified as protracted problems that are now firmly rooted in society, becoming an integral part. Overgrown young people in this society are constantly confronted with the image of the world that does not match their ideals. Growing so disregard faces several problems of the world, the artist's. Young people go through a difficult journey anesthetizing the role of "adults", and nothing else offers them sufficient resources to reflect today's world and live full lives (the meaning of life, the joy of living).

Communication arts may begin towards the development of a fully-fledged verbal communication, especially if the teachers are active element in this notice. Achieving the objectives of the educational process depends on effective communication between both sides. Given that teachers and students "to use another language" (in the context of the importance of the social environment and life experiences), to consider art as a possible means balancing communication with significant potential for mutual understanding, although the non-verbal level.

## References

- [1] Bartko, O.; Fila, R.; Reištetterová, Z., *Výtvarná příprava*, Bratislava, SNP, 1985
- [2] Eriksen, T.H., *Tyranie okamžiku*, Praha, Doplněk, 2006. ISBN 80-7239-185-2
- [3] Kulka, J., *Psychologie umění*, Praha, Grada, 2008, 186-229 p. ISBN 978-80-247-2329-7
- [4] Kulka, T., *Umění a gýč*, Praha, Torst, 2009
- [5] Labáth, V., *Riziková mládež*, Bratislava, SLON, 2001, ISBN 80-85850-66-4
- [6] Lipovetsky, G., *Éra prázdnoty*, Praha, Prostor, 2003, ISBN 80-7260-085-0
- [7] Rajský, A., *Nihilistický context kultivácie mladého človeka*, Trnava, TYPY, 2009, ISBN 978-80-8082-297-2
- [8] Šickova-Fabrici, J., *Základy arteterapie*, Praha, Portál, 2002, 30 p. ISBN 80-7178-616-0
- [9] Štofko, M., *Psychodidaktika procesuálnej výtvarnej výchovy*, Bratislava, VEDA, 2010, 32 p. ISBN
- [10] Turček, K., *Psychopatologické a sociálno-patologické prejavy detí a mládeže*, Bratislava, IRIS, 2003, 29 p. ISBN 80-88778-99-9
- [11] Vančát, J., *Tvorivost a obraznost ve školním vzdělávacím program*, Praha, MAC, 2008, ISBN 978-80-86783-31-4
- [12] Vančát, J., *Tvorba vizuálního zobrazení- Gnozeologický a komunikační aspekt výtvarného umění ve výtvarné výchově*, Praha, Karolinum, 2000, 23 p. ISBN 80-7184-965-8
- [13] Vaněk, J., *Estetika myslenia a tela*, Bratislava, IRIS, 1999, ISBN 80-88778-80-8
- [14] Vašutova, Mária, *Pedagogické problémy dětství a dospívání*, Ostrava, Repronis, 2005, ISBN 80-7042-691-8
- [15] Virilio, P., *Stroj videnia*, Bratislava, SFU, 2002, ISBN 80-85187-31-0
- [16] Vojtová, Z., *Poradenské zručnosti pre práce s adolescentmi*, Bratislava, Metodicko-pedagogické centrum, 2012, 10 p. ISBN 978-80-8052-406-7

## INTER-GENERATIONAL LEARNING AND INTER-GENERATIONAL READING

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**Abstract:** *The paper deals with the topic of inter-generational learning, mainly aimed at inter-generational reading. At first the basic terminology is explained and then both concepts and their interconnection are clarified. The paper is focused on particular manifestations of inter-generational learning which are illustrated through specific examples, reflecting the Czech situation. The conclusion of the paper brings the reflection of new options and relations of the Czech interpretation of inter-generational learning and reading, as a support for the inter-generational educational aspect in the society.*

**Keywords:** *Inter-generational learning, inter-generational reading, curriculum, reading strategies*

### 1. Introduction

Man is a social animal, living in communities. The most common social group is the family, as the basic social unit. Society, however, is made up of individuals of different ages, which we can refer to as generations. Mutual interaction of different age groups provides natural inter-generational relationships. Across these age gaps, mutual inter-generational contact can influence our learning about the world and ourselves, we can transfer fundamental knowledge, skills, attitudes, and values in both directions. We distinguish the transmission downwards (elder to younger, and vice versa, younger to older). Social historical context shows that people learn in different environments, and with different intensity, both formally and informally. Inter-generational learning takes place in different settings and contexts, e.g. in the family, at school, at work, during leisure activities, by accident, and deliberately. Inter-generational learning is a natural process, and at the same time a phenomenon. It is a transfer of model behaviours and perceptions, discovered structures, verbal and nonverbal patterns. Inter-generational learning addresses multiple disciplines, because it is a borderline discipline, on the border of adult education, social gerontology, as well as pedagogy, sociology, and psychology. Communication and its forms, e.g. reading and reading strategies, writing, narration across age gaps is a basic form of inter-generational learning and education.

### 2. Definition of basic concepts

The art of reading and understanding the text belongs among the social and cultural manifestations of advanced civilized man.

#### 2.1 Functional literacy

Skills for the implementation of various human activities necessary for life in contemporary civilization. It's literacy in the field of literary work, documentary, and numerical, for examples, the ability not only to read, but also to

understand complex texts, fill in forms, to understand graphs, tables, etc. [2].

A related skill is to read text not only technically, but also functionally (in view of certain communication situations in daily life).

#### 2.2 Life-long learning

One characteristic of life-long learning is learning-activity in various activities throughout the life of an individual, with responsibility, and appealing to the development of knowledge, but also skills. One learns all one's life, wants to improve, to connect theoretical knowledge with practical skills. One wants to succeed in society, both socially and professionally. in all phases of life-long learning.

#### 2.3 Inter-generational learning and inter-generational education

In the inter-generational learning process, contact with individuals across different age groups (generations), between generations, with different people in different environments (in the family, between children, parents, and grandparents, as well as school teachers and other school staff and pupils, in the work process in respect of the boss and employees, as well as in relationships with younger and older, and vice versa, is very important. In this type of teaching, we distinguish between intentional and unintentional, conscious and unconscious, non-formal and informal. If we talk about education between generations, it is important to create a stimulating, motivating, work environment which, thanks to set conditions, is suitable for both sides of the generation dispersion. Creating a mutual atmosphere of confidence, full of mutual respect and a sense that both sides benefit, not only from the inter-active exchange of views, arguments, and the discussion of the benefits of the active inter-generational process. Youth and the older generations need each other and respect each other, in terms of the life-long need for the concept of inter-generational learning as a multidimensional set of diverse cognitive activities. The



concept can be understood as *“a set of theory, research, and the application of knowledge and activities that are aimed at creating benefits of inter-generational interaction. It is a meeting and exchange between people from different generations.”* [3]

### 3. Inter-generational reading

In the process of the inter-generational learning children, the youth and the adults gain certain skills, knowledge, attitudes, cultural expressions, habits – they create cultural footprint and tradition which is the mirror of every-day activities and experience. In inter-generational learning (e.g. in a form of reading) we perceive a specific socially important intention, as well as the spontaneity, and thus the elements of dynamics and society stabilization. Inter-generational reading is a manifestation of the verbal cognitive as well as the social education which is the part of the forms of the lifelong education, where particular reading strategies have a formal and informal form. Inter-generational reading is interactive among consecutive generations (a child- a parent), then between generations further from each other (e.g. a grandchild – a grandparent). It is estimated that inter-generational reading appears in families where a reading pattern has been formed. The child as a recipient listens to the information, learns to pay attention, creates a hierarchy of key information according to the age and individual needs, analyses, evaluates, accepts or rejects the utility of data where besides others the educator's knowledge is reflected. We can meet inter-generational reading in pre-school and school institutions. The child's personality is developed already in pre-school age. At this time the need and motivation to learn is developed, where the development of various literacies is the integral part, thus the readers literacy too, which is placed in the valid pre-school and further school curriculum. Many surveys of reading skill show the necessity of the complex view of the readers' strategies development across all development stages of an individual in the childhood, the youth and the adulthood too. It is apparent from the international surveys that the immature reading literacy leads to learning problems and further to difficulties connected with the employment at the labour market (then we speak about the functional illiteracy). Achieving the lower level of education is linked to problems with the employment in society.

In economically and socially developed countries there are foundations for lifelong learning laid already in pre-school education, which is evident in the results in PIRLS and PISA tests.[5] Reading skills open basic relations in and outside the family, towards the future development of a child. Authors define the possibility to increase the future learning efficiency of a child, e.g. children attending the nursery and other pre-school facilities achieve significantly higher results in the international surveys mentioned above, which focused on the level of reading literacy, and these children reach the university degree more often.

Despite the fact that the pre-school facilities (as the natural social environment of peers) cannot fully cover for the family background, the interactive cooperation of a family and school (e.g. by visiting libraries together or doing

some other activities) develop in a complex way the needs and skills of children, their personality focusing on an ongoing education. Teachers in pre-school facilities are aware of the reading literacy, active or passive, being a first stage of the general literacy and thus they develop reading competences in children in various educational activities (work with pictures, board books, word games, reading books aloud, telling and re-telling real or fictional stories, in role playing, work with songs and drawings, language and word games), very often due to their professional attitude they substitute the major gaps in Framework Educational Programme for Pre-school Education (Rámcový vzdělávací program pro předškolní vzdělávání, RVP PV, 2004). This curriculum document does not include the characteristics of skills preceding the reading. The reading literacy is the pre-stage to the general literacy. We learn the skill to read, it is not natural to us. In the civilized society we head to the reciprocal understanding through the reciprocal interaction, information processing (which requires the ability to read and write well and to comprehend the text). We can assume that systematic education of reading and writing comes with the start of the school attendance.

In 2001 The National Program of Education Development – White Book (Národní program rozvoje vzdělání – Bílá kniha) was founded and this makes a complex concept of educational development in the Czech Republic. White Book and Law No. 561/2004 Coll. of Pre-school, primary, secondary and specialized tertiary and other types of education (O předškolním, základním, středním, vyšším odborném a jiném vzdělání) (school law) applies a new system of educational programmes and forming the two-level curriculum documents in the educational system: (national level – National program of education and framework educational programmes, and school level (in a form of school educational programmes which are processed by schools themselves according to the conditions of the particular school.)) [1]

Framework Educational Program for Primary Education (RVP ZV) is considered to be a key document specifying the demands of a state manifested in a form of objectives, content and expected outcomes in the primary education. It is so called a new qualitative approach to the primary education, its functions and key objectives of the school, the fundamental objective of which is supposed to be the equipment of all pupils with a set of so called “key competences”, being specified through the standards of the education results and considered to be the “set of knowledge, skills, attitudes and values essential for the personal development and employment of an individual in the society.” [4]

Inter-generational reading is a space and opportunity to learn something new, the opportunity to view the problem and to gain experience. It is a process of socialization in which the feelings of need, solidarity, sharing, understanding, respect, communication are developed – this is the assumption for transferring the fundamental social and cultural values, to deepen trust, respect and good relations among generations. School education of a reader is not an isolated process but opens possibilities to

cooperate due to the specified objectives in the valuable curriculum with specific educational agencies, companies, non-profit institutions, free time centres and libraries which arrange the cross-generational meetings and reading activities. Nowadays, more and more schools plan and organize the School Educational Programme and educational activities with so called generic (partner) reading and author reading. The wisdom and experience of the elderly is transferred in a natural verbal way to the young generation. Reading workshops, readers' meetings, authors reading appear, e.g. in the programme offer of Centre for family and social care, then in charity programmes such as Reading helps (Čtení pomáhá), Enjoyable holiday (Prima prázdniny), When a film helps (Když film pomáhá), Neither the teacher knows everything (Ani učitel neví všechno), Reading marathon 2015 (Maraton čtení 2015), Magic chair (Zázračné křeslo), Two worlds (Dva světy), Peaceful night in an asylum home (Klidné noci v azylovém domě), Swifts (Rorýsi), Where the life is in danger (Kde jde o život), Water is not for granted (Voda není samozřejmost), in the programme Drop of hope (Kapka naděje). Inter-generational reading is also dealt with in educational programmes of some universities (Mendel University, University of Ostrava).

#### 4. Examples of inter-generational reading in practice

The Primary School in Šumperk, 8<sup>th</sup> May Street 63, held a inter-generational programme called Journey through a century (Cesta staletím) as a part of the school anniversary. The event was attended by pupils from the sixth and seventh classes (3 pupils from each class, 12 pupils altogether) representing today's readers' generation and teachers (pensioners) representing the old generation of readers. The audience was composed of pupils from the sixth and seventh classes, 10 pupils from each class, 40 listeners altogether. Part of the inter-generational reading from favourite books of the participants was also a survey of books popularity (it was realized in interviews with the question "What is your favourite book?") It was found out that there are two books forming a link between both generations of readers (Defoe, D. Robinson Crusoe; Dumas, A. Three musketeers).

Connecting the international projects *Krokus* (planting yellow flowers in the school garden to pay tribute to victims of the Holocaust) and *Day of poetry*, the Secondary vocational school of pedagogy Ostrava-Vítkovice is trying to involve in the project Reading helps – Give a help by reading (Čtení pomáhá – Pomáhej tím, že si čteš). The pupils compete in recitation, in literary work, in creating sheets and book illustration, in making videos and photos of literature linked to the Jewish topic, in the meetings with witnesses (former students who survived the Holocaust) with the topic "The stream of fragility and media".

Ostrava University supports cross-generation reading too and on 7<sup>th</sup> October 2015 held Happening called "We are University of Ostrava", which is a mini-festival with the name "Reading for university and town" (ČUM aneb Čtení pro univerzitu a město). Professional and literature-related public, university students and others listened to authors reading by M. Viewegh and M. Reiner. Then the participants made a journey to four places in Ostrava centre

where further cultural programmes with multi-generation meetings took place (e.g. reading of the dean and university lecturers, author recital by poet P. Hruška, a recital of song texts by J. Neduha and reading from drama scripts by J. Klimszy, Nekvasil and others. Despite the age and genre, all activities mentioned above can be called inter-generational reading, i.e. literary genre according to the age.

#### 5. Conclusion

At the present time the society realise increasingly the importance of danger of discrimination of age. A mutual approximation of generations through lifelong education is happening in common educational activities. Reading strategies belong to successful strategies. Reading is a lifelong process, a right and a need and belongs to the elementary characteristics of state educational policy and curriculum.

Through reading an individual is motivated to various activities and it creates the pro-learning culture which is the foundation for the pro-learning society, and an open share reciprocal model of inter-generational learning can be developed. Inter-generational reading is both a voluntary and organized way to inter-generational learning.

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#### References

- [1] MŠMT, *Upravený rámcový vzdělávací program pro základní vzdělávání platný od 1.9.2013*, Praha, MŠMT, <http://www.msmt.cz/vzdelavani/upraveny-ramcovy-vzdelavaci-program-pro-zakladni-vzdelavani>
- [2] Průcha, J. et al., *Pedagogická encyklopedie*, Praha, Portál, s.r.o., 2009, 67 P.
- [3] Sanchéz, M., *Journal of intergenerational studies*, Challenges to Intergenerational Studies [online], 2006, pp. 2, 107–110, [http://dx.doi.org/10.1300/J194v04n02\\_09](http://dx.doi.org/10.1300/J194v04n02_09)
- [4] Švrčková, M., *Kvalita počáteční čtenářské gramotnosti. Výzkumná analýza a popis soudobého stavu*. 1. vydání, Ostrava, Ostravská univerzita v Ostravě, 2011, 243 P.
- [5] Ústav pro informace ve vzdělávání, *Měření vědomostí a dovedností: nová koncepce hodnocení žáků*, Praha, Ústav pro informace ve vzdělávání, 1999, 76 P, [http://www.csicr.cz/getattachment/cz/O-nas/Mezinarodni-setreni-archiv/PISA/PISA-2000/Mereni-vedomosti-a-dovednosti-publikace.pdf\[2013-11-23\]](http://www.csicr.cz/getattachment/cz/O-nas/Mezinarodni-setreni-archiv/PISA/PISA-2000/Mereni-vedomosti-a-dovednosti-publikace.pdf[2013-11-23])

## “THE SCHOOL” AND “THE SCHOOL OF LIFE” –PEDAGOGICAL ANALYSIS OF POLISH TV DOCU-SOAPS ABOUT MODERN TEENAGERS

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**Abstract:** *The aim of this article is to present the pedagogical analysis of two Polish documentary soaps: “The School” and “The school of life”. The first is broadcasted in the commercial TV – TVN, and the second one was broadcasted in TVP 2, which is belonged to the public concern. The pedagogical analysis contains a brief characteristics of formal parts of these programs, their contents and the evaluation of artistic and pedagogical areas. The analysis is preceded by the description of television programs which were addressed to young people and which are not broadcasted now. This part of the article was prepared to highlight the differences between the television programs about and for teenagers in the ten years ago and today.*

**Keywords:** *documentary soaps, teenager, television, TV-programs*

### 1. Introduction

In Poland, in the past almost every Sundays’ morning, at home where lived a teenager, began with the crowing of rooster who was proclaiming the beginning of “Teleranek” (“TV-morning”[1])– program for children and teenagers. It presented a lot of interesting things for young, like for example: science, sports, fun, interesting hobbies, *et cetera*. It connected information and entertainment [2]. Moreover, it was one of the oldest TV-program for young viewers in Poland. In addition to this, Polish public television broadcaster prepared for adolescents also others TV-programs like for example: “Szalone liczby”, “Tik-Tak”, “Krzyżówka Trzynastolatków”, “Poziom 2.0”, “5-10-15” or “Rower Błazeja”. But since 2005 the number of TV-programs for teenagers has been falling. Moreover, these TV-programs which now are broadcasting are not so good for young.

### 2. Some of TV-programs for teenagers which were broadcast by Polish public television concern before 2015

Before the author presents and evaluates some of the TV-programs for younger viewers which are broadcasting in television now, it will be presented a brief characteristic of TV-programs which are no longer available in TV schedule. This could help to notice and understand the difference between the new and the old Polish TV-programs for teenagers.

The first and probably the most marked by history TV-program for teenagers was “Teleranek”. In 13<sup>th</sup> of December 1981 gen. Wojciech Jaruzelski imposed martial law. In that morning the Polish teenagers and children did not see “Teleranek”. Everyone who lived in those days, remember that event. But going back to the TV-program - it was created in early seventies. The broadcasting started in 1972 in TVP 1. The authors of it was Maciej Zimiński and Joanna Koenig [3]. Despite the fact that the program over the years has evolved and changed, the formula of the introduction was always the same – the rooster always crowed. This symbol was created in Studio of Film Miniature in Warsaw and was initially black and white [4].

According to the study which were conducted in 1997 by the Public Opinion Research Centre (OBOP) in Poland the symbol of the rooster (and the time and day of the week) was most strongly identified with the program through its viewers [5]. Importantly, this TV-program from the beginning was prepared by young (of course under the supervision of adults) and for young. Many of Polish TV-presenters made their debut in this program. For example, Włodzimierz Szaranowicz is now one of the famous sports commentators of Polish television. In regard to the research which were presented earlier, it should be emphasized that in the opinion of the respondents “Teleranek” is a TV-program with a different theme each week, representing diverse topics in an extended way, allowing viewers to acquiring new knowledge, as well as helping the recipient to carry out the tasks of school and life [6]. The program was taken off from the air in 2009 despite of its cognitive and educational values. Even the Polish Children's Ombudsman [7] tried to asked the Polish Television to not stop broadcasting “Teleranek”, but it did not help.

The other TV-program, which were willingly watching by children and teenagers, and which were also young presenters was “5-10-15”. It was created in early eighties. Firstly, it was broadcasted in TVP2, then in TVP1. The character of it was similar to the its “older brother”. It was a TV-magazine, which gave some information and entertainment for children and teenagers. Its editor was Bożena Walter [8]. The program consisted of such elements as for example: “Omnibus”, “School Hit Parade”, “People like Bruce Lee”, “What was he doing when he was 5. 10. 15?”, “Shortpress”, “Do otter win?” [9].

The program was presented by for example: Marcin Tyszcza (now he is a famous fashion photographer), Krzysztof Ibisz (now he is one of the most popular TV-presenter in Polish televion), Piotr Kraśko (now he is an editorial director of “Wiadomości” in TVP1), Maria Niklińska (now she is a Polish actress), Justyna Pochanke (now she is a journalist, presenter of „The Facts” in TVN) [10]. “5-10-15” program was stopped broadcast between July and August 2007. The decision was made by the

director of TVP SA Małgorzata Raczyńska. It was caused by the low level of audience (in 2007 it was 780,000 viewers, while in 2006 1 240 000 viewers). In autumn the program was replaced by one of the American television series entitled "Seventh Heaven"[11].

For a little older audience, Polish Public TV prepared another program, which also was interesting. "Rower Błężeja" was broadcast for seven years (1997-2002), so much shorter than these two which were presented above. The broadcasting time of this program was different from "Teleranek" and "5-10-15". Viewers could watch it not in the morning weekends, but in the afternoon weekdays. A significant difference were also the subjects which were presented in the program. Sometimes the topics were highly controversial and did not match to a Public Television program. These topics were connected with for example: bisexuality and the methods of birth control [12]. In program also were presented other topics which were enriched by talking with experts, the young journalist relations, chat with the viewers and also some contest. The program was broadcast live, the audience participated in it. The interesting data about "Rower Błężeja" are presented in the qualitative research report conducted by the Public Opinion Research Centre carried out in 1999. This TV-program were watching by older adolescents, as well as students. This research suggests, that the program was marked by the culture of "skaters", connected with hip-hop music, which is characterized by loose, unconventional, freedom, which was often criticized by the respondents. In fact it gave the impression of chaos and something unreal, even fake. The respondents also said that the presenters of the program, was too much controlled by directors, which had destroyed their youth naturalness. They expected the broadest possible approach on the topic, not superficial and one-sided view. The respondents emphasized that the strongest element of the program was the music [13]. "Rower Błężej" was connected a little bit with "skaters" culture. Perhaps with the weakening of this type of subculture, the program lost the audience. Undoubtedly, for seven years it was a one of the main points of television schedule for teenagers.

### 3. Polish TV-programs for teenagers – the current situation

As it was said since 2005 the number of Polish TV-programs for adolescents has been falling. It has to be said that now, in October 2015 in Polish TV-schedule are any educational program for teenagers. Even "The school of life" (which could be, in some aspects, considered as a educational) has not been broadcast any longer. After coming home from schools Polish teenagers can watch many different documentary soaps like: "Why me?", "The hospital", "The jars", "The hidden truth" which are broadcast by the commercial broadcasters and are not good for young viewers. The exception is the "Scientist News" in TVP 1, but this program is for everybody, not only for adolescents.

## 4. "The school" and "The school of life" - pedagogical analysis

### 4.1 Formal details

In February 2015 Polish television broadcasters offered their viewers two types of docu-soaps for teenagers, which action took place in Polish schools. These are "The School" and "The school of life". The first one was broadcast in TVN in workdays at 3 pm o'clock and the second one in TVP2 also in workdays, but on 2.40 pm. The descriptions of both productions says that the productions represent contemporary problems that arise in the life of students from junior high school and high school. The characteristic of the program which is broadcast by TVN specifies that this series "opens the door to a world of available hard youth", presents the stories from life and also, presents real heroes. The aim is to make the viewers think about this.

Both productions are for 12 years old and older viewers [14], due to the fact that there often appear offensive expressions, scenes of violence and scenes related to sexuality (which will be confusing for younger viewers) and other negative behaviors presented in an attractive form.

### 4.2. Contents

Each of the episodes of both series lasts 40 minutes. After a short introduction making by the reader, it is presented the topic of an episode - the sequence of events that will take place and the characters, which in a minute will be announced closer. Then is presented a short jingle and the viewer can one more time hear the voice of the reader – its informed where the action takes place. The main character is shown in a bit more. In subsequent scenes can no longer hear the voice narration. It only interrupts the individual parts of the series, in the moments when for example, it is changing the place of action and in the end of the episode. Each presented scene is commented by the characters appearing on the screen. Comments last from a few to several seconds. The character is shown in a medium shot in front of the camera. On the TV-beam it is shown some information like: name, time, age of the character and summary sentence, like for example: *Slawek, 16 years old. He broke down because the girl had betrayed him.* In some episodes, depending on the subject of the section, appears other characters too, like teachers, parents, doctors or nurses, *et cetera*.

The topics of the episodes are really varied. The 48 sections of "The school of life" and 77 of "The School" shown issues connected with: alcohol and other drugs among adolescents, immigration, disabilities, relationships with parents, sexual initiation, anorexia, physical and psychical violence in relationships, peer violence, the main provisions of the law, gossips, unwanted pregnancies, complexes, poverty, competition, gambling ... and many others. In "The School" the viewer always observes two situations, but "The school of life" is focused only on one problem.

It should be emphasized that each episode of "The school of life" is finished by a psychology comment and some statistic connected with the problem. Moreover, the

authors of this program give their viewers some information about where and how they can resolve their problems which are likely to this from the episode. "The School" ends only a short comment by the reader and preview of what will happen in the next episode.

#### 4.3. Evaluation of artistic-technical side of this programs

Both series have short and simple introductions and endings. They consist on some scenes from the first episodes. In the introduction of "The school of life" the reader says to the viewer. It highlights that modern adolescents have many problems with find themselves in everyday life and asks parents – "Do you really know your child?". The second program is started with a rock song with the words: *Let's do it ourselves; you know everything about me. Forward let's step, don't stop. The fun can continue after dawn, probably you want this. Be a friend, not someone who turns away.* Besides the introduction, the music does not play a big role, the viewers can hear it basically just at the beginning and the end of the program. Also complements the expression of the narrator (in "The school of life") during scratching the chronology of events and changes in time and place of action.

In both productions play actors – amateurs [15], [16], what sometimes causes that the characters are more comic than real. Some of the statements and the creation of "acting" become a source to make many memes or virals in the internet.

Probably the whole episodes are making with only one camera, which is all time in motion. The camera follows these people who is talking or doing something important (eg. go away briskly after an argument). It looks a little amateurish. Static scenes appear only in case of comments on the situation uttered by the character.

The dialogs between characters are often short and very dynamic. They are full of colloquial speech and vulgarism. Actors – amateurs do not pay attention to the correct pronunciation and accent, what is very non-educational.

#### 4.4 The pedagogical assesment

"The School" and "The school of life" are broadcast in the afternoon workdays. These are examples of docu-soaps which are very popular now and which are watched by students after school. Most of these programs, what is very interesting, are not very directed (!). As is apparent from the records that can be found on various websites, the actors – amateurs instead of the screenplay receive guidance of what in the scene they have to say, the rest is up to them. Giving this information, it must be admitted that the level of conversation among those appearing on the screen and representing our society is very low. There are a lot of linguistic errors, syntax, and others that can start to be used in the language used by the viewers.

Apart from the low level of the dialogues, behavior of the characters is also not good. In many episodes are acts of aggression in relation to different people like teachers, parents, siblings, vulnerable people, *et cetera*. According to the theory of social learning by A. Bandura, observing such a behaviors can be encouraged to repeat them (Social

Learning Theory). It happens that in the programs like these appears in different areas some specific knowledge, but their number is negligible compared to the number of episodes which already have been produced.

Both documentary soaps are similarly constructed, they touch similar problems. An important difference between them is a summary of the episode. In the end of "The school of life" a psychologist summarizes the action. Moreover, there always is an information regarding to the statistics (*Do you know that...?*) which can be helpful for this viewer who has similar problem, that it is not unusual in our society. This procedure (giving some statistics) is popular in the psychological therapy. It could help to tame client to owned the problem, encourage to talk about it and find an appropriate solution. In "The School" the reader summarizes shortly the episode and it is not very educational or even helpful for teenagers who have similar problems. He tells about the final unfolding of events and informs about what is going to happen in the next episode. The series produced by commercial TV-station based of sensation, something unusual and do not indicate the sources of potential aid. In "The school of life" the viewer, who notice that not only him or her has some difficulties, can begin to seek help. So presenting some tables for the end of the episodes could be very important for young viewers and their parents or families [17], [18].

#### 5. Conclusions

Both series „The School“ and „The school of life“ can try to fulfill some educational functions. However, it is rather difficult. Some adolescents who are watching this type of programs say that they would rather treat this programs as good, afterschool entertainment, rather than the stimulus which can help to noticed and solve some problems from theirs everyday life. These series may be rather a starting point for a discussion in the classroom with teacher or school psychologist.

Parents or grandparents, who also are watching these programs can open their eyes to the fact that in Polish schools teenagers have some difficult situations. Perhaps people who are more aware of that can see the problems of their children and pay attention to it.

These productions do not present good part of Polish schools. It shows only problems which sometimes seem completely implausible. But the authors of the scenarios said that the ideas for the episodes gives always the life. It is a pity that the authors of TV-programs do not try to show good practice, as it was in the past when the viewers could see in TV-programs for examples: youth scientists, artists or athletes who are the examples of the effort and hard work pays off.

#### References

- [1] The footnote of the author.
- [2] <http://www.tvp.pl/dla-dzieci/teleranek/o-programie>.
- [3] Sosnowska, J. *Polskie telewizyjne programy edukacyjne dla dzieci i młodzieży – zarys historyczny*. [w:] A. Roguska (red.). *Media w edukacji. Wymiar kulturowy i aksjologiczny*. Siedlce: Fundacja na rzecz dzieci i młodzieży „Szansa”, 2013, s. 154.

- [4] <http://www.tvp.pl/dla-dzieci/teleranek/o-programie>,  
(<http://www.tvp.pl/dla-dzieci/teleranek/o-kogucie>)
- [5] OBOP (1997). *Odbiór programu „Teleranek” (Badania jakościowe)*. [http://tnsglobal.pl/archiv\\_files/M.1438c.pdf](http://tnsglobal.pl/archiv_files/M.1438c.pdf).
- [6] OBOP (1997). *Odbiór programu „Teleranek” (Badania jakościowe)*. [http://tnsglobal.pl/archiv\\_files/M.1438c.pdf](http://tnsglobal.pl/archiv_files/M.1438c.pdf).
- [7] The letter to the Chairman of the Board of Polish Public Broadcaster TVP S.A. from 25.02.2010. Source: [http://brpd.gov.pl/sites/default/files/rpd\\_stare/wystapienia/wyst\\_2010\\_02\\_25.pdf](http://brpd.gov.pl/sites/default/files/rpd_stare/wystapienia/wyst_2010_02_25.pdf).
- [8] <http://www.nostalgia.pl/5-10-15>.
- [9] Sosnowska, J. *Polskie telewizyjne programy edukacyjne dla dzieci i młodzieży – zarys historyczny*. [w:] A. Roguska (red.). *Media w edukacji. Wymiar kulturowy i aksjologiczny*. Siedlce: Fundacja na rzecz dzieci i młodzieży „Szansa”, 2013, s. 160.
- [10] <http://kobieta.onet.pl/dziecko/plotki/pamietacie-5-10-15-zobaczcie-gwiazdy-ktore-zaczynaly-w-tym-programie/9e297>.
- [11] <http://wiadomosci.dziennik.pl/wydarzenia/artykuly/219348,telewizyjna-jedynka-nie-pokaze-juz-5-10-15.html>.
- [12] <http://www.wirtualnemedial.pl/artykul/kontrowersyjny-rower-blazeja-w-tvp-1#>.
- [13] [http://tnsglobal.pl/archiv\\_files/M.1590.pdf](http://tnsglobal.pl/archiv_files/M.1590.pdf).
- [14] Dziennik Ustaw 2005 nr 130 poz. 1089.
- [15] <http://szkola.tvn.pl/aktualnosci,2735,n/chcesz-wystapic-w-szkole,144400.html>.
- [16] <http://olx.pl/oferta/casting-do-serialu-szkola-CID4-ID7qBed.html>.
- [17] “The school of life”: <http://vod.pl/szkola-zycia-serial>.
- [18] “The School”: <http://player.pl/serie-online/szkola-odcinki,2395/>.

## VALIDITY AND RELIABILITY OF SINGLE-ITEM SELF-REPORT MEASURES OF GENERAL QUALITY OF LIFE, GENERAL HEALTH AND SLEEP QUALITY

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**Abstract:** Different aspects of quality of life are important variables in the study of wellbeing and psychosocial functioning. For that reason, measurement of quality of life is indispensable in any researches related to health or wellbeing, which are often large scale surveys, frequently including repeated measurements. Hence, valid and easily applied measures are essential. Self-report questionnaires of different aspects of quality of life are often lengthy, which may result in a substantial burden to participants and a threat to the validity of measurement due to the effects of fatigue. To overcome these difficulties validity and reliability of single-item, self-report measures of general quality of life, general health and sleep quality were examined in a sample of 1451 university students. These three measures were administered in a subsample of 135 students on two occasions with three weeks interval between them. Intraclass correlation coefficients (ICC) for test-retest reliability were mostly high and all were satisfying, .86 for general quality of life, .72 for general health and .81 for sleep quality. All measures were related in predictable ways to perceived stress, depressiveness, anxiety, loneliness and daily hours of sleep. The study provides evidence for the validity and reliability of these single-item measures. These scales are potentially convenient measures of general quality of life, general health and sleep quality in large surveys.

**Keywords:** reliability, health, quality of life, single-item scale, sleep

### 1. Introduction

Quality of life is one of the most important variables in the study of the overall mental wellbeing. Usually it is associated with health, success in personal life, self-esteem, satisfactory social contacts, and the ability to cope with difficult situations [1]. For example, in medicine, epidemiological measures used so far became insufficient to assess a more complete picture of many illnesses. Therefore, the quality of life assessment was introduced to medical science, and it is used among others to predict the consequences of many disorders [2].

Another factor which has a huge impact on physical and psychological health is the quality of sleep. It is particularly relevant to psychological wellbeing. Factors related to anxiety and stress are one of the most important concomitants of sleep complaints in general population [3]. There is some support for the relationship between measures of well-being and good sleep quality [4]. Studies examining sleep quality have found a positive relationship between good sleep quality and self-reported health [5].

Cognitive studies continue to show that physical condition affects the way people interpret their environment. That includes the way of thinking about their bodies as well. Health is a crucial area of life, so every precariousness about it can interrupt self-regulation of a person and turn into anxiety. Negative evaluation of one's own health often results in visiting a doctor. Subjective assessment of persons health is, next to physicians opinion, the most complete information about one's physical well-being.

Each of these dimensions of psychological wellbeing demand proper research tools which would not be time consuming, especially when surveying large numbers of people. The quality of life, general health and sleep quality are good predictors of various disorders. The information

about these aspects of wellbeing can be used in the prophylaxis.

Recently published study showed that different aspects of wellbeing may be also crucial variables in educational research. A newly established construct of study addiction shows that learning may be unhealthy [6], and consequently there is a need for short and convenient measures of quality of life, general health and quality of sleep in educational research. These studies often require large samples and encompass multitude of relevant variables including socioeconomic background, school or university environment, personality, cognitive functioning, different learning attitudes and behaviours, school or academic performance, and diverse measures of wellbeing and health [7, 8, 9, 10, 11, 12].

### 2. General quality of life

The quality of life is defined as an individual way of perceiving own position in life in the context of the culture and value systems in which people live and in relation to their goals, expectations, standards and concerns [13]. Researches show that quality of life could be an effective prognostic indicator of treatment success. For instance, patients with a good quality of life at the beginning of treatment benefit from it far more than those with a poorer baseline score [14]. Additionally, quality of life was negatively related to anxiety and depression, and it was found to be positively associated with social support [15, 16]. Studies also showed the relationship between physical, functional capacity and quality of life [17]. Moreover, stress plays a significant role in evaluating quality of life, explaining a significant amount of the variance of all of its aspects [18]. This characteristic of well-being is commonly measured by *The World Health Organization Quality of Life Questionnaire*, which is

especially used in a large epidemiological surveys, clinical settings and clinical trials [19]. In this context quality of life is reflected by its four domains: physical, psychological, social and environment. It is designed for use in a wide spectrum of psychological and physical disorders.

### 3. General health

Health can be understood as “a state of physical, mental, and social well-being and not merely the absence of disease or infirmity” [20]. Health status is related with many factors, including individual factors, living and working conditions, general socioeconomic, cultural and environmental conditions, and access to health care services [21]. It is important to examine people's general health because it detects a wide range of psychological disorders, including the anxiety/depression spectrum [22].

### 4. Sleep quality

Sleep quality represents a complex phenomenon, which includes quantitative aspects of sleep, such as sleep duration, sleep latency, or number of arousals, as well as more purely subjective aspects, such as “depth” or “restfulness” of sleep. Sleep quality, relative to sleep quantity, is better related to health, affect balance, satisfaction with life, and feelings of tension, depression, anger, and fatigue. Therefore it is postulated that health care professionals should focus on sleep quality in addition to sleep quantity in their efforts to understand the role of sleep in daily life [23]. Most anxiety disorders are moderately associated with reduced sleep quality [24]. There is also evidence of its relation with loneliness, for example in research conducted by Cacioppo and associates lonely, relative to non-lonely, participants were characterized by significantly lower subjective sleep quality [25]. Most common measure of sleep quality is *Pittsburgh Sleep Quality Index (PSQI)*, a 19-question self-report questionnaire that assesses the sleep quality over a one-month time frame.

### 5. Single-item scales

Single item scales are increasingly more often used, especially in large surveys, possibly including repeated measurements, in which there is necessity for controlling multitude of different variables. Frequently they prove to be reliable and valid tools. Slowly recommendations and guidelines on the usage of single-item measures are being developed [26]. Gradually, the use of ultra-brief scales becomes more common practice in health research [27, 28, 29], marketing research [30], and educational research [31]. Still, it has to be emphasized that not always single-item measures are best solution. In some contexts their performance is significantly inferior to multi-item questionnaires, e.g. in studies on sexual satisfaction and behaviors [32]. Consequently, it is highly recommended to thoughtfully think through advantages and disadvantages of the use of single-item measures in a specific research setting, following current data available on the subject.

One of the reasons which make single-item measures useful tools, which can be applied in statistical testing of complex models, is the fact that analysis of Likert response format data at the item level is statistically robust [33, 34]. Nevertheless, in cases in which single-item measures are used it is recommended to use more stringent alpha level in order to make cautious statistical decisions.

On the basis of previous theoretical frameworks and empirical research into quality of life, health and sleep, it is hypothesized that: (H1) quality of life, general health and sleep quality are negatively related to perceived stress, depressiveness, anxiety, and loneliness, and (H2) positively related to hours of sleep, especially sleep quality which is, relative to quality of life and general health, most strongly related to this variable.

### 6. Methods

**Participants.** A total of 1451 students from different universities in Pomerania Region in Poland took part in the study, 675 men (46.5%) and 751 women (51.5%), 25 (1.7%) persons did not report gender, with mean age of 21.75 years ( $SD = 3.11$ ). Students were from different faculties, courses of study, years and modes of study. One hundred thirty five participants took part in test-retest procedure, 87 females and 77 males, 5 persons did not report gender, with mean age years  $M = 21.17$ ,  $SD = 1.86$ .

**Measures.** Three single-item, self-report measures were developed on the basis of items from WHOQOL Bref scale [19]. Originally used 5-point response scales have been modified to 9-point response scales, in compliance with recommendations to use at least 7-point Likert format response data when conducting statistical analyses on single item measures [33]. General quality of life was measured by question: “How would you rate your quality of life?” with 9-point response scale, from 1 - “Very poor” to 9 - “Very good”. General health was measured by question: “How satisfied are you with your health?” with 9-point response scale, from 1 - “Very dissatisfied” to 9 - “Very satisfied”. Sleep quality was measured by question: “How satisfied are you with your sleep?” with 9-point response scale, from 1 - “very dissatisfied” to 9 - “Very satisfied”. Other measures were widely used valid and reliable scales adapted in Poland. Perceived stress was measured with *Perceived Stress Scale (PSS-4)*, a 4-item, 5-point Likert response format scale [35]. Depressiveness and anxiety were measured by *Hospital Anxiety and Depression Scale*, which includes 14 items with 4-point response format, seven items for anxiety and seven for depression [36]. Loneliness was measured by *Short Loneliness Scale*, which includes three items with 3-point response format [37].

**Procedure.** Data collection used opportunistic sampling. Students were invited to participate anonymously in the study during lectures or classes. More than 90% of all present students agreed to do so. Ninety one percent of participants filled in ‘paper and pencil’ questionnaires and nine percent of students completed online versions of the questionnaires. The study took place from 2013 to 2015. General quality of life, general health and sleep quality were measured on two occasions with three week interval



between them. Anonymous way of coding participants was applied in order to match responses from both measurement occasions. Participation in the study was anonymous and no monetary or other material rewards were offered to the participants.

Statistical analyses. Intraclass correlation coefficient (ICC) along with the 95% confidence interval (CI) was used as a measure of test-retest reliability [38, 39]. Means, standard deviations, percentages and correlation coefficients were calculated. All statistical analyses were conducted in IBM SPSS 22.

## 7. Results

The three measures were highly intercorrelated: correlation of general quality of life ( $M = 6.72$ ;  $SD = 1.36$ ) with general health ( $M = 5.88$ ;  $SD = 2.09$ ) was  $r = .40$ ,  $p < .001$ , and with quality of sleep ( $M = 5.55$ ;  $SD = 2.10$ ) it was  $r = .35$ ,  $p < .001$ . The correlation between general health and quality of sleep was  $r = .44$ ,  $p < .001$ . An intraclass correlation coefficient (ICC) of .86 (95% CI = .81-.90,  $p < .001$ ) was obtained for general quality of life, .72 (95% CI = .60-.80,  $p < .001$ ) for general health and .81 (95% CI = .74-.87,  $p < .001$ ) for sleep quality. These results on test-retest reliability correspond to previously reported coefficients measured in a smaller subsample [6]. Means, standard deviations and correlations of general quality of life, general health and quality of sleep with studied variables are presented in table 1.

*Table 1. Means, standard deviations and correlations of general quality of life, general health and quality of sleep with perceived stress, depressiveness, anxiety, loneliness and hours of sleep*

Scale	M (SD)	General quality of life	General health	Sleep quality
Perceived stress	10.53 (3.05)	-.39**	-.31**	-.31**
Depressiveness <sup>a</sup>	13.88 (4.13)	-.46**	-.33**	-.36**
Anxiety <sup>a</sup>	12.00 (3.88)	-.40**	-.36**	-.36**
Loneliness	4.60 (1.71)	-.37**	-.22**	-.22**
Hours of sleep	7.24 (1.67)	.09**	.06*	.29**

\* $p < .05$ ; \*\* $p < .01$

<sup>a</sup>Subsample of 1074 students, 481 men (44.8%) and 572 women (53.3%), 21 (2.0%) persons did not report gender, with mean age of 21.77 years ( $SD = 3.24$ ).

## 8. Conclusions

The study provided evidence for good test-retest reliability of single-item measures of quality of life, general health and sleep quality. The results suggest that subjective evaluations of quality of life and sleep tend to be more stable in time than subjective assessment of general health. The measures were moderately interrelated indicating that they share common variance but they are also independent to a significant degree.

The obtained data on concurrent validity also provided initial support for the construct validity of the measures.

All hypotheses were substantiated and the measures related in predictable ways to the indicators of wellbeing measured by widely used, valid and reliable psychometric tools. Quality of life, general health, and quality of sleep were negatively related to perceived stress, depressiveness, anxiety and loneliness, and they were positively related to daily hours of sleep. Sleep quality was significantly more strongly related to hours of sleep than quality of life and general health. These results also supported previous findings that quality and quantity of sleep are overlapping but different characteristics of sleep and researchers should not equate them.

The results provided support for the validity and reliability of the measures of quality of life, general health and sleep quality. These measures are very quick to fill and therefore low-burden and low-cost measurement options, and can be easily applied in large surveys when important aspects of wellbeing and quality of life have to be measured along with many other variables. They can prove to be convenient in studying relationships between constructs and controlling important variables in complex models. On the other hand, the scales are not useful in precise individual evaluation of quality of life, general health or sleep for the purposes of diagnosis or direct comparison between individuals. The biggest strengths of the study are large and heterogeneous sample of university students and the use of widely applied, valid and reliable psychometric tools for measuring different aspects of wellbeing and psychosocial functioning. The main limitation of the study is a lack of data on the convergent validity with widely used, valid and reliable measures of quality of life, general health or quality of sleep. The future studies should investigate this type of validity also using different methods of measurement, such as observation or experience sampling methodology. There is also need for data on discriminant validity, as well as predictive validity of these measures. Direct comparisons with multidimensional multi-item scales of quality of life, general health and sleep quality in terms of their predictive value will enable more adequate evaluation of the usefulness of these brief measures. Research on more representative samples is also necessary.

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## References

- [1] Kochman, D., Jakość życia. Analiza teoretyczna, *Zdrowie Publiczne*, Vol. 117, No. 2, pp. 242–248, 2007.
- [2] Papuć, E., *Current Problems of Psychiatry*, Vol. 12, No. 2, pp. 141–145, 2011.
- [3] Karacan, I., Thornby, J. I., Williams, R. L., Sleep disturbance: A community survey [In:] Guilleminault, C.,

and Lugaresi, E. (Eds.), *Sleep/Wake Disorders: Natural History, Epidemiology, and Long-Term Evolution*, New York, Raven Press, 1983, pp. 37-60.

[4] Fossey, E., Fitzpatrick, M. F., Douglas, N. J., Shapiro C. M., Interaction and classification of sleep and health risk [In:] Peter J. H., Penzel T., Podszus T., von Wichert P. (Eds.), *Sleep and Health Risk*, Berlin, Springer, 1991, pp. 174-179.

[5] Lugaresi, E., Cirignotta, F., Zucconi, M., Mondini, S., Lenzi, P. L., Coccagna, G., Good and poor sleepers: an epidemiological survey of the San Marino population [In:] Guilleminault C., Lugaresi E. (Eds.), *Sleep/wake disorders: natural history, epidemiology and long-term evolution*, New York, Raven Press, 1983, pp.13-28.

[6] Atroszko P. A., Andreassen C. S., Griffiths M. D., Pallesen S., Study addiction – A new area of psychological study: Conceptualization, assessment, and preliminary empirical findings, *Journal of Behavioral Addictions*, Vol. 4, No. 2, s. 75–84, 2015.

[7] Atroszko B., Atroszko P., Sytuacja materialna studentów, zaangażowanie i samoskuteczność w zakresie nauki a kompulsja uczenia się, *Przegląd Pedagogiczny*, No. 2, pp. 45-53, 2013.

[8] Atroszko P., Relationship between financial resources and home environment and students' learning related attitudes, beliefs and behaviors, *Ad Alta: Journal of Interdisciplinary Research*, Vol. 3, No. 2, s. 7-10, 2013.

[9] Atroszko P. A., Zachowania i postawy studentów związane z uczeniem się a determinanty rozwoju gospodarki opartej na wiedzy [w:] Osiński, J., Pachocka, M., (Eds.), *Zmieniający się świat: perspektywa demograficzna, społeczna i gospodarcza*, Warszawa, Oficyna Wydawnicza Szkoła Główna Handlowa w Warszawie, 2013, pp. 185-197.

[10] Atroszko, P. A., Atroszko, B., Academic performance of Polish students from the perspective of the Self-Determination Theory [In:] Mokrys, M., Badura, S. & Lieskovsky, A., (Eds.), *EIIC - Proceedings in EIIC - The 3rd Electronic International Interdisciplinary Conference*, Zilina, EDIS - Publishing Institution of the University of Zilina, 2014, pp. 286-291.

[11] Atroszko P. A., Atroszko B., Uwarunkowania postaw i zachowań studentów wobec nauki a wyzwania gospodarki opartej na wiedzy [In:] *Gospodarka i polityka w badaniach młodych naukowców*, Stach, W., (Eds.), Poznań, Wydawnictwo Wyższej Szkoły Handlu i Usług, Instytut Naukowo-Wydawniczy Maiuscula, 2013, pp. 11-26.

[12] Atroszko, P. A., Wyszomirska-Góra, M., & Wenta, A., Coping strategies predicting hopelessness in female students – considerations for effective learning [In:] Mokrys, M., Badura, S., & Lieskovsky, A., (Eds.), *EIIC - Proceedings in EIIC - The 3rd Electronic International Interdisciplinary Conference*, Zilina, EDIS - Publishing Institution of the University of Zilina, 2014, pp. 275-279.

[13] The World Health Organization Quality of Life assessment (WHOQUALITY OF LIFE): position paper from the World Health Organization, *Social Science and Medicine*, Vol. 41, No. 10, pp. 1403–1409, 1995.

[14] Fallowfield, L., Quality of life: a new perspective for cancer patients, *Nat Rev Cancer*, Vol. 2, No. 11, pp. 873–879, 2002.

[15] Lee, Y. J., Kim, M. S., Cho, S., Kim, S. R., Association of depression and anxiety with reduced quality of life in patients with predialysis chronic kidney disease, *International Journal of Clinical Practice*, Vol. 67, No. 4, pp. 363-368, 2013.

[16] Tzivian, L., Friger, M., Kushnir, T., Associations between Stress and Quality of Life: Differences between Owners Keeping a Living Dog or Losing a Dog by Euthanasia, *PLoS One*, Vol. 10, No. 3, 2015.

[17] Öztürk, A., Simşek, T. T., Yümin, E. T., Sertel, M., Yümin, M., The relationship between physical, functional capacity and quality of life (Quality of life) among elderly people with a chronic disease, *Archives of Gerontology and Geriatrics*, Vol. 53, No. 3, pp. 278-283, Nov-Dec 2011.

[18] Masthoff, E. D., Trompenaars, F. J., Van Heck, G. L., De Vries, J., The relationship between stress and quality of life in psychiatric outpatients, *Stress and Health*, Vol. 22, No. 4, pp. 249–255, 2006.

[19] Skevington, S. M., Lotfy, M., O'Connell, K. A., The World Health Organization's WHOQUALITY OF LIFE-BREF quality of life assessment: psychometric properties and results of the international field trial. A report from the WHOQUALITY OF LIFE group, *Quality of Life Research*, Vol. 13, No. 2, pp. 299-310, 2004.

[20] World Health Organization, *Closing the gap in a generation: Health equity through action on the social determinants of health*, Geneva, 2008.

[21] Australian Institute of Health and Welfare, *Australia's health 2010*, Canberra, 2010.

[22] Kihç, C., Rezaki, M., Rezaki, B., Kaplan, I., Özgen, G., Sagduyu, A., Özturk M. O., General Health Questionnaire (GHQ12 & GHQ28): psychometric properties and factor structure of the scales in a Turkish primary care sample, *Social Psychiatry and Psychiatric Epidemiology*, Volume 32, No. 6, pp. 327-331, August 1997.

[23] Pilcher, J. J., Ginter, D. R., Sadowsky, B., Sleep quality versus sleep quantity: relationships between sleep and measures of health, well-being and sleepiness in college students, *Journal of psychosomatic research*, Vol. 42, No. 6, pp. 583-596, 1997.

[24] Ramsawh, H. J., Stein, M.B., Belik, S.L., Jacobi, F., Sareen, J., Relationship of anxiety disorders, sleep quality, and functional impairment in a community sample, *Journal of Psychiatric Research*, Vol. 43, No. 10, pp. 926–933, 2009.

[25] Cacioppo, J. T., Hawkley, L. C., Crawford, L. E., Ernst, J. M., Burleson, M. H., Kowalewski, R. B., ... & Berntson, G. G., Loneliness and health: Potential mechanisms, *Psychosomatic Medicine*, Vol. 64, No. 3, pp. 407-417, 2002.

[26] Diamantopoulos, A., Sarstedt, M., Fuchs, C., Wilczynski, P., and Kaiser, S., Guidelines for choosing between multi-item and single-item scales for construct measurement: a predictive validity perspective, *Journal of*

*the Academy of Marketing Science*, Vol. 40, No. 3, pp. 434-449, 2012.

[27] Lim, H. A., Mahendran, R., Chua, J., Peh, C. X., Lim, S. E., & Kua, E. H., The Distress Thermometer as an ultra-short screening tool: A first validation study for mixed-cancer outpatients in Singapore, *Comprehensive Psychiatry*, Vol. 55, No. 4, pp. 1055-1062, May 2014.

[28] Mannion, A. F., Mutter, U. M., Fekete, T. F., Porchet, F., Jeszenszky, D., & Kleinstuck, F. S., Validity of a single-item measure to assess leg or back pain as the predominant symptom in patients with degenerative disorders of the lumbar spine, *European Spine Journal*, Vol. 23, No. 4, pp. 882-887, April 2014.

[29] Zimmerman, M., Ruggero, C. J., Chelminski, I., Young, D., Posternak, M. A., Friedman, M., Boerescu, D., Attiullah, N., Developing brief scales for use in clinical practice: the reliability and validity of single-item self-report measures of depression symptom severity, psychosocial impairment due to depression, and quality of life, *Journal of Clinical Psychiatry*, Vol. 67, No. 10, pp. 1536-1541, 2006.

[30] Alexandrov, A., Characteristics of Single-Item Measures in Likert Scale Format, *Electronic Journal of Business Research Methods*, Vol. 8, No. 1, pp. 1-12, 2010.

[31] Atroszko, P., Developing Brief Scales for Educational Research: Reliability of Single-Item Self-Report Measures of Learning Engagement and Exam Stress [In:] *Proceedings of International Scientific Conference for Ph.D. students of EU countries*, Londyn, Sciemcee Publishing, 2014, pp.172-175.

[32] Shaughnessy, K., and Byers, E. S., Seeing the forest with the trees: Cybersex as a case study of single-item versus multi-item measures of sexual behavior, *Canadian Journal of Behavioural Science*, Vol. 45, No. 3, pp. 220-229, 2013.

[33] Carifio, J., and Perla, R. J., Ten common misunderstandings, misconceptions, persistent myths and urban legends about Likert scales and Likert response formats and their antidotes, *Journal of the Social Sciences*, Vol. 3, No. 3, pp. 106-116, 2007.

[34] Glass, G. V., Peckham, P. D., and Sanders, J. R., Consequences of Failure to Meet Assumptions Underlying the Fixed Effects Analyses of Variance and Covariance, *Review of Educational Research*, Vol. 42, No. 3, pp. 237-288, 1972.

[35] Cohen, S., Kamarck T., Mermelstein R., A global measure of perceived stress, *Journal of Health and Social Behavior*, Vol. 24, No. 4, pp. 385-396, 1983.

[36] Zigmond, A. S., Snaith, R. P., The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica*, Vol. 67, No. 6, 361-370, 1983.

[37] Hughes, M. E., Waite, L. J., Hawkey, L. C., Cacioppo, J. T., A Short Scale for Measuring Loneliness in Large Surveys: Results From Two Population-Based Studies, *Research On Aging*, Vol. 26, No. 6, 655-672, 2004.

[38] McGraw, K., and Wong, S. P., Forming inferences about some intraclass correlation coefficients, *Psychological Methods*, Vol. 1, No. 1, pp. 30-46, 1996.

[39] Shrout, P. E., Fleiss, J. L., Intraclass correlations: uses in assessing rater reliability, *Psychological Bulletin*, Vol. 86, No. 2, pp. 420-428, 1979.

## VALIDITY AND RELIABILITY OF SINGLE-ITEM SELF-REPORT MEASURES OF MEANING IN LIFE AND SATISFACTION WITH LIFE

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**Abstract:** Health, subjective well-being and many other fields of research require large surveys that often include repeated measurements, and involve a multitude of crucial variables. This results in a demand for effective, valid and reliable measurement tools. Widely applied self-report multi-item scales can be associated with high cost and burden for both respondents and researchers. Lengthy measures also provide a threat to the validity of measurements due to fatigue effects in participants. In order to overcome this issues a single-item, self-report measures of meaning in life and satisfaction with life were examined in a sample of 1451 university students. These two measures were administered in a subsample of 135 students on two occasions with three weeks interval between them. Intraclass correlation coefficients (ICC) for test-retest reliability were very high, .86 for meaning in life, and .88 for satisfaction in life. These measures were related in predictable ways to perceived stress, depressiveness, anxiety, and loneliness. The study provides evidence for the validity and reliability of these single-item measures. These scales are potentially convenient measures of meaning in life and satisfaction with life in large surveys.

**Keywords:** meaning in life, reliability, satisfaction with life, single-item measure, validity

### 1. Introduction

The interest in understanding quality of life and wellbeing has been increasing very fast [1] and became the focus of recent intense research attention. It is suggested that a positive well-being may be essential for people from an evolutionary perspective [2]. Positive affect associated with subjective well-being (SWB) might be crucial for motivational reasons. Positive moods trigger approach tendencies, such as obtaining food, finding shelter, social support etc. which increase one's chances of survival [3]. As popularity of this topic is increasing, it is essential to develop psychometrically reliable and valid research tools that are suitable for application in large surveys.

Recent studies on newly identified construct of study addiction showed that the different aspects of wellbeing and quality of life may be also crucial variables in educational research [4]. The growing interest in antecedents and consequences of unhealthy study attitudes and behaviours creates a need for short and convenient measures of meaning in life and satisfaction with life. These studies often require large samples and encompass multitude of relevant variables including socioeconomic background, school or university environment, personality, cognitive functioning, different learning attitudes and behaviours, school or academic performance, and diverse measures of wellbeing and health [5, 6, 7, 8, 9, 10].

### 2. Meaning in life

Meaning in life could be described as “the extent to which people comprehend, make sense of, or see significance in their lives, accompanied by the degree they perceive themselves to have a purpose or overarching aim in life” [11]. It is assumed that the purpose in life is a distinctive domain of psychological well-being [12] and that human being seems to be predetermined to instill a meaning to life [13]. In general, it was positively associated with

psychological and physical health, e.g. lower depression, anxiety, stress, loneliness, and positive and negative emotions [14]. One of the most widely used psychometric tools for measuring meaning in life is 10-item measure of the *Presence of Meaning in Life*, and the *Search for Meaning in Life* [15].

### 3. Satisfaction with life

Satisfaction with life has been defined as a “global evaluation by the person of the quality of his or her life” [16]. It could be also described as a cognitive component of SWB [17]. Most scientists and specialists seem to approve the statement that satisfaction with life should be considered the main component of any comprehensive conception of adjustment or mental health [18]. Satisfaction with life and meaning in life are mutually connected constructs and their moderate stability over one year has been proven [19]. One of the most widely used psychometric tools for measuring satisfaction with life is 5-item Satisfaction with Life Scale [20].

### 4. Single-item scales

An increasing number of large surveys, which frequently include repeated measurements, results in a demand for ultra-brief, single-item scales that do not impose additional burden and provide ease of interpretation. This type of measurement is characterized by a series of advantages, for instance in situations when time is restricted or when respondents' burden must be minimized [21]. Even though single-item measures are not always considered an appropriate method due to their worse psychometric properties in comparison to multi-item scales in specific contexts [22], their usefulness and popularity in research are constantly growing. Single, overall questions have been efficiently used in population surveys to measure e.g.

health status, quality of life, and health related quality of life [23].

The analysis of Likert response format data at the item level is statistically robust [24, 25]. This is one of the reasons which make single-item measures useful tools which can be applied in statistical testing of complex models. All the same, in cases in which single-item measures are used it is suggested to use more stringent alpha level in order to make cautious statistical decisions.

On the basis of previous theoretical frameworks and empirical research into meaning in life and satisfaction with life, it is hypothesized that: (H1) meaning in life and satisfaction with life are negatively related to perceived stress, depressiveness, anxiety and loneliness.

## 5. Methods

**Participants.** A total of 1451 students from different universities in Pomerania Region in Poland took part in the study, 675 men (46.5%) and 751 women (51.5%), 25 (1.7%) persons did not report gender, with mean age of 21.75 years ( $SD = 3.11$ ). Students were from different faculties, courses of study, years and modes of study. One hundred thirty five participants took part in test-retest procedure, 87 females and 77 males, 5 persons did not report gender, with mean age years  $M = 21.17$ ,  $SD = 1.86$ .

**Measures.** Two single-item, self-report measures were developed on the basis of items from WHOQOL Bref scale [21]. The previous 5-point Likert scale has been modified to a 9-point response scale, in line with recommendations to use at least 7-point Likert scale when conducting statistical tests and analyses on single-item measures [24]. Meaning in life was measured by question: "To what extent do you feel your life to be meaningful?" with 9-point response scale, from 1 - "Not at all" to 9 - "An extreme amount". Life satisfaction was measured by question: "How much do you enjoy life?" with 9-point response scale, from 1 - "Not at all" to 9 - "An extreme amount". Other measures were widely used valid and reliable scales adapted in Poland. Perceived stress was measured with *Perceived Stress Scale (PSS-4)*, a 4-item, 5-point response format scale [26]. Depressiveness and anxiety was measured by *Hospital Anxiety and Depression Scale*, which includes 14 items with 4-point response format scale, seven items for anxiety and seven for depression [27]. Loneliness was measured by *Short Loneliness Scale*, which includes 3 items with 3-point response format scale [28].

**Procedure.** Data collection used opportunistic sampling. Students were invited to participate anonymously in the study during lectures or classes. More than 90% of all present students agreed to do so. Ninety one percent of participants filled in 'paper and pencil' questionnaires and nine percent of students completed online versions of the questionnaires. The study took place from 2013 to 2015. Meaning in life and satisfaction with life were measured on two occasions with three week interval between them. Anonymous way of coding participants was applied in order to match responses from both measurement occasions. Participation in the study was anonymous and

no monetary or other material rewards were offered to the participants.

**Statistical analyses.** Intraclass correlation coefficient (ICC) along with the 95% confidence interval (CI) was used as a measure of test-retest reliability [29, 30]. Means, standard deviations, percentages and correlation coefficients were calculated. Statistical analyses were conducted in IBM SPSS.22.

## 6. Results

The correlation between meaning in life ( $M = 6.05$ ,  $SD = 2.01$ ) and satisfaction with life ( $M = 6.00$ ,  $SD = 1.86$ ) was very high,  $r = .76$ ,  $p < .001$ . An intraclass correlation coefficient (ICC) of .86 (95% CI = .81-.90,  $p < .001$ ) was obtained for meaning in life and .88 (95% CI = .83-.91,  $p < .001$ ) for satisfaction with life. Means, standard deviations and correlations of meaning in life and satisfaction with life with studied variables are presented in table 1.

*Table 1. Means, standard deviations and correlations of satisfaction with life and meaning in life with perceived stress, depressiveness, anxiety, and loneliness*

Scale	M (SD)	Satisfaction	Meaning
Perceived stress	10.53 (3.05)	-.42**	-.41**
Depressiveness <sup>a</sup>	13.88 (4.13)	-.49**	-.44**
Anxiety <sup>a</sup>	12.00 (3.88)	-.44**	-.36**
Loneliness	4.59 (1.71)	-.42**	-.40**

\* $p < .05$ ; \*\* $p < .01$

<sup>a</sup>Subsample of 1074 students, 481 men (44.8%) and 572 women (53.3%), 21 (2.0%) persons did not report gender, with mean age of 21.77 years ( $SD = 3.24$ ).

## 7. Conclusions

The conducted study provides evidence for very good test-retest reliability of single-item measures of meaning in life and satisfaction with life. The measures were highly interrelated indicating that they may in fact measure very similar or even the same construct.

The obtained data supported concurrent validity of the measures. All hypotheses were substantiated and the measures related in predictable ways to the indicators of wellbeing measured by widely used, valid and reliable psychometric tools. Meaning in life and satisfaction with life were negatively related to perceived stress, depressiveness, anxiety and loneliness. The pattern of correlations and the values of correlation coefficients were very similar providing more support for the hypothesis that these scales measure very similar construct.

The results provided support for the validity and reliability of the measures of meaning in life and satisfaction with life. These scales offer low cost and minimized burden options for both respondents and researchers. They are quick and easy to fill in and seem promising for application in various surveys, especially for large surveys when many other variables need to be measured and the relationships between them are more important than precise evaluations for every individual. The biggest

strengths of the study are a large and heterogeneous sample of university students and the use of widely applied valid and reliable measures of different aspects of wellbeing and psychosocial functioning. The main limitation of the study is a lack of data on the convergent validity with a widely used, valid and reliable measures of quality of life, general health or quality of sleep. The future studies should investigate this type of validity using also different methods of measurement, such as observation or experience sampling methodology. There is also need for data on discriminant validity, as well as predictive validity of these measures from longitudinal settings, including possible comparisons in predictive value with multidimensional multi-item scales of quality of life, general health and sleep quality. Also research on more representative samples is warranted. In light of the obtained results, there is a need for more studies investigating whether meaning in life and satisfaction with life are the same construct.

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### References

- [1] Seligman, M., Csikszentmihalyi, M., *Positive psychology: An introduction*, *American Psychologist*, Vol. 55, No.1, pp. 5-14, 2014.
- [2] Diener, E., Diener, C., Most people are happy, *Psychological Science*, Vol. 7, No. 3, pp. 181-185, 1996.
- [3] Diener, E., Ryan, K., Subjective well-being: a general overview, *South African Journal of Psychology*, Vol. 39, No. 4, pp. 391-406, 2009.
- [4] Atroszko, P. A., Andreassen, C. S., Griffiths, M. D., Pallesen, S., Study addiction – A new area of psychological study: Conceptualization, assessment, and preliminary empirical findings, *Journal of Behavioral Addictions*, Vol. 4, No. 2, pp. 75–84, 2015.
- [5] Atroszko, B., Atroszko, P., Sytuacja materialna studentów, zaangażowanie i samoskuteczność w zakresie nauki a kompulsja uczenia się, *Przegląd Pedagogiczny*, No. 2, pp. 45-53, 2013.
- [6] Atroszko, P., Relationship between financial resources and home environment and students' learning related attitudes, beliefs and behaviors, *Ad Alta: Journal of Interdisciplinary Research*, Vol. 3, No. 2, pp. 7-10, 2013.
- [7] Atroszko, P. A., Zachowania i postawy studentów związane z uczeniem się a determinanty rozwoju gospodarki opartej na wiedzy [In:] *Zmieniający się świat: perspektywa demograficzna, społeczna i gospodarcza*, Osiński, J., Pachocka, M., (Eds.), Warszawa, Oficyna Wydawnicza Szkoła Główna Handlowa w Warszawie, 2013, pp. 185-197.
- [8] Atroszko, P. A., Atroszko, B., Academic performance of Polish students from the perspective of the Self-Determination Theory [In:] Mokrys, M., Badura, S., Lieskovsky, A., (Eds.), *EIIC - Proceedings in EIIC - The 3rd Electronic International Interdisciplinary Conference*, Zilina, EDIS - Publishing Institution of the University of Zilina, 2014, pp. 286-291.
- [9] Atroszko, P. A., Atroszko, B., Uwarunkowania postaw i zachowań studentów wobec nauki a wyzwania gospodarki opartej na wiedzy [In:] *Gospodarka i polityka w badaniach młodych naukowców*, Stach, W., (Ed.), Poznań, Wydawnictwo Wyższej Szkoły Handlu i Usług, Instytut Naukowo-Wydawniczy Maiuscula, 2013, pp. 11-26.
- [10] Atroszko, P. A., Wyszomirska-Góra, M., & Went, A., Coping strategies predicting hopelessness in female students – considerations for effective learning [In:] Mokrys, M., Badura, S., Lieskovsky, A., (Eds.), *EIIC - Proceedings in EIIC - The 3rd Electronic International Interdisciplinary Conference*, Zilina, EDIS - Publishing Institution of the University of Zilina, 2014, pp. 275-279.
- [11] Steger, M. F., Meaning in life [In:] Lopez, S. J., (Ed.), *Oxford handbook of positive psychology*, 2nd, 2009.
- [12] Ryff, C. D., Happiness is everything, or is it? Explorations on the meaning of psychological well-being, *Journal of Personality and Social Psychology*, Vol. 57, No. 6, pp. 1069–1081, 1989.
- [13] Yalom, I. D., *Existential Psychotherapy*, New York (USA), Basic Book, 1980.
- [14] Ryff, C. D., Psychological Well-Being Revisited: Advances in Science and Practice, *Psychotherapy and Psychosomatics*, Vol. 83, No. 1, pp. 10–28, 2014.
- [15] Steger, M. F., Frazier, P., Oishi, S., & Kaler, M., The Meaning in Life Questionnaire: Assessing the presence of and search for meaning in life, *Journal of Counseling Psychology*, Vol. 53, pp. 80-93, 2006.
- [16] Pavot, W. G., Diener, E., Colvin, C. R., Sandvik, E., Further validation of the Satisfaction with Life Scale: Evidence for the cross-method convergence of well-being measures, *Journal of Personality Assessment*, Vol. 57, No. 1, pp. 149-61, 1991.
- [17] Andrews, F. M., Withey, S. B., *Social indicators of well-being: America's perception of life quality*, New York (USA), Plenum Press, 1976.
- [18] Sells S. B., Ecology and the science of psychology [In:] Willems, E. P., Raush, H. L., (Eds.), *Naturalistic viewpoints in psychological research*, New York (USA), Holt, Rinehart and Winston, 1969, pp. 15-30.
- [19] Steger, M. F., Kashdan, T. B., Stability and specificity of meaning in life and life satisfaction over one year, *Journal of Happiness Studies*, Vol. 8, No. 2, pp. 161–179, 2007.
- [20] Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S., The Satisfaction with Life Scale, *Journal of Personality Assessment*, Vol. 49, pp. 71-75, 1985.
- [21] Skevington S. M., Lotfy M., O'Connell K. A., The World Health Organization's WHOQOL-BREF quality of life assessment: Psychometric properties and results of the international field trial. A Report from the WHOQOL Group, *Quality of Life Research*, Vol. 13, No. 2, pp. 299–310, 2004.

- [22] Diamantopoulos, A., Sarstedt, M., Fuchs, C., Wilczynski, P., and Kaiser, S., Guidelines for choosing between multi-item and single-item scales for construct measurement: a predictive validity perspective, *Journal of the Academy of Marketing Science*, Vol. 40, No. 3, pp. 434-449, 2012.
- [23] Bowling, A., Just one question: If one question works, why ask several?, *Journal of Epidemiology and Community Health*, Vol. 59, No. 5, pp. 342-345, May 2005.
- [24] Carifio, J., Perla, R. J., Ten common misunderstandings, misconceptions, persistent myths and urban legends about Likert scales and Likert response formats and their antidotes, *Journal of the Social Sciences*, Vol. 3, No. 3, pp. 106-116, 2007.
- [25] Glass, G. V., Peckham, P. D., Sanders, J. R., Consequences of Failure to Meet Assumptions Underlying the Fixed Effects Analyses of Variance and Covariance, *Review of Educational Research*, Vol. 42, No. 3, pp. 237-288, 1972.
- [26] Cohen, S., Kamarck, T., Mermelstein, R., A global measure of perceived stress, *Journal of Health and Social Behavior*, Vol. 24, No. 4, pp. 385-396, 1983.
- [27] Zigmond, A. S., Snaith, R. P., The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica*, Vol. 67, No. 6, 361-370, 1983.
- [28] Hughes, M. E., Waite, L. J., Hawkley, L. C., Cacioppo, J. T., A Short Scale for Measuring Loneliness in Large Surveys: Results From Two Population-Based Studies. *Research On Aging*, Vol. 26, No. 6, 655-672, 2004.
- [29] McGraw, K. O., Wong, S. P., Forming inferences about some intraclass correlation coefficients, *Psychological Methods*, Vol. 1, No. 1, pp. 30-46, 1996.
- [30] Shrout, P. E., Fleiss, J. L., Intraclass correlations: Uses in assessing rater reliability, *Psychological Bulletin*, Vol. 86, No. 2, pp. 420-428, 1979.

## VALIDITY AND RELIABILITY OF SINGLE-ITEM SELF-REPORT MEASURES OF SOCIAL SUPPORT

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**Abstract:** Social support is one of the most important variables in the study of wellbeing and psychosocial functioning. The role of social support is recognized also in public health studies, as it is one of the significant predictors of health outcomes. For that reason measurement of social support is indispensable in any research related to health or wellbeing. These studies are often large surveys, frequently with repeated measurements. Therefore, valid and easily applied measures are required. Self-report questionnaires of social support are often lengthy. This may cause a significant burden to study participants and a threat to the validity of measurement due to fatigue effects. To overcome these difficulties validity and reliability of single-item, self-report measures of satisfaction with personal relationships and satisfaction with support from friends were examined in a sample of 1451 university students. These two measures were administered in a subsample of 135 students on two occasions with three weeks interval between them. Intraclass correlation coefficients (ICC) for test-retest reliability were satisfying, .80 for satisfaction with personal relationships, and .64 for satisfaction with support of friends. Both measures related in predictable ways to perceived stress, depressiveness, anxiety, loneliness and searching for emotional and instrumental social support. The study provides evidence for the validity and reliability of these single-item measures. These scales are potentially convenient measures of social support in large surveys.

**Keywords:** reliability, single-item measure, social support, validity, wellbeing

## 1. Introduction

Social support is crucial for maintaining psychological and physical health. World Health Organization (WHO) considers social wellbeing as an essential component of health and quality of life [1, 2]. It is one of the most important variables in the study of wellbeing and psychosocial functioning. The role of social support is recognized also in public health studies, as it is one of the significant predictors of health outcomes. Extensive body of research demonstrated that quantity and quality of social relationships are related to morbidity and mortality [3, 4, 5, 6, 7, 8].

Multiple researches show that social support is closely related with prevention of psychological and somatic disorders. Recent studies report that having supportive relationships protects from possibly pathogenic effects of stressful events [6, 9, 10] and decreases the risk of depression [11, 12, 13]. It has also positive effect on reducing anxiety. Studies show the impact of social support on recovery from illness, injury and effect on immune, endocrine, and cardiovascular functioning [2]. Satisfaction with personal relationships and satisfaction with support received from friends are two of the most direct indicators and important components of social support. One of the most widely used psychometric tools for measuring social support is *Multidimensional Scale of Perceived Social Support* [14]. It encompasses three subscales related to the source of the social support, namely family, friends or significant other.

Since recent studies showed that wellbeing and social support may also be crucial variables in educational settings, as unhealthy study attitudes and behaviours related to newly established construct of study addiction were identified [15], there is a need for short and

convenient measures of social support in educational research. These studies often require large samples and encompass multitude of relevant variables including socioeconomic background, school or university environment, personality, cognitive functioning, different learning attitudes and behaviours, school or academic performance, and diverse measures of wellbeing and health [16, 17, 18, 19, 20, 21].

## 2. Single-item scales

Running large scale survey studies requires control of many different variables. This and other factors, like decreased burden on both participants and researchers, contribute to the fact that single-item scales are more and more often used [22]. Gradually recommendations and guidelines on the usage of single-item scales are being developed [23]. By now single-item scales were used in health, marketing and educational research in which learning engagement, exam stress, depression symptom severity, psychosocial functioning specific physical symptoms, distress or quality of life of patients were measured with single-item measures [22, 24, 25]. The results of these studies suggest that these measures frequently prove to be reliable and valid. However, in some contexts they are not an optimal way of measuring variables, e.g. in studies on sexual satisfaction and behaviours [26]. For that reason, it is advised to carefully analyse advantages and disadvantages of use of single-item measures in particular research context and taking into account existing data on the subject.

On the basis of previous theoretical frameworks and empirical research into social support, it is hypothesized that: (H1) Satisfaction with personal relationships and satisfaction with support received from friends are negatively related to perceived stress, depressiveness,



anxiety and loneliness and (H2) positively related to searching for emotional and instrumental social support (especially with satisfaction with support from friends).

### 3. Methods

**Participants.** A total of 1451 students from different universities in Pomerania Region in Poland took part in the study, 675 men (46.5%) and 751 women (51.5%), 25 (1.7%) persons did not report gender, with mean age of 21.75 years ( $SD = 3.11$ ). Students were from different faculties, courses of study, years and modes of study. One hundred thirty five participants took part in test-retest procedure, 87 females and 77 males, 5 persons did not report gender, with mean age years  $M = 21.17$ ,  $SD = 1.86$ .

**Measures.** Two single-item, self-report measures were developed on the basis of items from WHOQOL Bref scale [27]. The scale of satisfaction with personal relationships consisted of the question: "How satisfied are you with your personal relationships?" and response scale ranged from 1 - "Very dissatisfied" to 9 - "Very satisfied". Satisfaction with support of friends was measured by the question: "How satisfied are you with the support you get from your friends?" with the same response format. The original 5-point response scale has been modified to 9-point scale due to recommendation to use at least 7-point Likert response format data when conducting statistical analyses on single-item measures [28]. Other measures were widely used valid and reliable scales adapted in Poland. Perceived stress was measured with *Perceived Stress Scale (PSS-4)*, a 4-item, 5-point Likert response format scale [29]. Depressiveness and anxiety were measured by *Hospital Anxiety and Depression Scale*, which includes 14 items with 4-point response format, seven items for anxiety and seven for depression [30]. Loneliness was measured by *Short Loneliness Scale*, which includes three items with 3-point response format scales [31]. The strategies of coping with stress were measured by Brief-COPE, which is 28-item scale [32]. The subscales measuring searching for emotional and instrumental social support were used in this study.

**Procedure.** Data collection used opportunistic sampling. Students were invited to participate anonymously in the study during lectures or classes. More than 90% of all present students agreed to do so. Ninety one percent of participants filled in 'paper and pencil' questionnaires and nine percent of students completed online versions of the questionnaires. The study took place from 2013 to 2015. Satisfaction with personal relationships and satisfaction with support from friends were measured on two occasions with three week interval between them. Anonymous way of coding participants was applied in order to match responses from both measurement occasions. Participation in the study was anonymous and no monetary or other material rewards were offered to the participants.

**Statistical analyses.** Intraclass correlation coefficient (ICC) along with the 95% confidence interval (CI) was used as a measure of test-retest reliability [30, 31]. Means, standard deviations, percentages and correlation coefficients were

calculated. All statistical analyses were conducted in IBM SPSS 22.

### 4. Results

The correlation between satisfaction with personal relationships ( $M = 5.82$ ;  $SD = 2.34$ ) and satisfaction with support of friends ( $M = 6.69$ ;  $SD = 1.81$ ) was positive and moderately high,  $r = .38$ ,  $p < .001$ . An intraclass correlation coefficient (ICC) of .80 (95% CI = .72-.86,  $p < .001$ ) was obtained for satisfaction with personal relationships, and .64 (95% CI = .49-.75,  $p < .001$ ) for satisfaction with support of friends. Means, standard deviations and correlations of satisfaction with personal relationships and satisfaction with support from friends with studied variables are presented in table 1.

*Table 1. Means, standard deviations and correlations of satisfaction with personal relationships and satisfaction with support from friends with perceived stress, depressiveness, anxiety, loneliness, and searching for instrumental and emotional social support*

Scale	M (SD)	Satisfaction with personal relationships	Satisfaction with support of friends
Perceived stress	10,53 (3,05)	-.33**	-.22**
Depressiveness <sup>a</sup>	13,88 (4,13)	-.30**	-.34**
Anxiety <sup>a</sup>	12,00 (3,88)	-.24**	-.26**
Loneliness	4,60 (1,71)	-.39**	-.35**
Emotional support <sup>a</sup>	3,91 (1,61)	.24**	.51**
Instrumental support <sup>a</sup>	3,73 (1,58)	.15**	.42**

\* $p < .05$ ; \*\* $p < .01$

<sup>a</sup>Subsample of 1074 students, 481 men (44.8%) and 572 women (53.3%), 21 (2.0%) persons did not report gender, with mean age of 21.77 years ( $SD = 3.24$ ).

### 5. Conclusions

The study provided evidence for the test-retest reliability of single-item measures of satisfaction with personal relationships and satisfaction with support of friends. The former measure had good reliability and the latter one had acceptable reliability. These results suggest that subjective assessment of satisfaction with personal relationships tends to be more stable in time than individual evaluation of satisfaction with support of friends. The measures were moderately interrelated indicating that they share common variance but they are also independent to a significant degree.

The obtained data on concurrent validity also provided initial support for the construct validity of the measures. All hypotheses were substantiated and the measures related in predictable ways to the indicators of wellbeing measured by widely used valid and reliable psychometric tools. Both satisfaction with personal relationships and satisfaction with support of friends were negatively related to perceived stress, depressiveness, anxiety and loneliness, and they were positively related to stress coping strategies

concerning searching for emotional and instrumental social support. Satisfaction with support of friends was significantly more strongly than satisfaction with personal relationships related to searching of social support.

The results provided support for the validity and reliability of the measures as indicators of two of the highly important components of social support. It corresponds to two of the three dimensions of social support measured by *Multidimensional Scale of Perceived Social Support* which validity received support in studies [14]. These measures are very quick to fill and therefore low-burden and low-cost measurement options. They can be easily applied in large scale research when important aspects of wellbeing and quality of life have to be measured along with many other variables. They can prove to be convenient in studying relationships between constructs and controlling important variables in complex models. On the other hand, the scales are not useful in precise individual evaluation of received social support for the purposes of diagnosis or direct comparison between individuals. The biggest strengths of the study are a large and heterogeneous sample of university students and the use of widely applied, valid and reliable measures of different aspects of wellbeing and psychosocial functioning. The main limitation of the study is a lack of data on the convergent validity with a widely used, valid and reliable measures of social support such as *Multidimensional Scale of Perceived Social Support* [14] or *Berlin Social Support Scales* [35]. The future studies should investigate this type of validity using also different methods of measurement of social support, such as observation or experience sampling methodology. There is also need for data on discriminant validity, as well as predictive validity of these measures from longitudinal settings, including possible comparisons in predictive value with multidimensional multi-item scales of social support. Research on more representative samples is warranted.

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### References

[1] World Health Organization, Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, (New York, 19-22 June, 1946; signed on 22 July 1946 by the representatives of 61 States and entered into force on 7 April 1948), *Official Records of the World Health Organization*, No. 2, pp. 100.  
[2] World Health Organization, WHOQOL Study Protocol. *WHO (MNH/PSF/93.9)*, 1993.

[3] Blazer, D. G., Social support and mortality in an elderly community population, *American Journal of Epidemiology*, Vol. 115, No. 5, pp. 684- 694, 1982.  
[4] Broadhead, W. E., Kaplan, B. H., James, S. A., Wagner, E. H., Schoenbach, V. J., Crimmon, R., Heyden, S., Tibblin, G., and Gehlbach, S. H., The epidemiologic evidence for a relationship between social support and health, *American Journal of Epidemiology*, Vol. 117, No. 5, pp. 521- 537, 1983.  
[5] Cassell, J., The contribution of the social environment to host resistance, *American Journal of Epidemiology*, Vol. 104, No. 2, pp. 107-123, 1976.  
[6] Cobb, S., Social support as a moderator of life stress, *Psychosomatic Medicine*, Vol. 38, No. 5, pp. 300-314, 1976.  
[7] Cohen, S., & Syme, S. L., *Social support and health*, New York (USA), Academic Press, 1985.  
[8] House, J. S., Landis, K. R., & Umberson, D., Social relationships and health, *Science*, Vol. 241, No. 4865, pp. 540-545, 1988.  
[9] Caplan, G., *Support systems and community mental health*, Michigan, Behavioral Publications, 1974.  
[10] Kaplan, B. W., Cassel, J. C. and Gore, S. Social support and health, *Medical care*, Vol. 15, No. 5, pp. 47-58, 1977.  
[11] Monroe, S. M., Social support and disorder: Toward an untangling of cause of effect, *American Journal of Community Psychology*, Vol. 11, No. 1, pp. 81-97, 1983.  
[12] Stice, E., Ragan, J. and Randall, P., Prospective Relations Between Social Support and Depression: Differential Direction of effects for parent and peer support, *Journal of Abnormal Psychology*, Vol.113, No.1, pp. 155-159, 2004.  
[13] Windle, M., A longitudinal study of stress buffering for adolescent problem behaviors, *Developmental Psychology*, Vol. 28, No. 3, 522-530, 1992.  
[14] Zimet, G.D., Dahlem, N.W., Zimet, S.G. & Farley, G.K., The Multidimensional Scale of Perceived Social Support, *Journal of Personality Assessment*, Vol. 52, 30-41, 1988.  
[15] Atroszko P. A., Andreassen C. S., Griffiths M. D., Pallesen S., Study addiction – A new area of psychological study: Conceptualization, assessment, and preliminary empirical findings, *Journal of Behavioral Addictions*, Vol. 4, No. 2, s. 75-84, 2015.  
[16] Atroszko B., Atroszko P., Sytuacja materialna studentów, zaangażowanie i samoskuteczność w zakresie nauki a kompulsja uczenia się, *Przegląd Pedagogiczny*, No. 2, pp. 45-53, 2013.  
[17] Atroszko P., Relationship between financial resources and home environment and students' learning related attitudes, beliefs and behaviors, *Ad Alta: Journal of Interdisciplinary Research*, Vol. 3, No. 2, pp. 7-10, 2013.  
[18] Atroszko P. A., Zachowania i postawy studentów związane z uczeniem się a determinanty rozwoju gospodarki opartej na wiedzy [In:] *Zmieniający się świat: perspektywa demograficzna, społeczna i gospodarcza*, Osiński, J., Pachocka, M., (Eds.), Warszawa, Oficyna Wydawnicza Szkoła Główna Handlowa w Warszawie, 2013, pp. 185-197.

- [19] Atroszko, P. A., Atroszko, B., Academic performance of Polish students from the perspective of the Self-Determination Theory [In:] Mokrys, M., Badura, S., Lieskovsky, A., (Eds.), *EIIC - Proceedings in EIIC - The 3rd Electronic International Interdisciplinary Conference*, Zilina, EDIS - Publishing Institution of the University of Zilina, 2014, pp. 286-291.
- [20] Atroszko P. A., Atroszko B., Uwarunkowania postaw i zachowań studentów wobec nauki a wyzwania gospodarki opartej na wiedzy [In:] *Gospodarka i polityka w badaniach młodych naukowców*, Stach W. (Ed.), Poznań, Wydawnictwo Wyższej Szkoły Handlu i Usług, Instytut Naukowo-Wydawniczy Maiuscula, 2013, s. 11-26.
- [21] Atroszko, P. A., Wyszomirska-Góra, M., Wenta, A., Coping strategies predicting hopelessness in female students – considerations for effective learning [In:] Mokrys M., Badura S., Lieskovsky A., (Eds.), *EIIC - Proceedings in EIIC - The 3rd Electronic International Interdisciplinary Conference*, Zilina, EDIS - Publishing Institution of the University of Zilina, 2014, pp. 275-279.
- [22] Atroszko, P., Developing Brief Scales for Educational Research: Reliability of Single-Item Self-Report Measures of Learning Engagement and Exam Stress [In:] *Proceedings of International Scientific Conference for Ph.D. students of EU countries*, Londyn, Sciemcee Publishing, 2014, pp.172-175.
- [23] Diamantopoulos, A., Sarstedt, M., Fuchs, C., Wilczynski, P., and Kaiser, S., Guidelines for choosing between multi-item and single-item scales for construct measurement: a predictive validity perspective, *Journal of the Academy of Marketing Science*, Vol. 40, No. 3, pp. 434-449, 2012.
- [24] Lim, H. A., Mahendran, R., Chua, J., Peh, C. X., Lim, S. E., & Kua, E. H., The Distress Thermometer as an ultrashort screening tool: A first validation study for mixedcancer outpatients in Singapore, *Comprehensive Psychiatry*, Vol. 55, No. 4, pp. 1055-1062, 2014.
- [25] Mannion, A. F., Mutter, U. M., Fekete, T. F., Porchet, F., Jeszenszky, D., & Kleinstuck, F. S., Validity of a single-item measure to assess leg or back pain as the predominant symptom in patients with degenerative disorders of the lumbar spine, *European Spine Journal*, Vol. 23, No. 4, pp. 882-887, 2014.
- [26] Shaughnessy, K., and Byers, E. S., Seeing the forest with the trees: Cybersex as a case study of single-item versus multi-item measures of sexual behaviour, *Canadian Journal of Behavioural Science*, Vol. 45, No. 3, pp. 220-229, 2013.
- [27] Skevington S. M., Lotfy M., O'Connel K. A., The World Health Organization's WHOQOL-BREF quality of life assessment: Psychometric properties and results of the international field trial. A Report from the WHOQOL Group, *Quality of Life Research*, Vol. 13, No. 2, pp. 299-310, 2004.
- [28] Carifio J., Perla J. R., Ten Common Misunderstandings, Misconceptions, Persistent Myths and Urban Legends about Likert Scales and Likert Response Formats and their Antidotes, *Journal of Social Sciences*, Vol. 3, No. 3, pp. 106-116, 2007.
- [29] Cohen, S., Kamarck T., Mermelstein R., A global measure of perceived stress, *Journal of Health and Social Behavior*, Vol. 24, No. 4, pp. 385-396, 1983.
- [30] Zigmond, A. S., Snaith, R. P., The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica*, Vol. 67, No. 6, 361-370, 1983.
- [31] Hughes, M. E., Waite, L. J., Hawkley, L. C., Cacioppo, J. T., A Short Scale for Measuring Loneliness in Large Surveys: Results From Two Population-Based Studies. *Research On Aging*, Vol. 26, No. 6, 655-672, 2004.
- [32] Carver, C. S., You want to measure coping but your protocol's too long: consider the Brief COPE, *International Journal of Behavioral Medicine*, Vol. 4, No.1, pp. 92-100, 1997.
- [33] McGraw, K. and Wong, S. P., Forming inferences about some intraclass correlation coefficients, *Psychological Methods*, Vol. 1, No. 1, pp. 30-46, 1996.
- [34] Shrout, P. E., Fleiss, J. L., Intraclass correlations: Uses in assessing rater reliability, *Psychological Bulletin*, Vol. 86, No. 2, pp. 420-428, 1979.
- [35] Schwarzer, R., and Schulz, U., *Berlin Social Support Scales (BSSS)*, 2000, Retrieved from <http://www.coping.de>.

## Session: History, Sociology

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## HISTORICAL GREEN ROOFS IN SLOVAKIA AND THEIR RETENTION FEATURES

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**Abstract:** Claim of this article is to present historical green roofs in Slovakia - Spis region. Green roofs are on the worldwide agenda. But what is so not well known is their origins. Aim of this article is to present few original buildings in Slovakia with their original roofing solutions, including green rooftops. The article provides basic information about water retention features of these original roofs in comparison with modern contemporary roofs.

**Keywords:** original green roof, roofing solution, Spis region, retention.

### 1. Introduction

In the turn of the 19<sup>th</sup> and 20<sup>th</sup> century, in Spis region, as a roofing material was mostly used traditional material (Fig. 1). In the area of Spis region it was mainly wood shingle (Fig. 2). Some buildings were covered with burnt roof tiles. Exceptionally sheet covering was used. In the early 20<sup>th</sup> century, asbestos cement roof tile started being applied. Besides pitched roofs from 70's of the 19<sup>th</sup> century buildings with flat roofs and buildings with very low slope were built. These kinds of roofs required a different roof covering.



Figure 1 Traditional wood shingle roof, Church in Zehra

Their occurrence was related to the use of new construction and insulation materials, like tar roofing paper and bitumen roofing felt. To protect such a roof against extreme weather conditions, particularly sun and UV radiation, the best solution was combination of soil together and growing plants.

### 2. Green roofs

Green roofs have many benefits [1]. In summer, they avoid overheating of the roof structure and the attic. In winter also thanks to the snow layer, they perform as insulation from the cold. Other features of green roofs are acoustic features. Today's highlights are ecological aspects of the roofs, because, inter alia, their feature is catching dust and pollutants from the air. The advantage of flat roofs is also an economic aspect. The size of the framework was significantly reduced, therefore wood consumption and quantity of roof covering was reduced, too. A significant

advantage of green roofs is that they reduce the risk of fire. In those times, when whole town neighborhoods and villages were destroyed by fire, building regulations and statutes implemented the obligation to use non-flammable roof coverings. One option was also green roof.

### 2. From Germany to Slovakia

In Germany in the 19<sup>th</sup> century the use of tar roofing paper on flat roofs expanded. These roofs were designed as "green roofs". Live business contacts and information exchange caused that news from the field of new building materials and technologies spread to Spis region. In the beginning of the 20<sup>th</sup> century ads offering fireproof roofing felt, fireproof roofing paper, roof varnish, coal tar, carbolineum (oily, water-insoluble dark brown mixture of coal tar) and insulating panels were appearing in periodicals [1].



Figure 2: Wood shingle roof [2]

### 2.1 Historical extensive green roofs

In Upper Spis region extensive green roofs were applied. Thanks to preserved examples we can reconstruct their roof construction and roof layers (Tab. 1). On slab shuttering insulating layer of cardboard, tar or asphalt was applied. On it, gravel drainage layer was filled. Bigger gravel stones were filled near the edges. Resistant vegetation was growing in the soil. Vegetation that can withstand extreme conditions, such as drought alternation, heat alternation and freeze alternation. As a barrier against leaching drainage and humus layers, edging towards eaves gutter, metal perforated lath with round openings for excess water drainage, on the edge of the roof was placed [1].

*Table 1 Extensive green roof layers*

1	resistant vegetation
2	gravel drainage layer (bigger gravel stones filled near the edges)
3	insulating layer of cardboard, tar or asphalt
4	slab shuttering
5	metal perforated lath with round openings, edging towards eaves gutter

### 2.1 Zuzana Lukacsikova house

Green roofs in the turn of the 19<sup>th</sup> and 20<sup>th</sup> centuries were also applied in rural architecture. New two-storey house with a mezzanine second floor and rural character in the beginning of the 20<sup>th</sup> century let to design in 45 Kostolne Square in Kezmarok probably Zuzana Lukacsikova. On the rafters of low slope roof, laths were saturated, forming full boarding isolated against moisture penetration with bitumen paint and bitumen sheets. Drainage layer, which was formed of large gravel stones, was next layer. In contact with drainage holes the concentration was greater. The total soil depth was 7-10 cm. Layers of vegetation except moss sedums were mainly *Sempervivum* and *Sedum Spurium*. The roof was destroyed during the redevelopment of the house in 2013. This house is a part of a wider group of buildings having several common marks. Objects are located in villages. They are mostly single-storey houses with residential ground floor, mezzanine second floor, which served as a store or granary. Facades are decorated with rusticated Art Nouveau stucco, which was based on the late early Vienna Art Nouveau historicism. In the village Mlynica, flat green roofs on the masonry economic tracts are preserved. The houses have pitched roofs. From the beginning of the 20<sup>th</sup> century comes rebuilding of a **House** in 17 Tatranska Street in Velka Lomnica. Roof vegetation of two-storey building with mezzanine floor consists of *Viola arvensis*, *Sedum acre*, *Crepis biennis* and *Erodium cicutarium*. In the front part of the roof is *Festuca rubra*. This plant was not found on other roof. On the roof of the **House** No. 36 in Zakovce, *Sedum acre* forms monoculture [3].

*Table 2 Zuzana Lukacsikova house green roof layers*

1	vegetation - Moss <i>Sedum</i> , <i>Sempervivum</i> , <i>Sedum Spurium</i>
2	soil 7-10 cm
3	drainage layer formed of large gravel stones
4	bitumen paint + bitumen sheets insulation against moisture penetration
5	saturated laths, forming full boarding
6	rafters of low slope roof

Nowadays, when we have preserved flat roofs covered with vegetation layer, we can not clearly distinguish, which roof has been established intentionally and which one spontaneously arising from the air-raids. Also, it is difficult to determine which plant species were creating original vegetation and which ones are picked up from air-raids within one hundred years (Fig. 3, 4). According to an old misbelieve, *Sedum acre* and *Sempervivum* are keeping the house safe from the lightning and therefore, one kind of *Sempervivum* is called *Sempervivum tectorum* [3].

*Figure 3 Air-raid vegetation in Cerveny Klastor*

Based on findings, it appears that in some cities and villages of nowadays districts of cities Poprad and Kezmarok were at the turn of the 19<sup>th</sup> and 20<sup>th</sup> century green roofs fairly widespread type of the roof. This is particularly the thing of the settlements where most of the time dominated German population. This remarkable phenomenon is these days only in small numbers. Only isolated functional green roofs remained, which are located in Zakovce, Huncovce, Poprad and Mlynica. Others are without vegetation and their original type is show thanks to strips, or characteristic low slope roof above the mezzanine floor in Spisska Bela, Kezmarok Poprad, Spisská Sobota, Matejovce, Stara Lesna, Velky Slavkov. From other smaller sites, Maly Slavkov, Tvarozna and Vysoke Tatry have just pictures remained. It would remarkable to try to restore these roofs, nowadays considered as ecological. At least the ones considered as monuments of historical care. Given that this phenomenon was escaping the attention of the professional community, the last examples should be documented and analyzed in detail [1].

*Figure 4 Air-raid vegetation in Cerveny Klastor*

### 2.2 Dr. Mikulas Sontag Sr. - Nicolaus Szontagh Sanatorium

So far, the eldest recorded examples of green roofs are in the region of Upper Spis in Vysoke Tatry. The oldest buildings with such roofs were in the Novy Smokovec. Dr. Mikulas Sontag sr. - Nicolaus Szontagh (1843-1899) after being spa doctor in Stary Smokovec decided to become independent and in 1875 founded Novy Smokovec, which became the center for pulmonary diseases. In 1876 he

opened the First Sanatorium for Tuberculosis Treatment in Slovakia (Fig. 5).

Botany was one of his hobbies. In 1980, he let build a New Bathhouse. It was sanitized in autumn in 1933. Unlike its older wooden high roof predecessor, built in 1877, the new building was built from brick and had a low slope roof. Two years later, Dr. Sontag let build a Tenement Villa Erika. The building was radically rebuilt in 2001-2003. Today, it is known as Villa Mon Ami with flat roofs. On these buildings, it is not entirely clear whether vegetation layers were created at the time of construction of these facilities, or a few years later [5, 6]



Figure 5: Sanatorium [4]

### 3 Nowadays extensive green roofs

The aim of this article is to provide basic background information about historical green roofs from Slovakia in comparison with nowadays green roofs in terms of water retention. The article is pointing at the possibilities that could mean some change to future generations. In this article, historical green roofs and their layers are described. In this part of the article, one nowadays green roof with its layers and features is described.

This part of the article focuses mainly on water storage. Water storage of noticed roof in litre per 1 m<sup>2</sup>. Aim of this article is to show on different roofs their ability to catch water, point at discharge coefficient and water storage of each named roof. Exemplary 1 m<sup>2</sup> is in the end of this article recalculated into 100 m<sup>2</sup>, what could represent roof of one single family house.

Question of this article is, what would it do to our habitats, buildings, environment, lives, health, if we were still building green - blue roofs, as we used to. How much water would we be able to keep above our heads and what would be the possibilities for us now and for our future generations.

#### 3.1 Lightweight green roof

Table 3 Lightweight green roofs layers [7]

1	Optigreen Pre-cultivated Sedum Vegetation Mat Type SM/G
2	Optigreen Low Density Substrate Type L (30 l/m <sup>2</sup> )
3	Optigreen Drainage Board Type FKD 25 (25 mm)
4	Optigreen Protection and Storage Fleece Type RMS 300
5	Waterproofing membrane
6	Suitable substructure

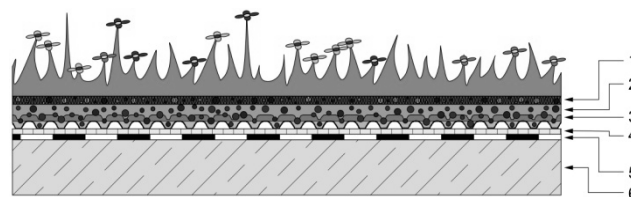


Figure 6. Lightweight roof [7]

Lightweight roof features: The lightest green roof solution. Special construction design. Drift-proof system solution, only usable with a secured, fixed roof membrane. Can also be used for non-pitched roofs without deep puddles forming. Available with automatic irrigation systems for dry regions. Increased care requirements and production costs as compared to the Economy Roof. Weight specifications refer to saturated conditions; dry weight is approximately 50 - 60 % of the saturated weight [7]. Roof layers are described in Tab.3 and its technical specifications are described in Fig. 6 and Tab.4.

Table 4 Lightweight green roof technical specifications [7]

Weight	53 kg/m <sup>2</sup>
Layer height	50 mm
Roof pitch	0-5° (0-9%)
Vegetation form	moss-sedum
Water retention	40-50%
Discharge coefficient	C=0,63-0,65
Water storage	18 l/m <sup>2</sup>
Ecological value	■ □ □ □ □
Maintenance costs	■ ■ □ □ □
Cost factor	■ ■ ■ □ □

Water storage of the noticed roof example is in liter per 1 m<sup>2</sup>. Aim of this article was to show roof's ability to catch water, point at discharge coefficient and water storage of named roof. Exemplary 1 m<sup>2</sup> is in Tab.8 recalculated into 100 m<sup>2</sup>, what could represent roof of one single family house.

Table 5 Water storage

ROOF	WATER STORAGE l/1 m <sup>2</sup>	WATER STORAGE l/100 m <sup>2</sup>
Lightweight	18	1800

### 4. Conclusions

Aim of this article is to show that green roofs started to spread in Slovakia in the turn of the 19<sup>th</sup> and 20<sup>th</sup> century from Germany. Many examples of preserved buildings, houses, flat and sloped roofs, existing but also ruined ones prove that layer of soil and vegetation on the top of the building was a well-founded material. Insulating and gravel drainage layer, resistant vegetation growing in the soil, barrier against leaching are roof components that were used in those times and are still used these days. The green roof principles and advantages have not changed, they are just being updated.

Aim of this article was to show different types of green roofs and their ability to catch water. Question to future is, what are 1800 liters of water per 1 single family house telling us. Retaining water of the total rainfall, keeping

water out of the city sewer system and reducing the amount of nitrogen entering the watershed. In history, there have been many green roofs in Spis region, lots of water used to be caught, now it time to think about it, go back and start building green roofs the way we used to build.

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### References

- [1] Semančík, M., *Vegetačné strechy na hornom Spiši. (Green roofs in upper Spis)*, Pamiatky a múzeá (Revue pre kultúrne dedičstvo) Vol.3, Slovakia, pp. 57-61, 2014
- [2] <http://www.obnova.sk/diskusie/historicka-stresna-krytina>
- [3] Šmíd M., *Průvodce odbornými názvy rostlin (Term vegetation guide)*. Hodnonín, Brázda, 2002
- [4] <http://www.olta.sk/sk/pobyty/kupele-novy-smokovec/historia/>
- [5] <http://www.szontagh.eu/eng/history.php>
- [6] <http://tatryblog.sk/2005/09/novy-smokovec-oslavuje-130-rokov/>
- [7] <http://www.optigreen.com/system-solutions/lightweight-roof/solution-1/>



## ETHICS OF BUSINESS RELATIONS IN RELATION WITH THE PROBLEMS OF SETTING THE EQUITABLE AND JUSTIFIED PURCHASE PRICE (PRETIUM IUSTUM)

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**Abstract:** Legal and historical science has during its whole existence dealt with the issue of setting of the fair and justified price (*pretium iustum*) in commercial and legal relations. We are addressing two cases dealing with moral and legal aspects related to setting of a fair and justified price that shall be derived from actual knowledge and informational basis of the contractual parties. Both of these cases are close in its merits and content, even though they have aroused during the time periods remoted significantly from each other. In our article we try to deal with the questions of ethics, justice and morality of such cases. The question of legality and admissibility is also addressed by the authors.

**Keywords:** ethics, morality, justice, purchase price, business relations

### 1. Introduction

The issues of business ethics in relation with setting of fair and equitable purchase price (*pretium iustum*) has been examined for ages, dating back to birth of legal and historical science. Great philosophers and lawyers such as Aristoteles, Masurius Sabinus, Sempronius Proculus, Thomas Aquinas, Thomas Hobbes and of course recent scientists have dealt with this issue many times. The article focuses on divergent questions related to fair and justified setting of the purchase price in the purchase agreement. Is it even possible to set the fair, justified and reasonable price according to the theory of moral, economics and law altogether? Are there any historical ethical or legal rules that paternalistically negate the liberalistic view of contractual freedom between the parties to the purchase agreement?

### 2. Honest man dilemma (view of morality)

The problem of business ethics and the answer to a question “What is a fair and moral price?” might in our opinion be interpreted on an example of a man that undertakes dangerous and risky marine journey from Alexandria to Rhodes with an intention to make money. This case (story) is a subject matter of a fictitious conversation between Diogenes of Sinope (Seculia) and Antipartes in the classical Cicero’s essay named “De Officiis (On Duties or On Obligations).”

Honest man (*vir bonus*) has brought significant amount of grain from Alexandria to an island Rhodes. Such situation would not be seen as extraordinary in the times of wealth. However, in these times there has been an extreme and lethal famine on the Island of Rhodes. Resources of grain meant for the inhabitants of Rhodes one of the only tools to be saved from death. Therefore the businessman could have seen such situation as the situation bringing immanent amount of profits for him. It is highly probable that in these times grain would be sold at the price higher

than current market price. It is caused by the fact that basic theory of demand and offer creates the final price of the goods. Demand for grain in those times at Rhodes has been enormous. Such situation means that the inhabitants of Rhodes would have even been grateful for the situation when the businessman sells the grain for the price highly above the “market price”.

We can modify such case illustrated in essay to think deeper about it. The businessman knew about the fact that there are many other ships approaching the Island of Rhodes arriving lately after his arrival. Let us assume that such businessman has enough time to sell all of his grain before the other businessmen arrive. Is the honest man obliged to inform the potential buyers about these circumstances or is he legitimately entitled to stay silent and set the higher price for his goods? Historical sources and essays have dealt with such case as for the viewpoint of ethics, morality, justice and last but not least, law. In Cicero’s masterpiece *De Officiis*, Antipatros as the dedicated supporter of morality and ethics comes with the answers. On the other side, there is Diogenes with his opposing arguments and rationale based on the ideas of liberalism and absolute contractual freedom of the parties to the contract.

Antipatros, student of famous “stoic” Diogenes, claims that in case the businessman (seller) knows about ships heading to Rhodes, such honest man shall say everything to the potential buyers so that they were informed about every aspect of such sale that is known also to the seller.

This viewpoint is challenged by Diogenes and “*ius civile*”. Diogenes argues that the seller is obliged to inform the buyer about every defect of the goods but no supplementary information have to be announced to the buyer.

Diogenes tries to talk on behalf of the honest man and says to the buyer: “I am bringing the goods and selling it not more expensively than the other, maybe even cheaper as I

*do have bigger reserves. Who is suffering the injustice?"* [1]

These two arguments are representing the discrepancy between what is moral (and simultaneously less profitable for the seller) and what is legal. As for the fact that aforementioned case comes from Cicero (who was dedicated supporter of moral behaviour), we can forecast who shall be seen as the winner of the moral-liberal dispute according to Cicero.

Antipatros challenges his teacher and claims that every single member of the society has to have natural sentiment with the society where he lives in, i.e. his profits are the profit of the whole society and the profits of the society shall be seen as his profits. It is immoral to hide the harm that will be caused to the others by our conducts. After such statement related to proclaimed needs of the society that shall be seen *inter homines natura coniuncta societas*, Diogenes claims that realistic needs of individual shall be pushed forward. *"Is it forbidden for the individual to have his own property?"* If such statements was true, the individual would not be entitled to own his own private property, nothing could be sold and everything should just be donated. Diogenes sees the difference between hiding the facts and staying silent.

Cicero (Antipatros) lets the morality and justice to win in this case: *"I do think that the seller of the grain should not stay silent in relation to the inhabitants of Rhodes. It is not possible to talk about hiding all the time but the situation when you stay silent and do not want others to know about that shall be seen as hiding. The human doing so shall not be seen as the human open-minded, simple, just and honest."* [2] Moral point of view regarding the sale of goods is pretty clear. The seller shall of course notify the buyer about all the circumstances affecting the purchase price.

Reality of day-to-day business in Rome was very different from abovementioned. You could hardly find a businessman that would follow clever lines of the Cicero's essay. What in fact limited the businessmen when setting the purchase price is the offer, demand and law?

### 3. *Pretium iustum* (legal viewpoint)

Roman law stipulated that purchase agreement in order to be valid has to meet two legal criteria. The parties to the contract have to agree upon the subject matter of the sale and the price for the subject matter. [3]

One of the core elements creating *emptio venditio* was the agreement of the partners on the purchase price that shall have been clear. [4] Except for the clarity (*certum*) the purchase price had to be verified (*verum*) and meant seriously. [5]

*Pretium iustum*, i.e. fair price, created the "triumvirate" of the features that purchase price had to dispense with. However, this last feature (*iustum*) was not seen as the condition *sine qua non*. The purchase price did not have to be fair or just according to *ius civile*. Why and how did the law allow the parties to enter into the purchase agreement that consists unjust or unfair condition and therefore unjust or unfair amount of purchase price?

Fair price was not the condition of validity of the purchase agreement mostly due to the liberal nature of the Roman civil law. Fully free citizen (*pater familias*) not only should but had to care about his own acts in a way to prevent irrational behaviour and loss of his assets when entering into a purchase agreement (economical decline of his assets). Stipulating the purchase price was fully in the discretion of the contractual parties. Purchase price was dependent on the demand, offer, economic, social, intellectual and emotional individual features of the seller and the buyer. Liberal viewpoint of the Roman law deemed the fair price as a price set in a way that the buyer is willing to pay for the goods. The parties to the contract have mutually stipulated what is and what is not just and fair in particular case. Evaluating the justice of the purchase price by court shall therefore be seen as improper infringement into the contractual liberty of the parties to the contract. Parties to the contract shall have the option to evaluate and negotiate their own value of the consideration reflecting their economic needs and interests. [6] Such attitude is transformed from Paul's fragment in Digesta: *"Quemadmodum in emendo et vendendo naturaliter concessum est quod pluri sit minoris emere, quod minoris sit pluri vendere et ita invicem se circumscribere ita in locationibus quoque et conductionibus iuris est."* [7] Parties to the contract could easily set the purchase price and could therefore ask for much more or much less than other person would deem as just and fair.

### 4. What is moral does not have to be seen as legal, what is legal does not have to be moral (morality vs. law)

What is allowed by law is not always honest. [8] Paulus characterises the reality of business and legal life in Rome and the eternal fight between the morality and law by this short and simple quote. Legal scholars of Roman legal science and philosophy knew that business ethics and Cicero's moral recommendations have not corresponded with the reality of making business in Rome that in general did not meet any moral standards - *Sed aliter leges, aliter philosophi tollunt asturias*. [9]

In order to show actual case of honest businessman – salesman with grain, we could find it in the judicial decisions of the United States of America. The case between the company Laidlaw & Co. and Mr. Organ was dealing with similar situation as the situation described by Cicero. During the times of war between USA and England (1812-1814), the price of tobacco has been significantly low as for the industrial blockade by England. The businessmen in USA did not have an access to the other markets where they could sell their goods. Mr. Organ has heard from his brother that peace agreement has just been signed between USA and England. He realized (as skilled businessman) that if the other people will get this information, the price of the tobacco will rise dramatically. Therefore (having knowledge of this information) he immediately entered into a contract with the company Laidlaw&Co. and bought enormous amount of tobacco (50 000kg) for current low price. The price went of tobacco doubled the other day. The lawsuit was filed against Mr. Organ by Laidlaw&Co. but the judge has seen

this agreement as valid and effective. The purchase agreement did not entail any provision that would violate the law. It was simply the situation when one party to the contract disposes with more information than the other. Such fact does not constitute invalidity of the contract. [10]

Abovementioned case shows us good business skills of Mr. Organ so as his moral unsoundness. It is impossible for any great lawyer to resolve the eternal dispute between moral and legal. We cannot really say who is right in case of Mr. Organ and Laidlaw&Co. We can understand the viewpoint of the businessman disposing with precious information and trying to make profit from it. On the other hand, we also understand the view of the company Laidlaw&Co. that have been fooled by such businessman and lost huge amount of assets because of its lack of information. Moral viewpoint is clear. Natural law stipulates what is moral and what is common for every member of the society. To establish and base the rules of the business relations on abstract rules of moral is impossible in a same way as it is impossible to prevent the human from his desire to own more than other people. Acts of most informed and clever businessman disposing with relevant information affecting the purchase price shall not be seen as fraudulent behaviour. No moral rules can prove such behaviour as fraudulent behaviour.

Current legal order in many European countries addresses the abovementioned cases and gives options for the parties to the contract to adjust their contractual obligations with respect to possible change of the conditions that are vital for entering into such contract. Moreover, legal order creates basic legal institutes and doctrines and includes them into civil legal rules in order to provide security for the parties. Such doctrines shall be respected in every case as they are representing the minimal fundament of the contractual liberty. Even though the doctrine of "*pacta sunt servanda*" is vital when talking about contractual relations and obligations, legal order created the clause named "*rebus sic stantibus*" as the possible corrective of such doctrine. Such clause protects the parties in cases when fundamental conditions that made the party to enter into contract are changed after signing the contract.

We can see that these two current legal institutes could possibly be used also for the cases described hereinabove and we assume that "informational deficit" might be challenged by such doctrines or clauses.

Legal orders also stress the requirement of good morals in their legal environment. All the legal acts within the respective legal framework shall comply with the conditions stipulated and related to good morals. The term "good morals" is associated with legal practice as well as legal theory. The basic assumption is that execution of rights and obligations arising from civil law relations must not interfere with the rights and legitimate interests of other persons without legal grounds and must not be in conflict with good morals. Moreover, every single legal act is invalid if the content or the purpose thereof violates or evades the law or is inconsistent with good morals. Where the parties to the contract leave the time of performance at the discretion of the debtor, law stipulates that it shall be

set by a court upon the application of the creditor on the basis of the circumstances of the case so that it complies with good morals.

In relation with the abovementioned, we can see that the term „good morals“ plays a vital and important role in the area of civil law and interferes with the contractual freedom of the parties. On the other side, such rules serve as the collateral for justice and equity in the private law relations.

Last but not least, it shall be mentioned that specifically within the business relations, the law creates the doctrine related to principles of honest business relations. The law stipulates that every exercise of a right that is contrary to the principles of honest business relations shall not enjoy legal protection. As for the analysed cases, we can see that currently valid doctrine might also have been applicable, mostly when talking about ethical aspect of business and aspects of „fair trading“. It is important to note that principles of honest business relations are currently applicable only for business relations, excluding the pure civil law relations. Moreover, the law does not protect the parties as for the fact that law does not stipulate the invalidity of the legal act in case of violation of the honest business relations doctrine. The law prohibits the court (or any other authority) to provide the party violating such doctrine with legal and justified protection.

#### References:

- [1] GIARDINA, A.: *Římský člověk a jeho svět*. Praha: Nakladatelství Vyšehrad, spol. s.r.o., 2014. p. 250
- [2] CICERO, M., T.: *O povinnostech*. Praha. 1970. p. 146
- [3] ZIMMERMAN, R.: *The Law of Obligations: Roman Foundations of the Civilian Tradition*. Cape Town: Juta & Co, Ltd. 1992. p. 234
- [4] VRANA, V.: *Kúpna cena – pretium vertum, certum, iustum v rímskom práve*. In: *Kúpna zmluva – História a súčasnosť I*. Košice: Univerzita Pavla Jozefa Šafárika v Košiciach. 2013. p. 413
- [5] Op. cit. ZIMMERMAN, R. p. 255
- [6] Op. cit. ZIMMERMAN, R. p. 256
- [7] Paul. D. 19, 2, 22, 3
- [8] Paul. D. 50, 17, 144
- [9] Op. cit. CICERO, M. T. p. 151
- [10] Laidlaw v. Organ, 15 U.S. 2 Wheat 178 (1817)

## CORPUS-BASED LINGUISTIC ANALYSIS OF COMPARISONS WITH A COLOUR COMPONENT

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**Abstract:** *This paper deals with an analysis of comparisons with a colour component on the basis of a corpus material. The analysis is based on the contextual environment of comparisons extracted from the Slovak National Corpus data. The corpus-based linguistic analysis covers comparisons with a colour component, while focusing on their contextual environment. By studying the contextual environment, we have obtained a wider picture of the semantics of selected comparisons.*

**Keywords:** *comparison, corpus-based analysis, context*

### 1. Introduction

The interpretation of the meaning and symbolism of colours is subjective. None of the possible interpretations of the meanings of colours in different fields are generally applicable. The interpretation of the semantics of colours can be rather misrepresented given the geographical and demographic developments, also with regard to the individual perception of a text. The informative value of colours depends not only on the demographic and geographic, but also historic differences. These very differences play an important role in the interpretation of colours.

Back to ancient times, people knew about the impacts of colours on human mind, thanks to which some colours were considered magic. As an example, we can mention the fact that during the ancient era people painted the bodies of the deceased with red colour because they believed in the magic power of this colour which was supposed to bring the dead back to life. Red was supposed to protect a man against danger, negative influence and demons or guarantee fertility. The present offers to us another example in connection with the European-Asian context. While Europeans consider black as the colour of grief, Japanese express grief with the white colour. White has a special position also in the Japanese culture in specific ritual activities. On the contrary, in the Chinese culture it is more common to wear mourning clothes made of colourless cloth. However, they are not necessarily white. Black and white colours have special position among other colours as they are both closely related to the absolute [1]. The absolute of these two colours is to be understood in the fact that with none of these colours it is possible to come up with categories of shades, richness and intensity.

Staying with the Asian context, it is interesting that Chinese discovered relations between tastes and colours. The results of a research showed that people who prefer blue colour love to have their food salted; people preferring red colour like strong tastes; green colour is typical for people who love sweets; and finally, violet colour is sought by those preferring bitter tastes.

Not even in paremiology the colour component is always the bearer of clear semantic information. The informative value of the symbolism of colours always depends on the context in which it is used. In folk literature, colours are assigned meanings on the basis of experience and situations, or similitude to objects and phenomena which we commonly face. The symbolism of colours accompanies us in our everyday life, and is largely influenced by the culture in which we live. Each of the wide range of colours reminds us of something from our common, real life. Further to this fact, colours acquire a new dimension in the form of symbols. By using comparisons with a colour component we can accentuate our own thoughts and make our linguistic expression special. The meanings of colours may sometimes appear irrational, but are substantiated.

### 2. Comparison

The term *comparison* used in this paper represents “*the means for a metaphoric expression of similitude*” [6, p. 125]. The informative value of a comparison and its meaning is a matter of opinion. For the purposes of this paper, we decided to analyse comparisons with the correlative conjunction *as* and perceive these phraseological units as paremiological forms, though they do not belong to this category in the strict sense. One of the incentives for classifying comparisons as paremiological forms is the fact that A. P. Zátorecký also chose this approach when compiling his paremiological collection of proverbs *Slovak Proverbs, Sayings and Stock Phrases*.

With respect to the frequency of comparisons with a colour component, we consider it important to mention the frequency of selected adjectives with a colour meaning in the Slovak National Corpus (SNC) database. The statistics which we dispose of are from the list of the 500 most frequent adjectives in the SNC database. The list of the most frequent adjectives was set up on 17 March 2011 for the purposes of preparing the *Dictionary of Slovak Collocations. Adjectives*. The frequency data contained in the table *Frequency of selected adjectives with a colour*

meaning in the SNC database is derived from the SNC version prim-5.0-public-all. The last item in the table represents the ranking of the adjectives in the 500 most frequent adjectives in the SNC. The table does not include adjectives with the category of shades, saturation, intensity and colour assessment, such as chocolate, dark, light blue, dark green, clear red, matt red, beautiful pink, bright white, etc.

*Table Frequency of selected adjectives with a colour meaning in the SNC database*

Adjective	Frequency – number of entries	Ranking in the SNC
Black	145,617	58
White	133,592	65
Red	97,921	96
Green	64,357	162
Blue	42,956	250
Yellow	37,729	293

A new SNC version prim-6.1-juls-all is currently available. We used this version for the detection of the frequency values of comparisons and for an analysis of the contextual environment of the comparisons. The frequency data shows the absolute frequency (number of entries) of comparisons in the SNC database which may also include, for example, names of works, movies, different publications, etc. For the purposes of the corpus-based linguistic analysis, we chose six comparisons with a colour component which we consider the most interesting. The order of the comparisons analysed was determined on the basis of the statistics from the table *Frequency of selected adjectives with a colour meaning in the SNC database*. The comparisons subject to our analysis can be found not only in the newly prepared *Dictionary of Slovak Collocations. Adjectives*, but are mainly contained in the above-mentioned *Archive of Slovak Proverbs* administered by the Institute of Ethnology of the Slovak Academy of Sciences in Bratislava. On the basis of the corpus material, we will seek to either confirm or negate the common meanings of comparisons using the SNC database. Naturally, we will not avoid additional information presenting new meanings, if such occur, as well as information on the contextual environment of the comparisons.

### 3. Analysis of comparisons with a colour component

*Black* is not considered a colour, but for the purposes of our paper we interpret it as a colour – on the basis of the definition of the word *black* from the *Concise Dictionary of the Slovak Language*: “having the colour of coal, soot, opp. of white” [4, p. 97]. This semantics is supported by the example *black colour*.

Black often relates to sadness and pain as contrast to white which as a colour symbolizes hope. Black represents the symbol of the night, defiance, protest, darkness, death or grief, and is also the symbol of elegance and nobleness. It can symbolize both the richness of life and its absolute deficiency. As we have already mentioned, black may be interpreted as the colour of night. With this interpretation it

is important to state that in this case black participates in the symbolic complex mother – fertility – secret – death. Due to these reasons it was often in the past the colour preferred by goddesses of motherhood and fertility and their ladies. To conclude, black may be interpreted as the colour of evil as it is connected with black magic [1].

Its positive meanings refer to unity, power, patience and persistence, as manifested in the flags of some countries. One of such examples is the Commonwealth of the Bahamas where black symbolises unity. Another country is the Republic of Trinidad and Tobago in the flag of which the symbolism of the black colour expresses power. The last example is the flag of the Co-operative Republic of Guyana in which black manifests patience and persistence [13].

For black, we chose the comparison *black as the night* with the frequency of 83 entries in the SNC database. The expressiveness of the comparison predestines it to stress, highlight or exaggerate a particular element of appearance of a person, such as eyes, hair, skin, or their overall look. Language users can use this comparison also when referring to a very tanned person. The meaning of the comparison does not primarily refer to items, objects and different phenomena only. Some entries in the SNC database refer to black as a colour and are without any connotation. In addition to these meanings, the contextual environment expands the group of meanings with affiliation to a certain ethnic group, not only Roma.

*White* is neutral, and in its essence it cannot be considered a colour, just like black. With regard to the white colour, we proceeded in the same manner as with black, because we perceive it as a colour. Our approach is based on its semantics according to the *Concise Dictionary of the Slovak Language*: “having the colour of snow, of milk” [4, p. 67]. The *Dictionary of the Slovak Language* provides a similar wording, completed with concrete examples containing the *white colour*.

White evokes in each of us feelings of perfect or even heavenly purity. This colour as a symbol of peace is most often depicted as a white flag or a white dove. It is also the symbol of innocence, order, sincerity, virginity, etc. Based on the above mentioned reasons, white is often used in wedding, initiatory or religious ceremonies. White is worn not only by individuals undergoing the ceremony but also by those who perform it. To illustrate it with an example, clergymen often wear white clerical vestments as they refer to the symbolism of white – spirit, light and purity. Another example is the fact that Christian angels and saints are presented in white clothes. Even the Christians who were baptized wore white clothes to symbolize the acquisition of the original innocence and purification from hereditary sin. What is interesting is that even though the mortuary sheet is white and is connected with the leaving of man from earthly life, white colour in this situation does not symbolize death, but another stage of supernatural life. However, the interpretation of white in dreams is different. White in dreams foreshadows the forthcoming death [1].

The meanings of freedom, understanding, tolerance and noble ideas are also symbolised in the flags of some countries. For example, the white colour in the flag of the

Federation of Saint Christopher and Nevis symbolises freedom. Another country is the Islamic Republic of Pakistan where white means tolerance. The last example is the Republic of Cuba where white inside the flag represents noble ideas [13].

For white, we chose the comparison *white as a paper* with a frequency of 14 entries in the SNC database. The semantics of this comparison refers to humans only. In its essence, it refers to a pale or a suddenly turned pale or sick person. This comparison, however, can also be used in case we talk about grey hair. Some entries are without any connotation and refer to white only as a colour. The analysis of the contextual environment showed other possible interpretations of this comparison. We can interpret it as a designation of a person with untanned skin, or of a tired, fragile or famished person.

*Red* has an irritating effect; it is connected with danger, heat, excitement, passion, ardency, intimacy, etc. It is also the symbol of blood, life, as well as death and fight. Speaking about red, we distinguish two types of meaning, i.e. positive and negative. In positive meaning red is a colour symbolizing e.g. fertility, love or life. As a symbol of fertility it was already used by the Romans. Their brides would wear striking red veils which symbolically did not refer only to fertility but also to love. Besides this fact the Romans considered red to be a colour symbolizing the power of emperors, nobility and generals. Another example of red having the meaning of power is the medieval executioners. In that period they would wear red clothes to symbolize their power over life and death. Or cardinals who wore red clothes and hats demonstrated their privilege to advocate the rights of the Church up to the absolute bloodshed. A devil is also portrayed in red symbolizing the flames of hell. In this way we approach the negative semantics of red symbolizing war, hatred or fire [1].

Red colour is not an exception, and can again be found in the flags of some countries, symbolising, for example, self-sacrifice, revolution, socialists or communists. The red colour in the flag of the Syrian Arab Republic represents self-sacrifice. Red in the flag of the Republic of Portugal symbolises revolution. The last flag mentioned here as an example is the flag of the People's Republic of China in which red represents the symbol of communists [13].

For red, we chose the comparison *red as a rose* with a frequency of 20 entries in the SNC database. This comparison expresses a nice, kind, allusive reference to someone's face, mainly lips and cheeks. We can also use it in situations where we want to highlight the shade of someone's hair, thus expressing the colour intensity (of the hair). On the basis of the analysis of the contextual environment, we also came to other interpretations of the meanings. This comparison can also refer to a person who feels excitement or expectation from a forthcoming event. Another interpretation can be kind, surprising abashment which does not evoke in an individual the feeling of shame, but rather slight confusion.

*Green* is the colour of nature, money, hope, as well as harmony and balance. Some consider it a colour which can bring harmony between the body and the mind, which

subsequently eliminates irritation or exhaustion. If we speak about green as a colour of nature, we think about the initiatory stage of the spring. Green can be interpreted as a colour of water, immortality or life. It is interesting that in Islam green is the colour of spiritual and material welfare. All of these are positive meanings. However, not even green is an exception and it can be interpreted in negative way as a colour of dangerous blaze, poison and devil. These negative interpretations of green originate in medieval times and alchemy. Alchemy is connected with green light that is a unique light phenomenon. In this case it is the symbol of enlightenment and image of life and death [1].

Green is the symbol of rainforests, solidarity or knighthood in the flags of some countries. One such example is the flag of the Federative Republic of Brazil in which green represents rainforests. Another country with a green component in the flag is the Republic of Guinea where green symbolises solidarity. The last example is the flag of the Republic of India in which green means knighthood [13].

For green, we chose the comparison *green as the ace* with a frequency of eight entries in the SNC database. The analysis of the contextual environment confirms the two common meanings. The informative value of the comparison refers to the individual's look and feelings. In this case, we talk about a pale person, but also about a person with very intense feelings of sickness.

*Blue* colour symbolises peace and balance, security, intelligence, sensitivity, fineness, reliability, stability, responsibility, etc. Blue can be seen as the colour of heaven, truth, loyalty and even the colour of protection. It is in Islam where blue symbolizes protection against evil look [1].

Blue is the symbol of lakes, Judaism, and rain in the flags of some countries. The first example of a flag with a blue component mentioned here is the flag of the Republic of Finland in which the blue colour represents numerous lakes. Another country is the State of Israel where blue in the flag symbolises Judaism. The last example of a flag with blue is the Kingdom of Lesotho where it symbolises rain [13].

For blue, we chose the comparison *blue as heaven* with a frequency of 22 entries in the SNC database. The semantics of this comparison only refers to the appearance of a person, specifically their eyes and the colour of the eyes. Some entries, however, are without connotation and refer to blue as a colour.

*Yellow* is also the colour of nature, just like green. Besides other things, it symbolises wisdom, balance, and also sun. Yellow with its symbolism and semantics closely relates to sun, light and gold. Also yellow has positive and negative semantics. In the negative perception it demonstrates envy or shame in clothing, e.g. Jewish yellow star. When interpreting yellow it is appropriate to distinguish between its shades. Here we come to the opposites again. I will mention the most popular ones. Golden-yellow shade represents the good and light. On the contrary, sulphur-yellow shade symbolizes the evil and the devil. In Islam the golden-yellow shade represents wisdom and good

advice. However, the light yellow stands for treachery and disappointment [1].

Yellow is the symbol of desert, savannah, as well as neutrality in the flags of some countries. One such example is the flag of the Republic of Chad in which yellow symbolises a desert. Another flag with a yellow component is the flag of the Republic of Guinea-Bissau, in which yellow represents a savannah. The last example of a flag with the yellow component is the flag of the Republic of Cyprus, symbolising neutrality [13].

For yellow, we chose the comparison *yellow as wax* with a frequency of seven entries in the SNC database. The meaning of this comparison primarily refers to a person, their face or skin. Three entries, however, are without connotation and refer to yellow only as a colour. This comparison can be used in talking about an individual as apparently a yellow person, usually of unhealthy colour. Another meaning which can be ascribed to this comparison is its use to describe a very pale or even suffering person.

#### 4. Conclusions

When we talk about colours in general, it can be concluded that colours help better express emotions, mood or the current state of the mind. Through the colour component we can allude – not only in paremiology, but in the linguistic expression of each individual – to what we actually think; concisely describe the appearance and the properties of a person, or to correctly and sensitively describe the appearance of objects, etc. By analysing the contextual environment of comparisons, we focused not on a single meaning, but on as large group of meanings as possible. We can conclude that contextual use can largely influence the semantics of the comparisons subject to our analysis.

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#### References

- [1] BECKER, U., *Dictionary of Symbols*, Praha, Portál, 2002, 360 p.
- [2] HABOVŠTIAKOVÁ, K., KROŠLÁKOVÁ, E., *Man in the Mirror of Phraseology*, Bratislava, Tatran, 1990, 217 p.
- [3] HULKE, W. M., *Magic of Colours. The Book about the Healing Power of Colours and their Impact on the Human Body, Soul and Spirit*, Praha, Nakladatelství Pragma, 1996, 154 p.
- [4] *Concise Dictionary of the Slovak Language*, Eds. J. Kačala, M. Pisárčiková, M. Považaj, Bratislava, Veda, 2003, 988 p.
- [5] MADDRON, T., *Life by Colours*, Praha, Ikar, 2005, 192 p.
- [6] MLACEK, J., ĎURČO, P. et al, *The Phraseological Terminology*, Bratislava, Stimul, 1995, 160 p.
- [7] SCHMIEDTOVÁ, V., SCHMIEDTOVÁ, B., Determining of the Language Basics of Colours in the Czech National Corpus, In: *Corpus Linguistics: The Status and Models Approaches*, Eds. F. Čermák, R. Blatná, Praha, NLN, 2006, pp. 285 – 313.
- [8] SCHMIEDTOVÁ, V., Free and Bound Connectivity/Collocations Colour Names and their Shades in the Czech Language: The Analysis Based on the CNC, In: *Collocations*, Eds. F. Čermák, M. Šulc, Praha, NLN, 2006, pp. 311 – 361.
- [9] *Dictionary of the Slovak Language. I. A – K*, Ed. Š. Peciar, Bratislava, Vydavateľstvo SAV, 1959, 815 p.
- [10] *Dictionary of the Contemporary Slovak Language. I. A – G*, Eds. K. Buzássyová, A. Jarošová, Bratislava, Veda, 2006, 1134 p.
- [11] *Dictionary of Slovak Collocations. Adjectives* (editorial preparation).
- [12] SMIEŠKOVÁ, E., *Small Dictionary of Phrases*, Bratislava, Slovenské pedagogické nakladateľstvo, 1989, 270 p.
- [13] SMITH, N., *Flags of the World*, Bratislava, INA, 1996, 80 p.
- [14] ZÁTURECKÝ, A. P., *Slovak Proverbs, Sayings and Stock Phrases*, Praha, Česká akademie, 1896, 389 p.

## POLITOLOGICAL CHARACTERISTIC OF THE SLOVAK STATE IN THE PERIOD OF 1938-1945

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**Abstract:** *The aim of this scientific paper is to identify a regime of the Slovak State. It is based on undemocratic theory of Brzezinski, Friedrich and complemented with the theory of J.J. Linz. During the development of the Slovak State was also changing the type of authoritarian regime. Kamenec dealt with the phased development. This author also divided the periods of Slovak State into four parts. Based on the policy changes this paper determines what kind of authoritarian regime is in question. This paper also tries to identify the Slovak State in this period as fascist or clerofascist, through the comparison of the values of fascist ideology which were set by Heywood, with the signs of the Slovak State.*

**Keywords:** *the Slovak State, authoritarian regime, fascism*

### 1. Introduction

The period of the existence of the Slovak State is still seen as a black spot in the history of Slovakia. The problem is its very creation. Especially when Czech politicians hardly bear that Tiso declared the establishment of the Slovak State. They considered this a betrayal against them and as a kind of treason against the then Czechoslovakia. They pointed mainly on the fact that the Slovaks were between the 20s and 30s of the 20th century markedly economically backward compared with the Czechs. They literally saw it as a sacrifice for Slovaks who as soon as they got such a chance, they declared an independent Slovak State and because of this the Czechs historians often evaluate this situation negatively. Before war it came to the division of Czechoslovakia into the Slovak State and the Protectorate of Bohemia and Moravia mainly through Hitler's plans. While in the Czech Republic the regime has been very hard in Slovakia has been a bit lighter. However, at a closer characterization of the Slovak State, the experts still cannot to settle. There is still a question about whether the Slovak State was fascist or clerofascist. Especially representatives of the Slovak church hardly bear if we say that the Slovak State was clerofascist, because it brings a darker vision to Church. It is also a problem to identify Tiso's regime. Was this regime totalitarian or authoritative? And if it was authoritative, by which of its kind is it? The aim of this paper is to answer to all of these questions. During more precisely classification of the political regime originate terminological differences.

### 2. Classification of the political regime of the Slovak State based on the typology by Friedrich and Brzezinski and Linz

The political regime of the Slovak State is possible considered as undemocratic. Some authors considered this regime as authoritarian-totalitarian or totalitarian-authoritative. These terms uselessly mix together two different types of non-democratic regimes: authoritative and totalitarian. The question is why authors label the political regime variously. The answer might be Tuka's statement: *"It is necessary to realize that the regime of the*

*Slovak State was not static but during its relatively short existence went through dynamic development"* [1]. From the statement above results that the political regime was not static but evolved during its short existence evolved. Ivan Kamenec divided its existence into four periods: 1. since the end of 1938 to summer of 1940, 2. since the summer of 1940 to the second half of 1942, 3. since the turn of the year 1942/43 in August 1944, 4. from September 1944 to spring of 1945 [2]. In the first period there is a split of political elites in the way of management of the newly established Slovak State between the two wings of the Hlinka's Slovak People's Party. Group around Tuka and Mach tried to push through against dominant, moderate, conservative-catholic wing. However, at this time they failed because the moderate wing had the trust of leaders in Germany. The distribution of the ruling elite is a sign that the regime can be considered authoritative, because heterogeneous elite is consistent with Linz conception of limited pluralism, which he considers for the most important sign of authoritarian regimes [3]. This political regime at the beginning of its existence did not fulfil the main features of a totalitarian regime that was defined by Friedrich and Brzezinski [4]. However, some signals totality can be seen in the concept of the HSPP, when the leader position of the Party was enshrined in the Constitution, as well as statements of Jozef Tiso on the principle: one God, one people, one body, one party. This gave a glimpse of the future direction of the political regime towards to totalitarianism. HSPP did not have necessary ideological base that we could consider this period as totalitarian. Populist regime was based on the mentality, which Linz defined for authoritarian regimes. The political regime in the period 1938-1940 is therefore considering as the type of regime, which corresponds to Linz's definitions of organically-statist authoritarian regime. Therefore came to a change in the political regime. This period lasted since the summer of 1940 to the second half of 1942. At the beginning of the year 1940 it seemed that the moderate wing won its struggle for the character of the regime. Radicalists were isolated Hlinka Guards were degraded to the organization of physical training and



military service function. Alexander Mach, commander of Hlinka Guards and the propaganda chief delivered his resignation to the President. The resignation was accepted. Right after that was in Hlinka Guards conducted purges and radicals were deprived of their functions and their management was subordinated to the presidency of HSPP. Worsening of the position of the moderate, Catholic wing happened at the Salzburg negotiations. German and Slovak leaders met here and Hitler expressed his dissatisfaction with the situation in Slovakia. Based on this negotiation was Ďurčanský called off of chair of the Foreign Minister, because of his efforts to bigger foreign independence of Slovakia against Germany. Tuka and Mach occupied key posts at the Ministry of Foreign and Internal Affairs. Moreover, Tuka retained the post of prime minister and Mach returned to the head of the Hlinka Guard. Catholic - moderate wing was able to respond to the situation and limit the influence of radicals. They have done this by downloading their methods and partly also objectives, what resulted in systemic transformation mode. Tiso, as the leader of the party began to consistently apply the principle of leadership and forced the radical to obedience. The result of the application of this principle was that the new act no. 215 about HSPP amplified Tiso's position and institutionalizes his personal cult that he was assigned with the title leader. As in Italy, the *"leader became the Chief Representative of party, co-coordinator of its policies and indicator of the manner in which the party should fulfil its mission"* [5]. The significance of HSPP in the political system also increased. The Parliament thus became politically insignificant. Act confirming the privileged position of the leader of the political system is one of the characteristics of a totalitarian system by Brzezinski and Friedrich [4]. In addition, the Office of State Security, which was under the control of radical started on a large scale execute reprisals. The adoption of regulation no. 198 about the legal status of Jews and of Constitutional act no. 68 meant year later the liquidation of social groups, which fulfil other characters by Brzezinski and Friedrich to describe the regime as totalitarian. Totalitarian regime touched army and economy relatively weak. This was due to the interest of the Nazis, that the army and the economy remain fully functional and have been involved in the service of the Third Reich. They did not want these efforts for a new political regime to somehow influence the fighting power of the army and the performance of the economy. On the basis of this the political system, which lasted since the summer of 1940 until 1942 fulfil the characteristics set by Linz for the defective, before-totalitarian subtype of the authoritarian regime. These are actually two subtypes of regimes, which connects their transit position between authoritarian and totalitarian regimes. However, there are different with mutual orientations. In before- totalitarian regime the power of the mass and ideological party is not consolidated, which means that there are institutions such as the army, the church, interest groups, which have certain autonomy. There is still some diminishing limited pluralism, which is inexorably approaching the totalitarian regime. Defective systems are characterized by stopping in front of the

fulfillment of all characters belonging to the totalitarian regime [3]. Some important autonomous structures as the church or in the case of the Slovak State the army and the economy remain permanently out of control. In the period of 1940-42 the Slovak State is an example of the defective, authoritarian regime. The Slovak State was a country whose development was dependent on external international situation. At the time when the Third Reich rejoiced in the victories and kept growing, in the Slovak State were attempts to create a totalitarian regime. These efforts were not successful and in the following years the Third Reich experienced the first major military defeat like for example in Stalingrad. The defeats of the Third Reich were transferred from the battlefield to the political regime of the Slovak State. At the turn of 1942-1943 the leaders of the radical wing were gradually slipping away from active policy. Tuka was compromised with so-called Sznacky's affair and Mach tried to find a way to the conservative-catholic wing. Blunting the radical wing resulted into de-ideologization of the regime, as well as decrease of reprisal action of the security forces. Transports of Jews stopped. The leading political party finds himself in crisis and ceased to be a mainstay of the regime. Unclear direction of the party was influenced by the fact that a year ago was executed mass recruitment. Result was distribution of the leading elite in the party and weakening the position of this elite resulted in a shift of defective totality to other subtypes of authoritarian regime. However, its exact typology is not possible due to its fast progressing erosion. Efforts to restore organically-etatistic regime disappeared and ethos in which it was built, has practically lost in [1]. On the contrary it reflected significant hijack in the public eye, which caused questionable internal political steps and also already mentioned international events. The result was to delegitimize the regime and its decomposition. The last part of the fascist regime in the framework of the Slovak State can be identified from autumn of 1944 to spring of 1945. Into the total character of the political system, this period belongs only conditionally. The Slovak state in this period did not have formal elements of state sovereignty. In the past the Slovak State was also in the primary issues subordinate to the Third Reich, but this time authorities of the Third Reich had the last word also in secondary issues. Dr. Jozef Tiso remained as president and continued with the reconstruction of the cabinet and in part also came to the dismantling of HSPP. Only group with the fighting power was the Hlinka Guard, which willingly collaborated with the Nazis. Hlinka Guard unleashed terror as in the period of defective totality and also renewed the deportations of Jews. They tried to create new form of Slovak national socialism and reconstruction of the party. The battle between the moderates and the radicals was once again decided by authorities of the Third Reich. They sided with conservatives and confirmed the leadership of President Tiso [1]. This decision ended the most radical regime during the Slovak State.

### 3. Comparison of the characters of the Slovak State's political regime with the fascist ideology

Undemocratic fascist political regime was a model regime for our government officials. Moderate wing of conservatives have tried to find a compromise between the will of the citizens and fascist values. On the other hands radicals led by Tuka and Mach wanted to in detail reproduce the fascist regime. Following the example of the fascists in Italy, the title leader was established. It was the highlighting of leadership principle, which was established in the act no. 215 about the status of HSPP [5]. It was the principle that all authority comes from the leader's personality. That principle became the guiding principle of the fascist state. From leadership thus it became demonstration of exclusively charismatic authority, who was potentially unlimited. The leader was an exceptionally talented individual and his authority was absolute. The principle of leadership was established by the belief that the leader has a monopoly on ideological wisdom. Thus, he determines what his will is; respectively what is a fundamental will of the people [6]. Privileged position within the political system had HSPP similar to Partito Nazionale Fascista in Italia. Its exceptional position was declared by the act no. 215, where it's written that "the Slovak nation will participate in the state power through the HSPP" [5]. A new element in the Constitution of the Slovak State was the establishment of the State Council, which was adapted from Fascist regime. The Council of State should be advisory and control organ for president. The Council did not fulfil the function of an objective, inspectional and advisory body, because six members were appointed by the president, 10 members were appointed by the political party HSPP, which was led by Tiso and one member was appointed by Hungarian and also by German partya. Totally 16 members out of 18 members were under the influence of President Tiso. According to the model of the Black shirts in Italy was founded the Hlinka Guard. It was a paramilitary organization, which was created by Alexander Mach. Their effort was to promote the ideas of the radical wing of the HSPP. It was a voluntary organization from which, however, could not get off. The Slovak State declared in the Constitution the corporative-estate principle. In compliance with the Constitution, citizens of the Slovak State should be based on the fascist Constitutions of Portugal and Austria divided into the estates according to professions. This entails the following six estates: agriculture, industry, commerce and trade, finance and insurance, professional occupations, public servants and extension workers. Applied in practice according to the ideology of fascism was also racial theory. However, not all forms of fascism, involves open racism. Italian fascism was based on a voluntaristic theory, that is, irrespective of race and colour had to all individuals subordinate to interests of fascist state and Mussolini's will. Ideas of superiority began to be observed in the management in Slovak State when was issued the regulation no. 198 about the legal status of Jews. This regulation explains the term Jew; it determines who can be considered a Jew and introduces them to extraordinary duties. Politicians of HSPP continued in anti-Semitic

policy and in May 15, 1942 approved a constitutional act no. 68 about the eviction of Jews. With this move they tried to legalize the Jewish transports to Nazi camps. During the period from 25 March to 20 October 1942 was to the so-called death-camps dispatched fifty-seven train sets [5]. On the based these facts we can see as the fascist Slovak State duplicated the fascist political regime. But wherever this fascist regime settled down, it has its own specifications as well as Dollfuss's regime in Austria, Mussolini's regime in Italy, Salazar's regime in Portugal and Franco's regime in Spain. In the political system of the Slovak State there is political-party involvement of the Catholic clergy. At the beginning were in parliament eleven priests elected, from total number sixty-three elected deputies. Later, the total number of priests in parliament stabilized at number five. Within the counties from six regions administrators were two priests. Within fifty-nine districts were sixteen districts occupied with priests. In the parliament was also five Lutherans [7]. Based on this unconventional political engagement of the Catholic and Lutheran priests, the Slovak State can be considered as clerofascist. On the other side, it must be said that many Catholic and Lutheran priests fought against the racial laws. They helped members of the Jewish ethnic minority in several ways such as: providing shelter before the Hlinka Guard units or creation of false documents to protect individual members of the Jewish minority. They act as a kind of opposition to the then regime. For this reason, religious and opponents of the fascist regime merged around them. Their aim was observance of human rights, which was reflected in 1943 when they expressed against the renewal of transports to labour camps. The planned deportation reported Interior Minister Alexander Mach in a speech in Ružomberok on 7 February 1943. However, then already everybody include priests knew, that they were not labour camps but death-camps. Slovak bishops have published their views on the resumption of deportations in the form of a pastoral letter on 8 March 1943. According to Chalupecký and Olexák in this pastoral letter bishops stand against deportations very decisive and clear. *"From their part, it was decisive, public and very clear protest against the undemocratic policy of the Slovak government. As a result of this pastoral letter - no doubt about it - the planned deportations in 1943 never renewed"* [11]. Identification of the Slovak State as clerofascist can be misleading and inaccurate, despite the fact that a number of Catholic and Lutheran clergy became part of undemocratic fascist regime and even the leader, Dr. Jozef Tiso, was a Catholic priest. But as we can see, from the case of deportation of Jews, bishops and priests retained in this undemocratic period as the pillars of freedom and democracy. Thanks to their courageous actions, in which also come on their own lives, we cannot identify the Slovak State as full clerofascist. This label has begun to be used in scientific publications after the Word War II. In particular, communist leaders used it for their own benefit to blacken the church in the eyes of citizens. Their aim was the gradual full abolition of the Church in former Czechoslovakia. It is thus a deliberately use of this term

during the communist regime. For this reason the regime of the Slovak State is appointed as the regime with the signs of fascist regime.

#### 4. Conclusions

In publications about political regime in the Slovak State are often ambiguities about identifications of regime. Some authors consider it to be totalitarian, for others it is authoritarian regime. This inconsistency was created due to the fact that the political regime was not static but went through dynamic development. Therefore, in this paper the regime of Slovak State is classified according to Brzezinski and Friedrich and Linz characteristics of undemocratic systems. In the beginning was successfully established organically-etatistic authoritarian regime, which was not stable. The privileged position of leader and party was implemented in 1940, what has led to the creation of defective totalitarian regime. However, even in this case it did not come to the consolidation of the regime. At the turn of 1942-1943 there was a retreat from repressive-mobilization positions and authoritarian regime of the Slovak State gradually degenerated. The last part of the fascist regime in the existence of Slovak state can be identified from autumn of 1944 to spring of 1945. However in the overall character of the political system, this period belongs only conditionally, because the Slovak State in this period did not have formal elements of state sovereignty. Moderate wing of the HSPP tried to find a compromise between the will of the citizens and fascist values. On the other hand, a radical wing led by Tuka and Mach wanted to reproduce the fascist regime in detail. According to model of the fascist regime was in the Constitution established: the position of leader, privileged position within the political system of HSPP similar to Partito Nazionale Fascista in Italia, establishment of the State Council and the corporative-estate principle. According to the model of the Black shirts in Italy was founded the Hlinka Guard, which promoted the ideas of the radical wing of the HSPP. Everywhere the fascist regime was settled down had its own specifications. In the case of the Slovak State it was political engagement of the Catholic and Lutheran clergy in HSPP. For this reason, this regime could be considered for clerofascist. But that means that during the characterization of the Slovak State we would have to forget actions of most bishops, priests and religious. Because they were the ones, who became for many members of the Jewish minority, pillars of freedom and democracy.

#### References

- [1] Kopeček, Lubomír, *Demokracie, diktatury a politické stranictví na slovensku*, Brno, CDK 2006, pp. 347
- [2] Kamenec, Ivan, *Slovenský štát v obrazech*, Praha, Ottovo nakladatelství, 2008, pp. 248
- [3] Linz Juan José, *Totalitarian and authoritarian regimes*, London, Lynne Rienner Publisher, 2000, pp. 343
- [4] Friedrich Carl and Brzezinski Zbigniew, *Totalitarian Dictatorship and Autocracy*, 1962, pp. 180

[5] Pekník, Miroslav, *Dokumenty slovenskej národnej identity a štátnosti II*, Národné literárne centrum - Dom slovenskej literatúry, 1998, pp. 600

[6] Heywood, Andrew, *Politické ideologie*, Plzeň, Aleš Čeněk, 2008, pp. 362

[7] Lacko, Martin, *Slovenská republika 1939-1945*, Bratislava, Perfekt, 2008 pp. 206

[8] Chalupecký Ivan, Olexák Peter, 2015, Biskup Ján Vojtaššák, *Biskup v rokoch 1939-1945*, [online], 2015, [cit 2015-08-13], Available at web page: <http://dieceza.kapitula.sk/?g=7&ext=10&sub=68>

## FAMILY ASSESSMENT: THE ANALYSIS OF SOCIAL RISK RATE OF THE FAMILY AND ITS COMPENSATION MECHANISMS ON THE MICRO-SOCIAL ENVIRONMENT LEVEL

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**Abstract:** This report is supported by research project VEGA 1/0487/14 "Crucial concepts of selected systems theories for assessing social risk rate of families under the terms of child protection". The aim of this article is (1) to demarcate indicators for qualifying social risk rates of the family on the microsocial environment level, which influence the family's capacity to saturate its members' needs, and (2) to identify possible means for improving the compensation mechanisms of the family. The article is dedicated to the risk and protective factors of micro-social environment that have ties to the family system and influence its members' functioning.

**Keywords:** Assessment indicators, Social risk rate, Compensation mechanisms, Family, Ecological perspective, Family resilience

### 1. Introduction

Assessing social risk rates of the family is a complicated process formed by numerous dependent variables. Ensuring its impartiality and objectivity is a difficult task to accomplish in practice, although the whole sanitation of the family environment stands upon the social risk rate assessment. Assessors base their premises on the views of the normality of the family, attributes achieved by the functional family, and prop themselves upon their expert knowledge and practical experience. In the family assessment process it is important to realise that identifying social risk elements in dysfunctional families is the starting point for building compensation mechanisms necessary for living up to demands of the environment that the family lives in.

The text is based on the research project VEGA 1/0487/14, participated in by social workers from the child protection department and family assessors from the accredited subjects as the participants of the focus groups and of the half-structured interview.

### 2. Social risk rate of the family and its compensation mechanisms

We incline to the opinion that *the risk factors represent certain threat to good adaptation course of the individual, they are certain stressful situations („ordeals“) for them and they predispose them to the negative results in the development of the course of their life.* [1]

Risk factors tied to the family system are influenced by the environment, community that the family lives in, schools that the children attend, and the options of spending leisure time. Risk factors occurring within the environment weaken the effective functioning of the family, namely the actual employment index, socio-economical status of the family, the highest education degree of the parents, civic amenities of the community, belonging to the ethnic minority, healthcare availability, and personal and intellectual potential of individuals. Compensation mechanisms are utilised by the family as a strategy for coping with difficult situations (e.g. poverty,

unemployment, addictions, neglecting child's development.) despite adversities. [2].

We use compensation mechanisms of the family in the sense of protective factors, which lower vulnerability of individual and adverse influences of the environment. [3].

### 3. Family resilience

Protective and risk factors are connected to the term family resilience. Meaning of this word is elasticity, flexibility, suppleness or arduousness. We incline to the definition of resilience that describes it as an ability to successfully overcome adversities.

Almost a copernician twist in the risk elements assessment is the change of the research question from: „*What went wrong and why?*“ to searching for the answers to the question: „*Why did not (something) bad happen?*“ [4]. Family resilience includes dynamic processes supporting positive adaptation of the family to significantly adverse life circumstances. Each family has got its own sources, which is either individual or environmental reservoir lowering the impact of the social risk on its members [5]. The task of a social worker is to identify these risk and protective factors on all levels micro-, mezo-, and macro-social environment from the point of view of the ecosystem perspective [6]. This kind of approach also liberates social worker from pathologizing discourse of looking for a victim. This role of a black sheep of the family is usually taken by underage children or old people as the weaker elements of the family system in terms of power. In the context of their problematic behaviour they are often marked by the family as bearers of the family symptom. The demands connected with the change of causal thinking and keeping distance from searching for the linear cause of a problem are placed upon a social worker.

### 4. Ecosystem perspective

Ecosystem perspective speaks about circular processes, which view „... individual outcomes as a result of transactional processes between the individual and their

environment [7]. From the point of view of the ecosystem perspective we can look at the problematic behaviour of an individual as a manifestation of problematic events happening within the family, and at a family malfunctioning as an insufficient access to the sources of the surroundings. We count hereby on a premise that people do not live somewhere in the vacuum, and their actions, although seemingly destructive, saturate some of their unsatisfied needs. Navrátil says that people, according to the concept of social functioning, do not exist as autonomous and isolated units, but are substantially influenced by their environment in their lives [8].

### 5. Micro-social family environment

The aim of the sub-chapter is to identify the social risk rate of the family connected with micro-social environment. We consider the micro-social environment the individual factors connected to family members and environmental characteristics of a family [9].

Family starts to create its own micro-world from the moment dated by the members as an event that unites them historically, but even more emotionally. Usually it is marriage of the parents, birth of the first child, moving in of the partner... Social risk of the postmodern society lies in the change of purposes for the partners to get married. Matoušek says that families are not established in order to ensure the population's reproduction, but to satisfy the emotional needs of the partners. Stability of such families stands or falls on the emotional affection of the partners and saturation of their emotional needs within the partnership [10]. Generally, it is recommended to get married only once the primary emotional exaltation passes, and not earlier than one year after having met each other [11]. The risk factor of premature marriage can be unplanned pregnancy or the effort to get away from the parents' influence by escaping to the partnership. Increased rate of social risk can be seen in the cases when "children have children". Lack of parental abilities and desire for free life can show itself in the quality of the emotional bond (attachment), by which the child on the unconscious level creates the patterns of behaviour and processes experiences. This emotional bond between a child and a person taking care of them is a crucial factor playing a significant role in the process of socialisation, and self-confidence and indomitability rate of the child. *„Insecure attachment represents certain risks and increased possibility of failure, and is above all connected to the less effective emotional regulation, lower social adaptation, and mental disorders“* [12].

If we should identify compensation mechanisms in this area, it would be interventions focused on increasing parental abilities and provision of the timely intervention in the form of early care of the child. Such complex stimulation of a child's development, support of the psycho-motor development, creation of stimulating environment for a healthy development of a child and building emotional bond can reduce the social risk connected to the micro-system that the family lives in. Increasing parental abilities in an orientation family has got appreciable significance also for the future when the

descendants establish their own families. In our research we encountered an important piece of information, namely that the child protection often investigates the families of the children having children. "Actually, unfortunately we already have her daughter, who has a little child, so I do not want to say that it is transmitted, but those behavioral patterns in that family, unfortunately, are observed by the children, and then when they enter the partnerships, marriages or any other relationships, then unfortunately they come back to us, as the very same problems actually occur in those families"... In connection with the increased number of divorced marriages and entering new partnerships, Froma Walsh speaks about new normality when traditional forms of the family recede and new, alternative types of families emerge [13]. Wide spectrum of emerging forms of cohabitation and entering of a new partner into the intimate micro-world of the family, which shares common history, increases the social risk rate of the family. Bronfenbrenner proved by his own research that presence of a step-father in a family is a factor which increases probability of risky behaviour in the children [14]. Possible risk is setting a parentified child, who had a role of a "partner" before the coming of the adult into the family, aside. Their competencies and a certain degree of power connected to the responsibility for financial situation and well-being of younger siblings is taken away from them and suddenly there is a person with no idea about the hard times that the family had endured together and that had made them even more attached, sitting down at the head of the table... It resulted from our research, that the assessors notice not only the atmosphere in the family, but they also reflect the non-traditional family relations: *„...people who then, as the case may be, do not have their family support, or when they do, then they also live in such odd relationships ... such family bonds that there are even, let us say, three generations stuffed in one apartment....“* Exceeding openness of the family, where the assessor is not quite certain who does and who does not belong to the family, is the indicator pointing to the insufficient connection between its members. Socially dysfunctional families are characteristic exactly by extremely complicated family relations. Dysfunctional families are too open, in short periods of time various partners of the parents enter and leave, children of one of the partners, common children. Families live in various communities, where they live with another people in common household without being relatives... [15]. In certain life stages when children become adults and bring their new partners home, it is natural, that the family becomes more open towards its surroundings with the lack of privacy of its members. The indicator of insufficient participation and exceeding openness of the family is in accord with Beavers' centrifugal understanding of dysfunctional family, whose members satisfy their needs outside of the family. Adults and adolescents have natural desire to have their private hobbies, their way of spending leisure time and the interests and activities outside the family; nevertheless, family cohesion, spending time together and common dealing with finances of the parents that enables the family to reach higher material stability, are important for

underage children. In practice we encounter the cases of excessive permeability of the borders, which is obvious also in the household setting and equipment, where the child is allowed to sleep in the parents' bedroom and has got no space of their own, or when they are dragged into the communication between parents that they should not be part of. Often there are situations when family is contrariwise very closed, and exceeding emotional connection does not allow the individual to build their own individuality. Rigid and unchanging rules about checking the high school student's homework or about the curfew for children at eight o'clock bring problems, and reconstruction of subsystems in the family and consolidation of either parents' or siblings' subsystem is necessary [16]. The comprehensive image of healthy, neither too rigid nor too permeable borders was contributed to by the longitudinal research of the psychologist Barbara H. Fiese on family routine activities and rituals, which pointed out the significance of the ritual of family dinner [17]. Dining together enables family members to get to know each other closer and, according to the author, leads to better parenting. Such stabilisers of family life are beneficial for the children's emotional development, whereby the author emphasizes the necessity of the father's presence at the dinner. The compensational tool of social worker for increasing family cohesion as a disposition of indomitability of its members could be deliberate creation of the space for common family activities. Family that is under the constant pressure of stressful life circumstances and solving existential problems does not have many opportunities and often also insufficient skills to express positive emotions. Parents criticise their children, who then in effort to escape the family rules seek refuge in deviant forms of problematic behaviour. Family activities can consist of common household care, garden, family weekends, compliments, praise, trips...

The answer to a joke circulating among social workers: "How many social workers does it take to change a light bulb?" is: "One, but the light bulb has to want it..." Same goes for the family; it can wander from one social worker to another, but if it does not change its deviant behavioral patterns and the way of life in debt, and if it does not mobilise its members towards activity, then even a multi-professional team of experts cannot help. In social work it is important to be aware that in the society there will always be a certain percentage of people who are unemployable, commit crimes, are addicted to drugs or alcohol, are victims of domestic abuse or the abusers, whom we cannot "help". Work with family is difficult, since all the above mentioned socio-pathological phenomenons of the society are related to it, and also because, social worker makes serious decisions often under the time pressure and faces strong emotions resulting from the dynamical processes in the family...

## References

- [1] Punová, M Podpora resiliencie ve vzdělávání. Studia paedagogica, roč. 18, č. 2-3, rok 2013
- [2] Thomlison, B. 2014. Family assessment handbook: *An introduction and practical guide to family assessment*. USA: Florida international university 4. edition p.284 ISBN 978-285-44397-3
- [3] Punová, M Podpora resiliencie ve vzdělávání. Studia paedagogica, roč. 18, č. 2-3, rok 2013
- [4]. Punová, M Podpora resiliencie ve vzdělávání. Studia paedagogica, roč. 18, č. 2-3, rok 2013
- [5]. Walsh, F. Women in Families: A Framework for Family Therapy, 1991
- [6] Healy, K. Social Work Theories in Context, Creating Frameworks for Practice, 2005, ISBN 9780230628151
- [7]. BENARD, B. 1991. Fostering resiliency in kids: Protective factors in the family school and community 1991, 36 s.
- [8] Navrátil, P. a kol., 2014. Reflexivní posouzení v sociální práci s rodinami. Vydavatel'stvo: munipress. 2014, 385 s. ISBN 978-80-210-7505-4
- [9] . Fraser 1997 in: Punová, M Podpora resiliencie ve vzdělávání. Studia paedagogica, roč. 18, č. 2-3, rok 2013
- [10] Matousek, O. a kol. (2001). Základy sociální práce. Praha: Portál. 309 s. ISBN: 80-7178-473-7
- [11] Gabura, J. 2006. Sociální práce s rodinou. Bratislava: OZ Sociální práce, 2006. 59 s. ISBN: neuvedené
- [12] Vojtová, V. - Červenka, K. et al. Educational needs of children at risk and with behavioral disorders. 1. Vyd. Brno: Masarykova univerzita, 2012, 193 s. ISBN 9788021061347, s. 74
- [13] Walsh, F. Women in Families: A Framework for Family Therapy, 1991
- [14]. Bronfenbrenner, 1986, Ecology of the family as a context for human development: Research perspectives.
- [15] Mydlíková, E. in: Smutek, M. – Seibel, F.W. – Truhlarova, Z. 2010 1. Vydanie Vydavatel'stvo Gaudeamus, Rizika sociální práce Sborník z konference VII. Hradecké dny sociální práce ISBN 978-80-7435-086-3 s. 566
- [16] Navrátil, P. a kol., 2014. Reflexivní posouzení v sociální práci s rodinami. Vydavatel'stvo: munipress. 2014, 385 s. ISBN 978-80-210-7505-4
- [17] FIESE, B. H. at al., 2002. A Review of 50 Years of Research on naturally occurring family routines and rituals: Cause for celebration?" In: Syracuse University Journal of family psychology, vol 16, p. 4.

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