

# **INTERNATIONAL DAY OF SCIENCE 2017**

**ECONOMICS, MANAGEMENT, INNOVATION**

**PROCEEDINGS OF THE INTERNATIONAL SCIENTIFIC CONFERENCE**

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## FOREWORD

Dear participants of the conference 'International Day of Science 2017; Economics, Management, Innovation', it is indeed a great pleasure to welcome you to Moravian University College Olomouc.

This year, we can take pleasure in a rich programme of this international conference as scientists from Belgium, the Czech Republic, Hungary, Poland, Russia, the Slovak Republic, and Ukraine will present their papers. As many as 36 contributions including key speakers will be presented at the conference.

Strictly speaking, this is the first year of the international scientific conference which actually unifies two events held at Moravian University College Olomouc in the past. From 2008 to 2016, annually, the Department of Economics of MUCO organised workshops on current economic issues; from 2014 to 2016, Moravian University College Olomouc organised the Day of Science. From 2017, both of these events are to be superseded by this international conference.

We can look forward to performances by the key speakers, i.e. Nadine Roijackers from the University of Hasselt (Belgium), Włodzimierz Sroka from the University of Dabrowa Gornicza (Poland), František Dařena from Mendel University in Brno (Czech Republic) and Ivo Telec from Palacký University (Czech Republic) as well as particular specialized sections which are thematically focused as follows: Management and Marketing, Economics and Methods, Innovation and Security, Corporate Economics and Finance, and Economy and Sustainable Development.

I wish you all to enjoy the interesting presentations, the subsequent fruitful discussions and last but not least the social evening. I am looking forward to seeing you all again in Olomouc on the campus of Moravian University College Olomouc on the occasion of the conference in 2018.

On behalf of the scientific committee and the organisational team of the conference

Jarmila Zimmermannová

Vice-rector for research & development



## KEYNOTE SPEAKERS



**Nadine Roijackers** is associate professor of Strategy/Innovation at Hasselt University (B). She wrote her PhD thesis at the United Nations University/MERIT (NL) on inter-firm collaborative innovation in the pharmaceutical biotechnology industry. During the period 2002-2007 she held a number of research/academic positions. From 2007 to 2009 she was a senior strategy consultant at KPMG Consulting (NL). As of 2009 she has returned to the academic world where she currently researches open innovation ecosystems. Journal outlets for her work include LRP, RP, Harvard BHR, BJM, EMJ, TFSC, SBE, CMR, and JPIM.



**František Dařena**, associate professor and head of Natural language processing and text mining group at the Department of Informatics, Faculty of Business and Economics, Mendel University Brno, member of SoNet research center, author of several publications in international scientific journals, conference proceedings, and monographs, member of editorial board of international journals and editor-in-chief of International Journal in Foundations of Computer Science & Technology. His research areas include intelligent data processing, machine learning, and text/data mining.



**Włodzimierz Sroka** specializes in theoretical and practical issues relating to the management and strategic management. He is the author of numerous scientific papers about strategic alliances, mergers and acquisitions, strategy, restructuring and alliance networks published both in Polish and international journals, as well as well reputable publishers such as Springer Verlag or Shaker Verlag. His research activities mainly include cooperative strategies, and mergers and acquisitions. He holds his Ph.D., M.Sc. and B.Sc. degrees in Management and Marketing from the Karol Adamiecki University of Economics in Katowice, as well as habilitation from the University of Žilina. Currently he is an Associate Professor at the University of Dąbrowa Górnicza, and simultaneously is the president of a medium-size engineering company. He was previously employed in different managerial positions in both the steel and machine industries.



**Ivo Telec** is a Czech lawyer, an expert in intellectual property law. He also deals with the related law against unfair competition and personal law. In addition to that, he deals with federal law, foundation law and public benefit law. He has been active in the academic sphere since 1991. In 2003, he was awarded a professorship in the field of civil law. Since 2004, he has been the Head of the Department of Civil Law and Labour Law at the Law Faculty of Palacký University. He also teaches at the Institute of Forensic Engineering of the Brno University of Technology, at the Faculty of Informatics of Masaryk University in Brno and the Faculty of Law of Paneuropean University.



# CRITERIA OF URBAN SUSTAINABLE DEVELOPMENT

**Maryna Averkyna**

*National University "Ostroh Academy", Department of Economic-Mathematical Modeling  
and Information Technology, Ukraine*

maryna.averkyna@oa.edu.ua

## **Abstract:**

The author points that in the present conditions we have not to talk about the urban development, but also about urban development under the principles of sustainability. The importance of criteria of urban sustainable development is revealed in the paper. The author identifies a city as a logistics system which is characterized by a system of incoming and outgoing flows. Criteria of urban sustainable development are defined.

## **Key words:**

Urban Sustainable Development, Criteria, Consumption of Resources, Reproduction of Socio-Ecological and Economic Resources, Socio-Ecological and Economic Security, Logistization

## **JEL Classification:** O18

## **1 Introduction: Importance to develop the criteria of urban sustainable development**

The city plays a pivotal role in the perspective of sustainable development: it consists of the accumulation of previous generations' actions accomplished to transform the territory and to improve the living conditions, and it is the place where most of the population lives and most of the resource [1]. At the international level, the first World Summit on Sustainable Development at Rio de Janeiro in 1992 established Agenda 21 and suggested that all countries around the world formulate economic policies with a minimum impact on the environment, and encourage social promotion of individuals and the community (UN, 1992a) [2]. Cities, as voracious consumers of energy and producers of waste, including the bulk of the world's greenhouse gas emissions, are seen as critically important loci of numerous, complex inter-linked sustainability, development, and planning problems [3]. That is why there is particular importance to develop the criteria of urban sustainable development.

## **2 Methods: Definition urban sustainable development**

Theoretic aspects of urban sustainable development are presented in papers of C. Diamantini, B. Zanon [1], Feng Li, Xusheng Liu, Dan Hu, Rusong Wang, Wenrui Yang, Dong Li, Dan Zhao [4], Giuseppe Munda [5]. The definition of the mentioned goal of sustainable development is determined with understanding urban sustainable development as positive, quantitative, qualitative, directed, irreversible changes in the supply-production-distribution-consumption that allow to adapt to the effects of endogenous and exogenous factors ensure higher rates of reproduction of resources relatively to the rate of consumption, while eliminating disturbing of the socio-ecological and economic security as a result of a balance between the consumption and reproduction of resources. Formation of such a definition was based on the research of the semantic concepts of "development" and "sustainability." While cities and metropolitan areas are logistic systems it is necessary to develop the criteria of urban sustainable development. The research objective is to develop the criteria of urban sustainable development.

### 3 Paper results

The city as a logistics system is characterized by a system of input and output flows that occur through the consumption of the socio-ecological and economic resources, the availability of internal and external environment in which there are basic stages of the logistics process: procurement – production – distribution – consumption that actually confirms the position to review the city as a logistics facility [6]. The city as any logistics system is adaptive, open to interaction with the environment is organized, structured economic system consisting of interconnected and interacting participants, united unity of purpose and economic interests, and which is established to optimize the resources used in economic flows.

Accepting as a basis our definition of "development" we can argue that urban development is adapting of the city to the effects of endogenous and exogenous factors through qualitative directed and irreversible changes in the structure and improve the rate of consumption of ecological and socio-economic resources and they reproduction in the process of supply – production – distribution – consumption.

However, in the present conditions we have to talk not only about the urban development, but also about urban development under the principles of sustainability. Therefore, it is necessary to determine conditions for achieving sustainability in order to determine the parameters which influence and time interval maintaining urban sustainability. To do this, we define the nature and meaning of the "sustainability" term, based on scientific research sources in terms of the interpretation of the concept of "sustainability":

1. Sustainable development – development that meets the needs of the present without compromising the ability of future generations to meet their own needs ("Agenda 21").
2. The ability of the system to return to equilibrium after it has been taken out of this state by external (or in systems with active elements – internal) disturbances, the state of equilibrium in which the system is able to return, called the stable state of equilibrium ("Systems Theory And Systems Analysis In Managing Organizations") [6, p. 24].
3. Sustainability as a property of systems in their development to remain in the limited area of the phase space (stability by Joseph-Louis Lagrange).
4. Sustainability of the system as its ability to retain some of the features of the phase portrait for small perturbation (structural stability by Alexandr Andronov and Lev Pontryagin).
5. Sustainability as a property of the system in any way to deviate a little from some not perturbed motion (movement of subject, research for sustainability) under certain perturbations of the initial state of the system (depending on the specified deviation) in the phase space (sustainability by Alexandr Lyapunov).

As we can see, the concept of sustainable development scientists is constantly detailed and there are defined enough features in order to meet the needs of present and future generations.

In our opinion, sustainable development depends on the dynamic equilibrium. We believe that the dynamic equilibrium should provide consistency between the various elements of the system in use and reproduction of resources in terms of occurrence of disturbances from external and internal threats to the socio-ecological-economic system.

We believe that stability – is the ability of the system, imposed under certain external and internal influences, to provide qualitative improvements of the system with minimum deviation, provide a balance in the consumption and reproduction of resources without violating safety of the system and contribute to increasing reproduction rates over consumption ones. It should also be emphasized that in the short term, the system oscillates around the equilibrium, and the long-term condition provided a balance between consumption and reproduction of system resources. System's return to the equilibrium state is a prerequisite for such a development that meets the needs of the present day and at the same time creates an opportunity for future generations to enjoy the present achievements and to meet their needs.

Crucial role is given to the socio-ecological and economic security as a component of sustainable development in the safe existence of the present and future generations.

In our opinion, the criteria of sustainable development cities (agglomeration) are:

1. Rational consumption of resources that requires a consumption of the certain amount of resources only for its intended purpose (for the most efficient operation of the system). Rational consumption of socio-ecological and economic resources of the city (agglomeration) is a key issue, since it provides their guaranteed safety and allows using them safely. The process of consumption of urban socio-ecological and economic resources should be based on rational criteria that will serve as securing sustainable development.
2. Reproduction of socio-ecological and economic resources of the city (agglomeration). Reproduction of a separate system is occurring due to the restoration of its elements (resources), caused by the fact that in the consumption of resources is a loss of their original characteristics. Reproduction is the well timed appearance of a certain system resources, sufficient to ensure the functioning of the system or its individual components (quantity and quality). Reproduction of any system requires constant renewal cycles that contribute to streamline functional and structural relationships between elements of the system.

The content in the reproductive process is interdependent unity of production, distribution, exchange and consumption of goods. Existence of the reproductive cycle's phases, their relative completeness in space and time allows us to consider the city as the reproductive system.

Developments of the organization principles of recovering processes, as well as organization principles of the city, occur by stages. They are born, formed, reach maturity and transform. Initially, from the stage of birth degree of internal balance and functioning of all elements increase. Having reached the stage of maturity, reproductive processes are gradually modified that must be considered in the design of their future development. This is reflected in the appearance of new forms of nature management, changing economic specialization and cooperation of production, changes in distribution and forms of communication between people. Thus begins a new stage in the reproduction of the city, territorial organization of the economy and people's lives.

Each hierarchical level of local development corresponds with certain social, environmental and economic interests. Needs of the city and its development goals agreed with each of the aforementioned types of interests. With the lack of consistency between the interests and abilities of reproductive processes contradictions will occur, overlap, interact and causing each other and will grow into complex social, environmental, economic, and other urban problems.

Therefore, reproduction processes in backbone subsystem provide improvement of urban systems, affect the self-organization of the supporting subsystems and reflect a certain level of urban development based on sustainability.

3. Socio-ecological and economic security. It should be noted that the high level of economic growth in the process of sustainable development, can be dangerous due to unreasonable consumption of natural resources and even their destruction. Intensive production processes and significant volumes of potentially hazardous enterprises negatively impact on the atmosphere, water and land resources with emissions and discharges of hazardous substances and the generation of hazardous waste. The dominance of consumerist ideology promotes accelerated, uncontrolled reduction of the non-renewable natural resources, determines the risks and hazards in all urban structures. Careful compliance with all the requirements of environmental safety hinders economic development and creation conditions for economic growth. Illegal human behavior causes financial and environmental risks [5]. The mentioned trends contribute to the manifestation of the risks that are barriers to achieving sustainable development.

We believe that the security of the system generates a set of features that ensure its structural integrity and independent functioning through adequate response to negative external and internal factors.

Security of each individual system is entirely dependent on the state of safeness. State security is a combination of properties which ensure the structural integrity and independent functioning through adequate response to negative external and internal factors. The need for state protection is one of the primary needs of the population of the city and is a component of sustainable development.

4. Logistization criterion. Separation of this criterion is stipulated by the fact that the movement of resources in the urban subsystems, in the form of flows in the supply-production-distribution-consumption, affects urban sustainable development. Speaking of logistization in general, it shows as reducing of the consumption and losses of socio-ecological and economic resources during flow's maintenance as well as reducing of the environment impact. Therefore, from a functional point urban sustainable development is also associated with redistribution of flows in the urban subsystems, influencing the logistization level. Flows' redistribution is the process by which the direction of flow may vary in the certain space. Redistribution allows avoiding unproductive loss of resources, reduce losses during processing, reduce the degree of processing of raw materials in the presence of opportunity and ensure the reproduction of the city. Flows' redistribution suggests their involvement in the areas of a certain area, as they can bring the greatest benefit and ensure the reproduction process through the city.

#### **4 Discussion**

Urban sustainable development requires rational consumption of resources, reproduction of socio-ecological and economic resources of the city (agglomeration), maintenance of the socio-ecological and economic security, reduction of the consumption and losses of socio-ecological and economic resources during flow's maintenance as well as reducing of the environment impact, redistribution of flows in the urban subsystems, influencing the logistization level. These criteria must be considered during development of the urban sustainable development theory. Proposed criteria can be used during estimation the rate of urban sustainable development and formation mechanism for maintenance urban sustainable development.

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# AN APPROACH TO EDUCATION OF THE OFFICERS BY COMPETENCIES

**Andrea Brichová**

*University of Defence, Department of Economy, Czech Republic  
a.brichova@centrum.cz*

## **Abstract:**

An education by competencies is common in civil sphere and it starts to be noticed in military education. It is necessary to follow trends in the education and combine them with requirements of army daily life and its needs. Also foreign armies use the competency approach to education of their soldiers. Combination of these aspects should form military education and make it effective, economical and also its quality. The education of military students of University of Defence is the beginning of education of military officers recruited from civilian sector. Armed forces must be also attractive for its applicants to be competitive. Soldier in his active duty is educated for the whole time of his career so education must be developed all the time. It is not enough to fulfil qualification requirements before joining Army already.

## **Key words:**

Education, officer, competence, career

## **JEL Classification:** I23

## **1 Introduction: Improvement of the Czech Military Education**

It is at the discretion of each political representation which form of armies chooses to defend their sovereignty. In the past it was not possible to be without its own army, currently the defence of the country can be secure as a service. States that have a professional army have to recruit its soldiers from the civilian job market and they must be more attractive than other employers. For this reason, there is modernizing access to soldiers and changing views on their learning and development, and so on.

The Armed Forces of the Czech Republic has its own system of education, where soldiers are trained at secondary and university level, they also receive professional military education and language education. This text is targeting at the Defence University in Brno, which is the only military university in the Czech Republic and its graduates are primarily intended for the defense department. In addition to the usual academic requirements must also meet the training requirements of military training that graduates inclusion of a military study must meet.

Foreign armed forces based on their experience with focus on leadership as a management system in an army environment. Leadership is developed partly on the basis of experience of the leader, but relies too well about his character and knowledge. Abroad, it is abstracted from using the term management in a military environment and instead of that it leans toward leadership. There have been efforts to implement management to military in the Czech Republic. Some experiences from abroad evidence that it is not possible to fully apply management in military environment because of differences of military and civilian environment. This article brings reflection of the application leadership to education provided to young officers attending the University of Defence. That knowledge can be developed and students can deepen this are of their studies to improve themselves. High preparedness of young officers can facilitate their entry into military career.

## **2 Methods: Used methods**

In this text some methods were used. The purpose to write this text was personal experience with military education and deployment. I was able to observe the character of military education during my attending the University of Defence. I am able to evaluate, which part of my studies is useful in daily army routine during my deployment in the army. First of all it was necessary to find out difficulties of deployment for inchoative young officers.

Literary review was used to bring out basis of military education in foreign armies, it is leadership. A method of analysis was used to study doctrines and documents in foreign armies, mainly doctrines of U.S. Army. The synthesis method was useful for determination of the competency of lead others like useful tool of improvement of military education like the first influence by leadership. A descriptive method was used to define Czech military education. These methods were used for exploration of the field of leadership. This influence of military leadership was the basic idea to define specific competency for graduates of the University of Defence.

### **2.1 Competency approach**

Since the eighties, we may encounter discussions solving competencies. Primarily are competencies associated with management, but their influence is now evident across many branches. Competencies help uncover differences between average and outstanding performance. If we want to achieve objective goals through competencies, these competencies must be appropriately chosen, i.e., must be defined precisely for environments where we want to use them. In practice, this approach facilitates hiring the right people to appropriate job positions; it helps to objectively and efficiently utilize the system of remuneration. It is a tool to assess the readiness how to achieve strategic objectives in the military, but it is also the possibility to do something to take care of human development according to the strategic plan. The career of employees can be developed by competencies. Competencies represent a complex set of skills and the amount of knowledge in combination with certain attitudes amount of experience and motivation [1].

Inconsistency in the competency approach is reflected in the plethora of definitions of competence. For example, author Richard Boyatzis sees competence as "There are several an underlying characteristics of a competencies like Motives, knowledge, skills and social roles." Spencer and Spencer give this definition of "five characteristics as hidden and visible part of the competencies showed in the iceberg model." David Dubois summarizes competence as "competency is the employee's capacity to meet Requirement and the job would Producing the output performance." Each author presents an original version of what skills exactly. Quantity definitions demonstrate that this is a much discussed topic. And it also illustrates the fact that every area where we want to use the competency approach is unique and requires special handling [2].

### **2.2 Military Environment and its' particularities**

The fundamental determinant of the military environment is its mission. The Army of the Czech Republic (ACR) is an instrument of power of the state, which should guarantee the country's sovereignty. Therefore, it also has its specific outcomes such as the ability to conduct combat operations. Requirements for military professionals, especially commanders and officers are demanding. Within the army command is exercised and maintained a hierarchical structure. The ACR is a particular emphasis on the ability of the armed forces to ensure the defense and the achievement of political and military ambitions of the country and finally fulfill the roles and functions of the armed forces. Capabilities are according to the White Paper perceived as the ability to operate effectively in crisis situations and wars. Skills of soldiers must be systematically prepared and developed that will help them achieve the goals. Theoretical framework defines the master of commanders strictly. Their responsibility is to manage all activities based on the qualities of military technology and equipment. Demanding leadership skills must

be manifested in extreme conditions, such as foreign operations, where the master also bears full responsibility for the lives of their subordinates. Graduates of the University of Defence as young officers are assigned according to the needs of the Czech Republic to the formations and units of the ACR. So the young commanding officer getting into practice, where his subordinates can serve for decades, and have many practical military experience. Ability to adequately conduct their subordinates and command authority is crucial for the young officer [3].

Superiority and subordination is established by functional division and is also established by military ranks. The officer, who is able to lead people, is a prerequisite for appropriate demeanor that gives the respect of his speech and facilitating mutual military communications. Commander's obligations are described in the basic order as well as the duties of soldiers. The commander should in particular be an example for his subordinate soldiers and should to fulfill the tasks with minimum losses. These demands must be met under all conditions. Demanding situations require complete compliance of the commander with his unit, the competency to lead people may be the tool which facilitates the achievement of the target. Mastering the skills to lead people may be the key to effectively bring their theoretical knowledge into practice [7].

## 2.3 Leadership

Leadership is the basis of many foreign armies. Leadership as specific mean of command based on values nation, experience of its army and character of the commander is way of conducting the army, because we can not simply use management. Abroad, armies use and teach the leadership. Leadership is perceived by foreign armies in this way:

### 2.3.1 USA

The idea of leadership draws from the legacy of General of the Army Douglas MacArthur, who in his speech of 1962 summed up : „Your mission ... is to win our wars ... You are ones who are trained to fight. Yours is the profession of arms, the will to win, the sure knowledge that in war there is no substitute for victory; that if you lose, the nation will be destroyed ...[9] “

- **Leadership** – is the process of influencing people by providing purpose, direction, and motivation while operating to accomplish the mission and improving the organization [9].
- **Command** – is the authority that a commander in the military service lawfully exercises over subordinates by virtue of rank or assignment. Command includes the leadership, authority, responsibility, and accountability for effectively using available resources and planning the employment of organizing, directing, coordinating, and controlling military forces to accomplish assigned missions. It includes responsibility for unit readiness, health, welfare, morale, and discipline of assigned personnel. Command is a specific and legal leadership responsibility unique to the military [9].

### 2.3.2 Great Britain

Leadership is one of the most observed and least understood phenomena on earth.

– James MacGregor Burns

- **Leadership** – is visionary; it is the projection of personality and character to inspire the team to achieve the desired outcome. There is no prescription for leadership and no prescribed style of leader. Leadership is a combination of example, persuasion and compulsion dependent on the situation. It should aim to transform and be underpinned by individual who understands him/herself, the organization, the environment in which they operate and the people that they are privileged to lead [10].
- **Command** – is a position of authority and responsibility to which military men and women are legally appointed. Leadership and management are the key components to the successful exercises of Command. Successful management is readily measured against objective criteria but commanders are not leaders until their position has been ratified in the hearts and minds of those they command [10].

### 2.3.3 Australia

Already in 1996, Professor Fred Fiedler has assessed the study of leadership, which lasted fifty years, "If it was easy to understand leadership, we have already answered everything. It is certain that we know a lot more than forty years ago, but without a doubt we know that we still have much to learn. „Brigadier General Kevin O'Brien conducted a study in 1999 on the acceptance conditions, how to develop leadership in the Australian armed forces. Quality people are just the beginning. A vital part of the team's leadership - that can help ordinary Australians doing extraordinary things. Leadership is not another special skills / competencies such as logistics and fiscal management, but it is the key how to unlock people's potential. As economists have a "multiplier effect", so leadership is a "multiplier" for the Australian Army 21st century. Australian White Paper on Defence of 2000 highlights the importance of leadership [10].

- **Leadership** – is the ability of an individual to influence others effectively in a given situation, based on a combination of that individual's knowledge, skills and attitudes [10].
- **Command** – is the lawful authority that an individual in the Services exerts over subordinates by virtue of his or her rank or appointment. The exercise of a code of military law [10].

Command is allocated to commander thanks to his fiction by virtue of law, but leadership is the value that every manager who wants to become a leader must master himself. The commander still may not automatically be the leader, must work on his own development to receive acceptance of his subordinate soldiers in a way that it will also be considered from a human point of view, not only by virtue of his function.

An option how to use leadership in the Czech military education can be the competency lead others defined for graduates of the Faculty of Military Leadership University of Defence. Leadership experience richly introduced the American military in their doctrines. The US military leadership considered the most important aspect of the military profession. Quality leadership is behind the success of the whole army both today and in the future. On that basis, the challenges, circumstances and peculiarities environments soldiers face such changes and requirements character leaders. These include decentralized operations that require high-quality leaders capable in all aspects of leadership.

This means in particular adaptation of thinking, formation of the unit and employments to the specific needs of a given task. Here it is necessary to use mainly adaptability, innovative ways of solving, willingness to take risks. General Omar Bradley sees leadership as: "Leadership in the Democratic army and Means firmness, not harshness; understanding, not Weakness; generosity, not selfishness; pride, not egotism."

Being a leader means a personal commitment, continual self-education, self-esteem and passion to drive and own soldiers. At the same time the behaviour of a leader is not just about issuing orders, but it is about gaining respect, leadership by example, creating a positive climate, inspire others and improving team excellence [9].

The experience of foreign colleagues shows that the competency approach is applicable in a military environment. Of course competency to lead others is different to the levels of command, where it is used. Delimitation of the competency to lead others for graduates of the University of Defence will be different from the competency to lead others which should hold senior commanders service at higher positions in the structure of the ACR. The competency to lead others of UO students should have been basic knowledge for the beginning of their military career. Subsequently, this knowledge should be deepened depending on their role.

Leader helps his unit to appropriate shared values, achieve their goals and fulfill assignments despite obstacles that may arise, to encourage them to work. At the same time leader listens to and is able to maximize the potential of their subordinate soldiers. Students should accept the fact that leading is requirement of the duty. The basic knowledge of the competency to lead others like a part of leadership can help them to be a good commander. They should know and accept it like their own duty to improve themselves in the competency to lead others and do their best to be a good commander – leader. Being the commander of a military unit means not only take responsibility for this unit and perform tasks that are assigned to the superior level, but also take responsibility for their subordinates.

Subordinates soldiers should have the authority in their commander which they can admire, nearest supervisor should be someone who they can trust and human support to help them carry obligations often difficult service and will motivate them to constantly improve their performance. Competency approach is used in both the civilian sector, and in the military. It is possible to find a competency approach in all branches in the civilian environment, but we begin to accept this approach in Czech military.

### 3 Czech Military education

The most important component of any organization is its human resources, which the organization has with certain traits, qualifications (competencies), competence and motivation. With their help, then achieves its goals and fulfill their purposes and intentions [6].

Training guides each soldier during his career. One of the components is the qualification requirements, it is academic education. Soldier during the service based on the requirements of their position has to get another education like language education, vocational training and career education. Officers of ACR are mainly graduates of the University of Defence. These graduates as the future commanders should lead their troops also by personal example. The competency to lead others for commander should also include moral principles and values, the ability to motivate others, to be able to admit a mistake and the ability to cooperate and work under pressure. This is the foundation of leadership. These skills in theoretical and practical level should be provided to each officer of the ACR. Military training is a way to prepare professional soldiers by the Leeds of armed forces.

Nowadays, students are educated according to requirements of Higher Education Act and due to demands of a number of military expertises. It is also essential to fulfil qualification requirements of a service position and career course. An officer course is a part of university studies at the University of Defence. Career courses are held at Training Command – Military Academy in Vyškov. All the students have to pass Officer course during university studies, the amount of students is about 200 students per year (2014 – 242 students, 2013 – 227 students, 2012 – 219 students, 2011 – 179 students, 2010 – 170 students).

Military training can be divided into three core segments, which apply to all professional soldiers and accompanied them throughout their service in the Czech Army. This is the preparation of individual, collective training and individual preparation. Individual preparation includes the preparation of a soldier, according to the requirements of his service position. Collective training is the same for all soldiers for example it is medical preparation, topographical training, firearms training, combined arms case etc., Which is conducted separately within military units but also collectively by the Training Command - Military Academy, where ongoing career courses. Individual preparation is an essential part and the above-mentioned forms of education, the responsibility for own education and skills development is up to each soldier. Service positions in the Army of the Czech Republic are defined by two basic determinants in the context of education; those are the qualification prerequisite and the qualification requirement. Qualification prerequisite is schooling set to perform service at each position. Qualification requirement specifies service position; it is a language requirement, career courses, and vocational courses.

Education is the responsibility of every soldier and is enshrined in the law of professional soldiers. The soldiers are obliged to increase their knowledge and enhance their skills, take care of their physical fitness. The White Paper of defence also deals with Training military personnel. This document talks about the state of army and defines the strategic planning and the development of skills and competencies that must be in compliance with the economic management of the resort. Human resources of the army are the most important source.

Competency approach to education is the possibility how to interconnect the entire educational system in the Army, a school training at military schools, career preparation and training. The unification of educational requirements of military schools and Training Command - Military Academy, which provides career and vocational courses to streamline the preparation of military professionals. Education is demanded throughout service in the army, and it is an area that deserves attention and also brings a lot of positive impacts. The educational potential is increasing the value of the whole army.

Education of young officers can be shaped according to the needs of the ACR from the outset and thus reflect the needs, according to the current state. Graduates of the University of Defence in large numbers immediately after graduation, starts their career like commanders of subordinate units, so the knowledge of leading is useful. Additionally, these officers are able to convey the theoretical knowledge gained at the university immediately to their subordinate soldiers, which have a positive effect on the entire organization, thus ACR. Due to the nature of the ACR's ability to command and lead subordinate

units are functional demands of all commanding positions, but for adequate commanding is essential to equip the officers to their functions by necessary knowledge.

The basic knowledge of the competency to lead others can be further developed by specialized courses according to the needs of the individual commanding positions, which supports the continuity of military training. The competency to lead others, which would be part of the curriculum of the University of Defence, would be the basic platform of this knowledge which could be developed by superstructure.

Education in military schools is one of the possibilities of recruitment in the Army of the Czech Republic. It is also a form of promotion and the possibility of educating future military professionals from the outset of their careers in the armed forces. Competitiveness is an area that must be reflected by the Army because also ACR hires people from the civilian environment. Additionally, the educational potential is increasing the value of the whole organization and sets in motion all other sources, which brings benefits to the whole structure of the ACR.

Competency issue is a new approach that can be applied in the Army and has great potential for its use. Appropriate use of this approach can be set at the University of Defence. The knowledge of this issue can be developed during further military education which is essential part of the careers of soldiers during their duty.

#### 4 Discussion

Possibilities of improvement of education – foreign influence of military leadership. Military competency specified for graduates of the University of Defence, the unique knowledge gained at the University of Defence. The competency to lead others – the outcome of research. Foreign educational influences – army education in foreign armies.

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# ECONOMIC AND SOCIAL ASPECTS OF INTERCULTURAL MANAGEMENT IMPLEMENTATION IN SME'S SECTOR – COMPARATIVE STUDY OF THE SITUATION IN POLAND AND CZECH REPUBLIC

**Katarzyna Czainska**

*European University College of Business, Faculty of Economics and Management,  
Poland*

*k.czainska@universityofbusiness.eu*

## **Abstract:**

In this article the author presents social and economic elements of the Polish and Czech Republic economy to justify the need of intercultural management implementation in enterprises from the SME's sector. Economic, demographic and social indicators has been analysed to compare both countries. The author also presents a diagnostic tool (Application RIO) which helps to measure the degree of preparedness of organizations for the management of multicultural human resources. She also formulated recommendations for the use of this tool and the rules of interpretation of results specified by the application. Moreover, preparation of analysis described in the paper, was one of elements of the scientific project focused on SME's sector in Poland and Czech Republic, but also Ukraine.

## **Key words:**

Entrepreneurship, SME, Intercultural management

## **JEL Classification:** M14

## **1 Introduction**

Intercultural human resources in enterprises for many European and worldwide organizations are obvious elements of a company. But, due to existing and dynamic demographic trends in the field of migration, intercultural management has become a major challenge for small and medium-sized enterprises in Europe. This problem is particularly important for companies which operate in countries where previously coefficient of multiculturalism of society was relatively low, that are, Poland and Czech Republic.

Following above mentioned thesis, the author has decided to analyze and underline particular facts which should affect acceleration of implementation of multicultural management in the SME sector in chosen countries. So, the main goal of the paper is presentation of economic and demographic features, ratios and trends that justify SME sector development, internationalization of societies and, as an consequence, necessary changes in human resource management in small and medium enterprises. Moreover, the author has briefly described a IT tool which can help to diagnose and improve interculturalism in SMEs. Research and analysis has been done based on official reports, statistical data and professional statements issued by reliable organization of worldwide influence, i.e. Global Entrepreneurship Monitor, OECD, European Union, etc. Besides, the author has used results of her study presenting RIO Application.

The issue raised in the paper is very practical in nature. Globalization trends, including the mobility of people, especially the emigration, justify the need for the acquisition of competence in management by the owners and managers of enterprises from the SME sector. This fact should be seen by a broad sector

entities, education, business consulting and management support (i.e. a company providing management tools, such an IT industry). Intercultural HR Management is also an interesting area of research for the representatives of different fields of science, particularly interdisciplinary teams.

## 2 Economic and demographic situation in the Czech Republic and Poland

Both countries are adjacent to each other, they are members of the European Union and the Visegrad Group, but differ in terms of economy and demography (Table. 1).

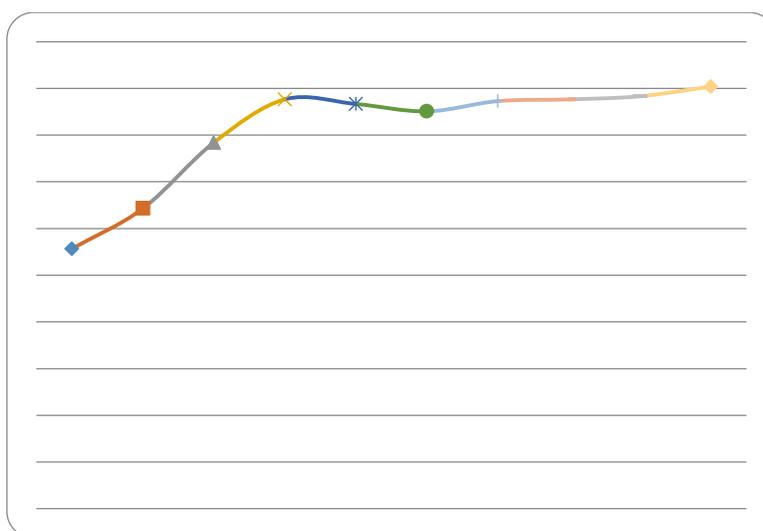
Table 1: Comparison of economic factors – Poland/Czech Republic 2015

FACTOR	POLAND	CZECH REPUBLIC	COMPARISON PL / CZ
GDP per capita (EUR)	11,25	15,60	-4,35
GDP (EUR BN)	428	164	264
Economic Growth (GDP, annual variation in %)	3,6	4,3	-0,7
Unemployment Rate	9,8	6,5	3,3
Public Debt (% of GDP)	51,3	41,1	10,2
Export (EUR bilion)	172	118	54
Import (EUR bilion)	170	111	59
External Debt (% of GDP)	69,2	70,7	-1,5

Source: <http://www.focus-economics.com/countries>, [12.01.2016]

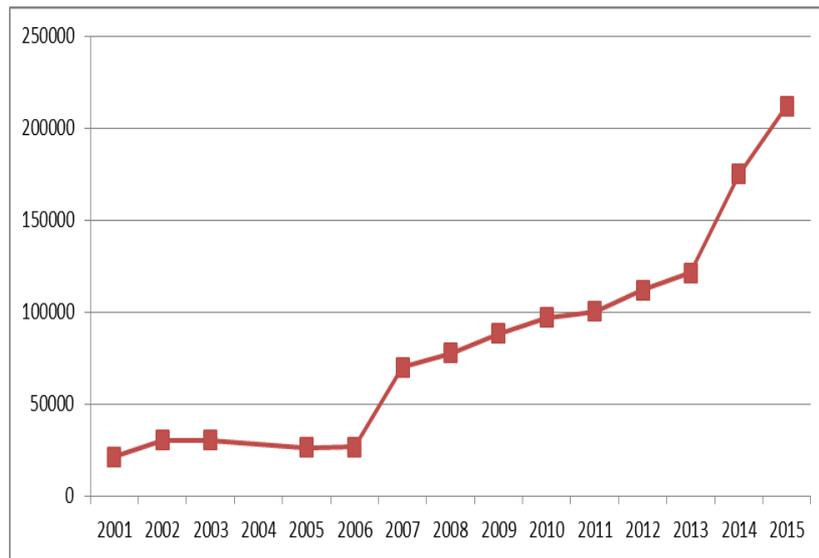
Both countries have in common the need to adapt to the European trends such as, increasing level of multicultural societies, and thus of human resources in organizations. Compared to other European countries, the level of multiculturalism in Poland and the Czech Republic still is not high (Fig. 1, 2). According to European Commission [5; pp. 6, 22], in 2013 the number of immigrants to Czech Republic was approximately on the level of 30,1 th., and 220,3 th. to Poland. The largest number of immigrants was reported in Germany (692.7 th.), followed by the United Kingdom (526 th.), France (332.6 th.), Italy (307.5 th.) and Spain (280.8 th.).

Figure 1: Foreign nationals residing in the Czech Republic in the last decade (2004 – 2014)



Source: Based on Czech Republic. Migration Profile Light. 2015, International Centre for Migration Policy Development (ICMPD), Prague, 2015, p. 9

Figure 2: Immigrants in Poland – dynamics



Source: J. Konieczna - Salamatin, *Imigracja do Polski w oczach opinii publicznej. Komentarz do wyników badań CBOS*, Institute for Socio – Economic Enquiry, [http://www.i-see.org.pl/strona/uploads/ngrey/Documents/materialy\\_doc/lipiec\\_2015.pdf](http://www.i-see.org.pl/strona/uploads/ngrey/Documents/materialy_doc/lipiec_2015.pdf) [6.07.2016] and *Dane liczbowe dotyczące postępowań prowadzonych wobec cudzoziemców w 2015 roku*, Urząd do spraw cudzoziemców, <http://udsc.gov.pl/statystyki/raporty-okresowe/zestawienia-roczne/> [6.07.2016]

Referring to the report presented by International Centre for Migration Policy Development (ICMPD) [2] in 2015, 451,9 th. foreigners lived in Czech Republic (4,3% of the total population of the country). They originally come from Ukraine, Slovak Republic, Vietnam (all together accounting for about 57 % of all foreigners legally residing in the Czech Republic), and Russian Federation, Germany, Poland, Bulgaria, Romania, USA and the United Kingdom.

According to Polish statistics [3; 4] in 2014 the numbers of foreigners holding all possible residence documents was 175,07 th. (0,46 % of the total population of the country). It increased in 2015 up to 211,87 th. (0,58% of the total population of the country). Ukrainians were the largest group registered (40% of the total numbers of foreigners), followed by those from Vietnam, China, Belarus, India, Uzbekistan and Moldavia.

Concerning findings presented in 2016 by OECD [7], permanent migration flows increased by around 10% in 2015, and because of many reason (i.e. conflict in Syria) this trend will still increase. So, it can be concluded that it affect changes of labour market in OECD countries, including Poland and Czech Republic. Presented market trends of internationalization of employees in the SME sector should lead to the activation of processes, trainings and researches in this field, both from the academic and business perspective.

### 3 Level of entrepreneurship and SME's sector in the Czech Republic and Poland

Quantity of small and medium-sized enterprises in a country depends on number of legal, economic and social factors. However, one of the most important factors is the level of entrepreneurship of citizens.

Comparing the basic parameters of entrepreneurship analyzed by the Global Entrepreneurship Monitor (tab. 3) it could be considered that entrepreneurship in Poland is at a better level than in the Czech Republic. Polish people see more opportunities, they are focused on success as entrepreneurs and finally being an owner of a company (even a small one) brings positive response from society (in 90's of XX century the meaning of a word "entrepreneur" was almost equal to "thief", which comes both from communists' propaganda and real cases of frauds noticed those days).

**Table 3: Entrepreneurial Behaviour and Attitudes (%) – 2011<sup>1</sup>**

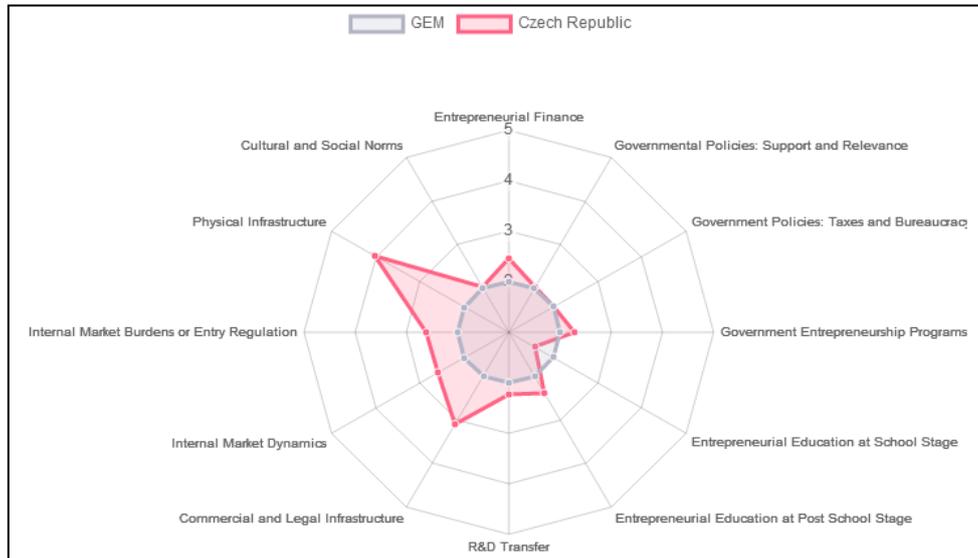
FACTOR	CZECH REPUBLIC (CZ)	POLAND (PL)	DIFFERENCE CZ/PL
<b>SELF- PERCEPTIONS</b>			
Perceived opportunities rate	23,9	33,1	-9,2
Perceived capabilities rate	39,2	52,0	-12,8
Fear of failure rate	34,6	42,9	-8,3
Entrepreneurial intentions rate	13,9	22,7	-8,8
<b>SOCIETAL VALUES</b>			
Entrepreneurship as a good career choice rate	N/A	64,4	N/A
High status to successful entrepreneurs rate	47,8	72,9	-25,1
Media attention for entrepreneurship	N/A	58,0	N/A

Source: D.J. Kelley, S. Singer, M. Herrington, *Global Entrepreneurship Monitor. 2011 Global Report*, <http://gemconsortium.org/report> [04.01.2017]

Result of evaluation of so-called Entrepreneurial Ecosystem<sup>2</sup> is also better in Poland (fig. 3 and fig. 4).

If, however, recognize that the determinant of the level of entrepreneurship in the country is the number of operating enterprises, the Czech Republic can boast much better result than Poland (Tab. 4).

**Figure 3: The Entrepreneurial Ecosystem – CZECH REPUBLIC**



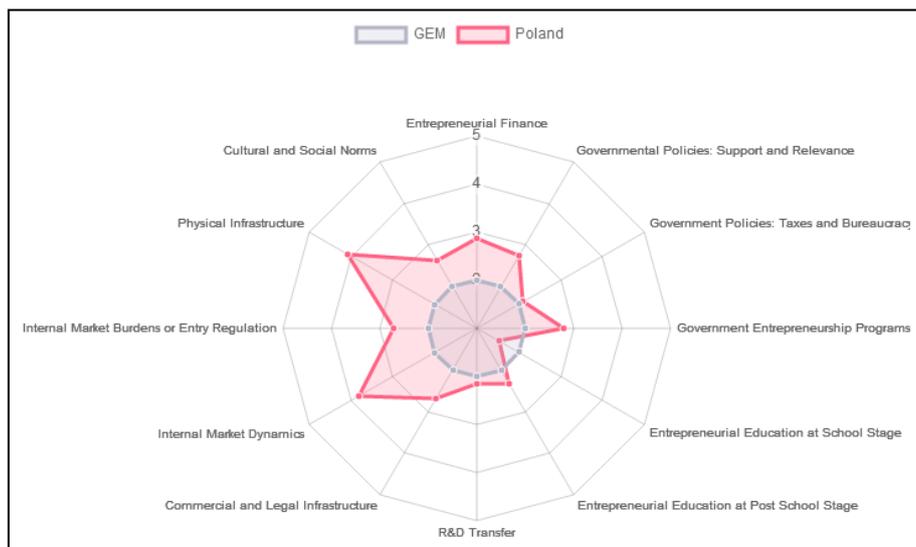
Source: <http://www.gemconsortium.org/country-profile/55> [04.01.2017]

Expert Ratings: 1 = highly insufficient; 5 = highly sufficient

<sup>1</sup> Data listed in Table no. 3 present situation in 2011, because further data from the Czech Republic are not available in GEM.

<sup>2</sup> Entrepreneurial Ecosystem consist of: entrepreneurial finance; governmental policies: support and relevance, taxes and bureaucracy; governmental entrepreneurship programs; entrepreneurial education at school stage; entrepreneurial education at post school stage; R&D transfer; commercial and legal infrastructure; internal market dynamics; internal market boarders and entry regulation; physical infrastructure; cultural and social norm.

**Figure 3: The Entrepreneurial Ecosystem – POLAND**



Source: <http://www.gemconsortium.org/country-profile/99> [04.01.2017]

Expert Ratings: 1 = highly insufficient, 5 = highly sufficient

**Table 2: Quantity of SME in Poland and Czech Republic**

COUNTRY	TOTAL POPULATION OF THE COUNTRY	15 – 64 YEARS OLD CITIZENS	NUMBER OF SME	SME / TOTAL POPULATION	SME / 15 – 64 YEARS OLD CITIZENS
<b>CZECH REPUBLIC</b>	10 512 400	7 109 400	1 006 434	0,096	0,142
<b>POLAND</b>	38 017 900	26 639 100	1 516 864	0,040	0,057

Source: [http://ec.europa.eu/eurostat/statistics-explained/index.php/Statistics\\_on\\_small\\_and\\_medium-sized\\_enterprises](http://ec.europa.eu/eurostat/statistics-explained/index.php/Statistics_on_small_and_medium-sized_enterprises) [12.01.2017] and *Short Analytical Web Note 3/2015*, European Commission, <http://ec.europa.eu/eurostat/documents/3217494/6917833/KE-BM-15-003-EN-N.pdf/76dac490-9176-47bc-80d9-029e1d967af6> [05.01.2017], p. 6, 22.

#### **4 Small and medium enterprises (SME) sector in the Czech Republic and Poland**

The European Union noticed the importance of SME for the economy and improvement of the citizens life conditions. Therefore, it was decided to pursue a policy of supporting their activity. One of the first initiatives in this regard was to develop unified rules of eligibility of enterprises. The first recommendation establishing a common SME definition was adopted in 1996 by the European Commission [9]. In 2003, the European Commission implemented a new recommendation [10] in order to take account of economic developments since 1996. It entered into force in 2005 and applied to all the policies, programmes and measures that the European Commission operates for SMEs. For EU Member States, use of the definition is voluntary, but recommended. So, according to mentioned acts: *the category of micro, small and medium-sized enterprises (SMEs) is made up of enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding 50 million euro, and/or an annual balance sheet total not exceeding 43 million euro* [11].

Moreover, in 2008 the European Commission presented a proposal for a Small Business Act for Europe (SBA) to recognise the central role of SMEs in the EU economy and establish a comprehensive policy framework for the EU and its Member States through [12]:

- a) A set of 10 principles to guide the conception and implementation of policies both at EU and Member State level, as follows:
  1. Create an environment in which entrepreneurs and family businesses can thrive and entrepreneurship is rewarded,
  2. Ensure that honest entrepreneurs who have faced bankruptcy quickly get a second chance,
  3. Design rules according to the “Think Small First” principle,
  4. Make public administrations responsive to SMEs’ needs,
  5. Adapt public policy tools to SME needs: facilitate SMEs’ participation in public procurement and better use State Aid possibilities for SMEs,
  6. Facilitate SMEs’ access to finance and develop a legal and business environment supportive to timely payments in commercial transactions,
  7. Help SMEs to benefit more from the opportunities offered by the Single Market,
  8. Promote the upgrading of skills in SMEs and all forms of innovation,
  9. Enable SMEs to turn environmental challenges into opportunities,
  10. Encourage and support SMEs to benefit from the growth of markets.
- b) A set of new legislative proposals which are guided by the “Think Small First” principle, i.e.:
  - General Block Exemption Regulation on State Aids (GBER),
  - Regulation providing for a Statute for a European Private Company (SPE),
  - Directive on reduced VAT rates,
- c) A set of new policy measures which implement these 10 principles according to the needs of SMEs both at Community and at Member State level.

EU recommendations have been introduced both in Poland and Czech Republic. In both countries the share of SMEs in total number of enterprises is about 99%, what is consistent in the general European trend. In the overall ranking of quantity of SMEs in EU, Poland achieved 5<sup>th</sup> place, and Czech Republic 6<sup>th</sup> place. Leaders are Italy, France, Spain, Germany and the United Kingdom [13].

Small and medium sized enterprises are an important sector of the economy of Czech Republic. These companies contribute more than 50% of the GDP and are the biggest employers. There is a positive trend in the overall number of SME’s with a slight fall in 2005 and 2010. A significant drop was noticed in 2010, but it was influenced and connected with the residual effects of the world economic crisis. According to S. Richter and L. Štěrbová, who analysed the ratio of entrepreneurs and legal entities, the share fluctuates since 2005 *around 16% to 17% of legal entities and 84% to 85% of the entrepreneurs, when it starts rapidly rising in the middle of the period and hitting 30% of the legal entities and 70% of the entrepreneurs in 2011. Because the absolute number of SME companies is more or less constant with some little increase, this trend is indicative for changes in the business environment as more and more entrepreneurs are establishing legal entities in order to expand their business and to be considered “more professional”* [14].

The situation is similar in Poland, where small and medium-sized enterprises are a major driver of the economy, and thus indirectly affect the social climate in the country, generating income, jobs and affecting empower citizens. According to a recent report by the Polish Agency for Enterprise Development [15] on the sector of small and medium-sized enterprises in 2013, Poland had 1.77 million non-financial companies known as the active companies. Small and medium enterprises are in this up to 99.8%. It is also important to notice the fact that the SME’s sector generates up to 48.5% of Polish Gross Domestic Product, and among all groups of enterprises, the largest share in the GDP is created by microenterprises

– approximately 30%. Another area in which the importance of the SME's sector can be emphasize is employment. At the end of 2013 number of persons employed in enterprises in Poland amounted to nearly 8.9 million people, of which 6.2 million (69%) worked in the SME's sector entities, including micro and small businesses employ more than half (4.6 million people) of the population employed in the entire sector enterprises; medium-sized enterprises employ every fifth employee (1.6 million people) and large – almost one third (2.7 million people).

## **5 Intercultural Aspect of SME Management in the Czech Republic and Poland**

As mentioned in the first part of the paper, both in Poland and in the Czech Republic three trends can be observed: 1/ increasing number of SME's, which are the largest and most important employers; 2/ demand for labor force (low unemployment); 3/ increasing trend of the number of foreigners in the structure of society. Therefore, it is anticipated that in the next three years the number of employees (foreigners) in the SME's will increase. Consequently, increase in the so-called the level of multicultural human resources, will also be noticed. Considering the fact that entrepreneurs from both Poland and Czech Republic have no experience in managing such groups of employees, it is necessary among other things, to conduct information, consulting and training in this area. Moreover, targeted scientific projects should be conducted, as it was explained, i.e. by P. Krenar, P. Taraba [16], M. Rozkwitalska [17], K. Czainska [18].

One of the tools intended to prepare the company for intercultural management is diagnosis of a company by using the IT application – RIO. RIO Application has been designed, projected and implemented by the author as a result of her research. It allows to specify the value of the so-called RIO (*Ratio of Interculturalism of Organization*) that estimate ability of organization to manage intercultural human resources. Diagnosis consists of eight thematic modules: (A) The nationality structure of human resources; (B) Recruitment; (C) Occupational Adaptation; (D) Training and Integration; (E) Internal Communications; (F) External Communication; (G) Organization of work; (H) Ethics. Study of using RIO Application is made on the basis of data collected through questionnaires completed by representatives of a particular company. After fulfilling questionnaire in RIO Application, respondent or group of respondents receive report that consists of: total value of RIO, short interpretation of RIO and results in particular modules in a table and a diagram. Interpretation of a total score is very general, but it is not mistake, it has been planned by the author. Professional diagnosis should consist of: collection of data related to company, interviews and observations. Based on results gained after all above mentioned analysis, a consultant can present final conclusion and suggest changes and/or improvements in particular modules of organizational culture.

Management Consultancy provided by using RIO Application should result in the implementation of an organizational culture conducive integration of workers from different countries and cultures.

## **6 Conclusion**

As a background for further research, the following suggestions should be noted, which managers of intercultural teams have to take into account implementing new organizational culture [18]: 1/ organizational culture is a phenomenon that is created continuously rather than rapidly; a manager cannot expect results of its implementation in a short time; 2/ it is necessary to define the cultural pattern in a company, which is the most important for the organization objectives, outcomes, principles and values; this pattern must be communicated and explained to all members of the organization and particular managers; 3/ implementation of a particular cultural pattern will allow employees to distinguish the culture of personal life (eg. family, religious) from culture of the workplace (organizational role); 4/ organizational culture (both positive and negative) is always a tool for shaping the attitudes of its members; 5/ if the organization professionally and consistently implements cultural pattern, it will become both the formal and informal mechanism of human resources management, at the stage of recruitment and selection it will make easier to choose appropriate people who will be able and will have the will to

adapt to the rules operating in the enterprise, in adaptation phase and staff training will set the boundaries of non-compliance employee and the necessary range of training, and in the process of employee assessment it will allow managers to objectify the assessment, because you omit the aspect of the origin of the employee; 6/ work with immigrants requires a longer period of professional adaptation, when managers should take into account the phenomenon of culture shock; the better mechanisms of formal and informal communication about the nature of organizational culture are used in the company (eg. Through training, familiar with the regulations and instructions), the shorter and less invasive process of adaptation; 7/ in the process of resolving interpersonal conflicts manager should completely omit differences among cultures (ethnic or national cultures); the point of reference should only be a derogation of the employee from the organizational culture; 8/ coherence of the working group, despite appearances, cannot be achieved by emphasizing the diversity of its members, but by emphasizing the unity of purpose and belonging to a group and the enterprise.

Based on above mentioned paradigms, further interdisciplinary research will be conducted, because it is necessary to analyze deeper social, legal and economic factors affecting intercultural management in SME's sector in Poland, Czech Republic, Ukraine and even other countries.

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# ASSOCIATION BETWEEN ONLINE TEXTS AND STOCK PRICES

**František Dařena**

*Mendel University in Brno, Moravian University College Olomouc, Czech Republic  
frantisek.darena@mendelu.cz, frantisek.darena@mvso.cz*

**Jonáš Petrovský**

*Mendel University in Brno, Czech Republic  
xpetrovs@node.mendelu.cz*

## **Abstract:**

The paper is focused on quantifying the strength of association between stock price movements and content of texts of corresponding companies. As the principal tool, machine learning based classification was used. Four different variable parameters of data preparation were used and six classifiers were applied to the data. It has been found that a classifier type and a smoothing method applied to stock price data were the most important factors. After the mentioned parameters were considered and investigated texts related to periods with significant stock price movements were separated with accuracy ranging from about 60 to 74% which demonstrates a nonrandom association between these two time series.

## **Key words:**

Capital markets, stock price movements, machine learning

**JEL Classification:** G17, C38

## **1 Introduction**

A lot of research focuses on incorporating large amount of human opinions into models of various social and economic phenomena. Data provided by digital media is very popular also in the field of capital markets where it can help in explaining less rational factors like investors' sentiment as influential for asset pricing and capital market volatility [5]. A lot of the past research utilized structured data but other information sources, like texts often representing subjective attitudes into financial models provide another perspective and potentially complementary information to quantitative information.

Both objective and subjective information can be contained in a textual form in various sources, like newspaper articles, scientific papers, annual reports, discussion boards, social networks and others. From the texts, useful knowledge might be extracted in a process known as text mining [7]. It is a branch of computer science that uses techniques from data mining, information retrieval, machine learning, statistics, natural language processing, and knowledge management [2]. Text mining involves general tasks such as text categorization, term extraction, single- or multi-document document summarization, clustering, association rules mining, or sentiment analysis [7]. At the end of the last century, machine learning gained on its popularity and became a dominant approach to text mining [19].

Many researches, like [22], [17] or [14] analysed stock price movements in relation with sentiment, primarily at aggregate level, from one source (e.g., Twitter or newspapers), based on the existence of specific words or expressions identified by rules or lexicons, or in a limited time period. In our work we focus on the analysis of information content at a micro level. The objective is to determine whether the content of online texts related to a company has a clearly quantifiable association with movements of prices of stocks related to that company. Documents from three different sources, Yahoo! Finance,

Facebook, and Twitter collected in a period of about 8 months are analysed and using a machine learning based procedure the association is demonstrated.

## 2 Analysed data

Data related to so-called blue chip companies was used in the research. The companies were selected from Standard Poor's 500 and FTSEurofirst 300 as they contain a sufficient number of listed companies both US based and European. Information about stock prices was obtained from Yahoo! Finance as it contains daily data for many stock exchanges around the whole world, with long history, and is available free of charge.

Texts related to the investigated companies were downloaded from financial news server Yahoo! Finance (rather objective information) because it contains news aggregated from several sources, is one of the most visited servers, and is accessible free of charge. Other sources of text data include social networks and microblogging sites Facebook and Twitter, belonging to the biggest sites on the web. From the investigated companies, only 55% had a profile page containing posts usually created by the company representatives and comments by other Facebook users. Besides the textual content, all documents also contained information about the time of their publication. The amounts of documents from different sources can be found in Tab. 1.

**Table 1: Amounts of data from different sources (from 2015-08-01 to 2016-04-04)**

Document type	Total number	Daily average/company	Monthly average/company
Yahoo! Finance article	81,519	0.40	12.55
Facebook post	134,941	0.71	21.97
Facebook comment	2,222,362	17.59	545.43
Twitter status	3,887,527	774.29	24,003.00

## 3 Quantifying the association between stock prices and texts

Analysis of the association between stock price movements and the content of texts published on the web can be seen as a problem of finding correlation between two time series – stock prices and documents' content. However, as the latter is generally not represented by a scalar value, measures like Pearson's correlation coefficient [1] cannot be simply used. The values of these time series thus need to be converted to a type suitable for quantification of the association between them.

### 3.1 Processing stock price data

Stock prices are represented by numeric values. However, the absolute values are not too important unlike the changes between certain moments in time. Therefore, a transformation based on stock price changes is defined.

Naturally, the prices change very quickly, although sometimes in small rates, reflecting many different events, habits, or sentiment [3]. There is also evidence that price movements might be completely random [4]. Not all changes are thus important. Rather trends, cycles, or their combinations are more interesting [13]. These movements can be revealed by replacing the original values by some values not showing that high volatility. Popular candidates are moving averages, widely used in technical analyses studying stocks markets, that substitute the original data by sequences of averages calculated from subsets of the data sets (a new value is calculated based on  $n$  last original values). There exist two distinct groups of smoothing methods – averaging methods, and exponential smoothing methods. The former (Simple Moving Average – SMA) relies on calculating the mean of successive smaller sets of numbers of past data, while the latter (Exponentially Weighted Moving Average – EWMA) assigns exponentially decreasing weights as the observations get older [11].

Not every change, that can be easily measured between different moments, is usually important (e.g., a very small change in the order of tenths of a percent). Wuthrich et al. [22] found that appreciation and depreciation takes place when the market moves up or down by at least 0.5% and that the average change in market indices is often much more, about 1.5

### **3.2 Processing text data**

Information consisting of objective facts, personal attitudes, feelings, assumptions, current mood, etc. is expressed by the words and their combinations contained in the text. Some approaches to text analysis are based on lexicons and sets of additional rules where the extracted semantic content depends on the presence of some of the predefined words or expressions from a lexicon, sometimes considering more complex issues [21, 6].

Other approaches rather rely on availability of a sufficient amount of data from which a model can be learned. These methods often use an algorithmic approach that tries to find a function that models the data. This approach, known as machine learning performs better than a dictionary based approach for many natural language processing tasks [9].

In order to apply some machine learning algorithms texts are usually converted to a structured representation. A widely used structured format is the vector space model proposed by Salton and McGill [16]. Every document is represented by a vector where individual dimensions correspond to the features (terms) and the values are the weights (importance) of the features. This simple approach, known as the bag-of-words, is popular because of its simplicity and straightforward process of creation while providing satisfactory results [8]. In our experiments, three weighting schemes – term presence, term frequency \* inverse document frequency (tf-idf), and tf-idf with cosine normalization were used.

### **3.3 Association strength calculation**

To quantify the relationship between stock prices and related texts a classifier assigning a label to a text might be trained. The classifier [15] is a function of document properties that tries to generalize a set of good examples (training set) in order to predict a class of previously unseen documents. For the training phase, a sufficient amount of training instances needed to be prepared and appropriately labelled. For every text, the date of its publication and a related company was known. It was then possible to take the stock price movement trend for that company for a corresponding date (considering also a lag) and use it as a label for the document. The induced classifier than tried to map the document features to the labels derived from stock price movements.

The strength of the relationship between the input (the content of documents) and output (the label) might be then expressed by standard classification performance measures, like the accuracy of F-measure since they contain information how well is a classifier able to assign a correct label to a document based on the values of its attributes [20]. In other words, good classification performance demonstrated strong relationship between the content of texts and stock price movements.

### **3.4 Experiments**

Four different data sources (newspaper articles, Facebook posts and comments, and tweets) were investigated separately. Only 200 most retweeted tweets and 40 most liked comments for every company in every day were processed. In the other remaining data sets, no preselection needed to be performed. The stock price time series were transformed according to the principle described above and a class label for training a classifier in order to determine the correlation with stock price movements needed to be assigned to every text.

In order to transform the stock price data and to determine the class label of a document  $D_i$  related to company  $C_i$ , released at time  $T_r$ , representing a change in stock price of company  $C_i$  at time  $T_c$  the following aspects and parameters need to be determined:

- Values of stock prices to be considered – here, adjusted closing values, simple moving average and exponential moving average, both based on 5 and 20 days were analysed in order to include averages with different sensitivities; for days when no value was available, the price was calculated as the arithmetic average of the last closing value and the first following opening value.
- The lag between publication of texts at date  $T_r$  and a stock price movement at  $T_c$  – lags of 1, 2, and 3 days were investigated to consider also other than immediate effects.
- The minimal relative difference in stock prices at  $T_c$  and  $T_{c-1}$  to be considered significant – changes 1, 2, 3, 4, and 5 percent were investigated. If a price change is within the percentage limits it is considered constant and all documents related to the specific date are labelled by the “constant” class label. If the price change is above the limit in the positive direction, i.e., increased more than, e.g., 3%, documents are labelled as “increase”. In the remaining case, the price decreased significantly and the corresponding documents are labelled by the “decrease” label.

As the data was massively unbalanced (a large majority of documents belonged to days when no significant change in stock prices occurred) biased or useless results in terms of accuracy would be achieved without further data set adjustment. Because significant increases or decreases of prices are more interesting than remaining approximately on the same level, only documents labelled as “increase” or “decrease” were included to further processing and these classes were balanced

From the great amount of existing classifiers, the following ones, available in Python’s scikit-learn package [10] were investigated: Multinomial Naïve Bayes (with  $\alpha=1$ ), Bernoulli Naïve Bayes, Logistic regression (Maximum entropy), CART decision tree, Random forest, and Linear SVC as they belong to the ones often used in sentiment analysis and text classification [12, 23]. The data was split into training and testing sets in the proportion 65:35 percent.

## 4 Results

The data collections for experimenting were prepared according to the steps described in the previous sections. Subsequently, six different classifiers were trained and tested on each of the data sets represented by three different term weighting schemes. Values of the metrics related to classification correctness were obtained for each experiment. To achieve sufficiently general results, collections with less than 500 documents were excluded from detailed analyses of the experiments with individual data sources. Selected measures of the most important classification performance metrics and data set properties for all experiments can be found in Tab. 2. The values are based on experiments using all possible combinations of parameters and classifiers. Because the collections were almost perfectly balanced in terms of class distribution in the data sets, the values of accuracy, precision, recall, and F-measure reached almost the same values. Thus, in the following text, only the values of accuracy are presented.

**Table 2: Classification performance metrics values and data set characteristics for all experiments with data from all four sources**

	Average accuracy	Min. accuracy	Max. accuracy	Accuracy variance	Average number of documents	Average number of attributes
Yahoo! Finance articles	0.6376	0.5430	0.8142	0.0025	10911	13597
Facebook posts	0.5819	0.5020	0.6940	0.0013	14191	6743
Facebook comments	0.6039	0.5229	0.7861	0.0027	43037	10456
Twitter	0.6658	0.5531	0.8393	0.0022	35768	8459

From the Tab. 2 it is obvious that the classification accuracy varies quite considerably from its minimal to maximal values which is given by different experimental settings. A detailed exploration of the used algorithms and experimental settings was conducted in order to reveal how individual parameters influence the classification process. For every variable parameter (a method of stock price values smoothing, a lag between documents' release and related stock price changes, minimal stock price change, classifier, and weighting scheme) average accuracies for all experiments with the same value of the parameter were calculated.

It was found that that only the smoothing method and used classifier had a significant impact on accuracy values. Higher accuracies were achieved for sma(20) and ewma(20) and for LinearSVC, MaxEnt, and NB-multi classifiers across all data sources (the average accuracies from all experiments using combinations containing only these values for respective parameters increased to 0.72 for Yahoo! Finance articles, 0.61 for Facebook posts, 0.67 for Facebook comments, and 0.70 for Twitter).

Tab. 3 contains accuracies achieved in experiments when the three mentioned parameters and two smoothing methods using 20 days for calculating the moving average values. Because the differences between accuracies for three different weighting schemes, three classifiers, and two smoothing methods were very small (within 2%), only the analysis of the influence of lag in days and minimal price change is presented.

**Table 3: Average accuracies for individual experiments' parameters. All experiments with classifiers and smoothing methods different than shown were excluded**

Lag in days	1	2	A3
Yahoo! Finance	0.7414	0.7181	0.7125
Facebook comments	0.6711	0.6752	0.6552
Facebook posts	0.6449	0.5980	0.5960
Twitter	0.6761	0.6992	0.7045

Minimal price change	1	2	3	4	5
Yahoo! Finance	0.6958	0.7329	0.7142	0,7283	0,7474
Facebook comments	0.6291	0.6632	0.6677	0,6858	0,7187
Facebook posts	0.6007	0.6074	0.6001	0,6028	0,6356
Twitter	0.7137	0.7132	0.7044	0,6542	0,6598

## 5 Discussion and conclusion

Because of high volatility of the stock price data [18] smoothing of the time series has proven to be a reasonable step improving the accuracy significantly. Moving averages based on 20 days had more positive impact than moving averages based on 5 days.

When looking at the time between publication of documents and related stock price changes the strongest correlation was found for shorter time spans for the Yahoo! Finance and Facebook documents (1 day, or 1-2 days, respectively) and longer (2-3 days) for Twitter. A possible explanation might be in the nature of the documents (different speed of publishing the documents).

Generally, higher considered minimal stock price changes lead to better results in terms of classification accuracy. We can assume that this is caused by some accompanied exceptional content of documents in related periods with significant stock price movements. On the other hand, this parameter negatively influences the size of available data (there are less periods with big changes than periods with small changes).

After the mentioned parameters were considered and investigated texts related to periods with significant stock price movements could be separated with accuracy ranging from about 60 to 74% which demonstrates an association between these two time series.

The paper presented the result of experiments that were designed with the goal of revealing the association between texts published in online environments and changes in stock prices of the corresponding companies at a micro level.

As the principal tool, machine learning based classification was used. All used classifiers were able to confirm the association between texts and stock price movements with all data sets prepared for the conducted experiments. Some of them, namely Linear SVC, Maximum Entropy, and multinomial Naïve Bayes classifiers outperformed the others in terms of achieved accuracy which was used to quantify the strength of such relationship.

Of course, there are other aspects that influence stock price movements and that are not always included in online texts. It is thus clear that the documents' content cannot explain or predict all movements. Future research directions will include a tighter interconnection with the economic aspects of the domain, including, e.g., other external market and economy information and industry specifics. Other directions will include the machine learning perspective, e.g., processing the data in a stream, working with unbalanced data, or using alternative structured document representations.

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# MODEL OF COST CALCULATION METHOD ABC IN THE PUBLIC SECTOR

**Jan Drbola**

*University of Defence, Faculty of Military Leadership, Department of  
Economy, Czech Republic  
drbola.h@email.cz*

## **Abstract:**

The need for planning resources (human, material and financial) is already known for centuries. Early planning has always been associated with the leadership of the military campaign. Whether it was a period in which Master Sun or Adam Smith served, resource planning has always played an important role. Today, this process is not lost its significance, on the contrary, we have methods that help us with resource planning and subsequent evaluation on their use. In branch of financial resources, all of this information are provided by several methods. One of these methods is method of Activity Based Costing, which is commonly applied in business management in private ownership, but it can also be used in conditions of public sector.

## **Key words:**

Public sector, calculation, expense, activity based costing

## **JEL Classification:** O3

## **1 Introduction the topic**

In terms of measuring the effectiveness of management is a public sector very complicated field, although there are methods that can used to measure this variable. The result of this measuring is not as meaningful as in the case of private sector companies, especially because of the absence of profit category. For this reason, public sector tends to maximize the inputs and outputs to minimize. [1] This paper focuses on one area of the public sector, especially of the field of defence.

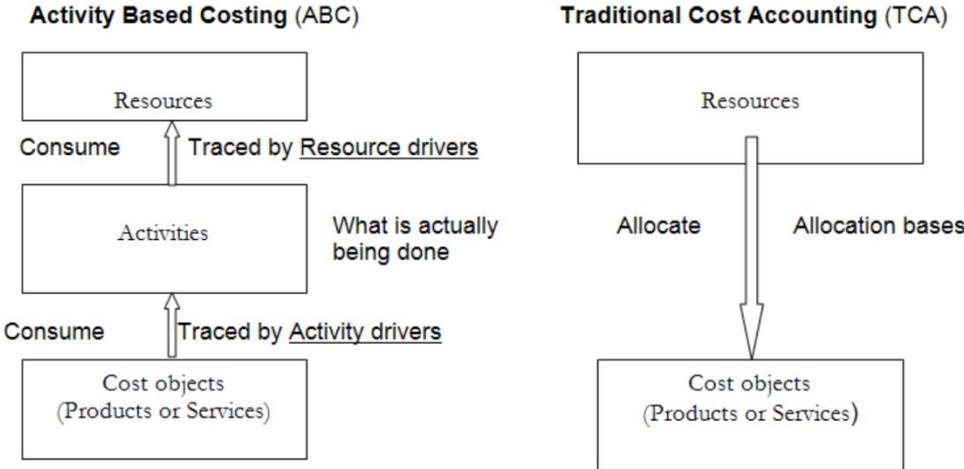
The main goal of this paper is to propose possible instrument for the representatives of military element in their decision-making process, especially in the field of effectivity of planned expenses and for planning process. They don't need to know principles and rules of accounting, but they should be able to work with accounting output, which help for better decision. [8] An essential prerequisite for obtaining relevant information for further examination is to distinguish fixed and variable costs. Unlike of fixed cost are variable cost dependent on amount of realized activities. [9]

As originally introduced in the 1980s, ABC corrected serious deficiencies in traditional standard-cost systems. [4, 5]. The traditional systems typically used only three cost categories: labour, materials, and overhead. While manufacturing companies could generally trace the labour and materials used by their individual products, their cost systems allocated the indirect and support costs-the "overhead" – with measures already being recorded, such as direct labour hours and direct labour dollars. [6]

ABC is a two dimensional model with cost assignment view (CAV) and the process view (Figure 1). The CAV generally occurs in two stages – from resources to activities (stage 1) and then from activities to cost objects (stage 2). Resources are an economic element that is used or applied in the performance of activities. Examples include salaries and supplies. Activities are aggregation of actions performed within an organization that is useful for the purposes of activity-based costing. Finally, cost objects are products

or services for which a separate cost measurement is desired. The main purpose of this process is to find out the costs of the activities and the cost objects. The second view of ABC – process view, provides a report of either what has happened or what is happening. The definition of activity remains the same as in the CAV. Cost drivers are any factor that causes a change in the cost of an activity. An activity may have multiple cost drivers associated with it. Performance measures (financial or non-financial) are indicators of the work performed and the results achieved in an activity, process or organizational unit. [7]

Figure 1: Activity based costing (ABC) versus traditional cost accounting (TCA) systems



Source: [7]

ABC method (Activity Based Costing) is a calculation of the costs by assigning individual activities. This is a cost-mathematical model of the organization that is using financial indicators describes the flows of financial resources and their impact in terms of costs. Using this calculation can be accurately describe the flow of funds expended in the organization, analyse and evaluate the processes that take place in the organization.

The aim of this work is to process the conditions of selected military unit costing model based on particular activities (using the ABC model) to view the stream of costs of resources consumed over a certain activity to the cost object.

In conditions of Czech armed forces are no (or very little) studies that deal with issues of cost monitoring. There is the departure of controlling (economic section of Ministry of defence), that try to implement controlling in the conditions of Czech armed forces. Process of implementation of controlling now underway to pilot cost centres, but their final project can't capture cost as in details as in this paper.

Abroad, this issue was has been addressed for several decades yet. In German army has been accepted many measures, that caused, economic control is closer to economic control of civil firms. It's important to mention, that there is cost capturing and their evaluation on high level, although there is still a difference between economic theory and economic practice. [10] Early 90s Great Britain military budget annually decreased, thus representatives of ministry of defense had to accept some measures, which allow to control army with lower amount of resources and hold its abilities on the same level. It was the main reason for accept Resource accounting a budgeting system, that allows monitoring cost occur, so representatives are able to evaluate rate of economic advantage of each possible expense. [6] In procurement were newly established some conditions, that involved thinking about life cycle expenses or influence on macroeconomic indicators. [7]

## 2 Methods

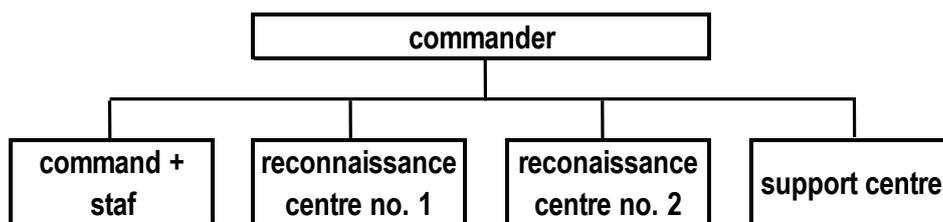
In the beginning of this paper was necessary to use method of observation and measurement to analyse each activity that are involved to the observed object (military training). These observed activities were captured by using method of description. Other method is analysis and synthesis used for identification each kind of cost on the first side and for grouping identified cost into calculation formula on the other side. It is necessary to mention method of modelling used throughout the practical part. In the whole paper are used mathematical a statistical methods for determining concrete values of each activity. It is not possible to describe each activity that are involved in the military training, therefore I used a method of abstraction and incremental costs are involved in mentioned activities. However number of total costs corresponds to real costs.

### 2.1 Characteristics of the expense entity

Expense entities are for purpose of calculation divided:

- Production entity
- Support entity
- Overheads entity

Figure 2: Structure of the military unit



### 2.2 Production entity

As an exemplary production of production entity for the needs of the model is chosen reconnaissance centre no.1 performing tasks of reconnaissance. The organic structure of reconnaissance centre no. 1, further comprising a sub-battle groups. Each battle group consists of commander, his deputy and three other members of the group (total five members of the group).

The object of the cost calculation is an exercise of the battle group filling reconnaissance activity in a training environment. Break is determined in the length of 10 minutes per hour. For this group will be calculated the cost of a one-day survey of members of one battle group of reconnaissance centre no. 1. This survey will be conducted in the military training area Libavá (dist. Olomouc). Distance from the crew to the military area Libavá is 55 km. As a supervising instructor is designated commander of reconnaissance centre no. 1, who will oversee compliance with the principles of safety, tactics and the actual execution of exploration activities.

**Table 1: Planned during of exercise**

<b>From</b>	<b>To</b>	<b>Activity</b>
06:00	06:20	Vehicles preparing, material loading, pick-up weapons
06:20	07:40	Moving from base to military area Libavá, preparing material for task
07:40	08:30	Issue of combat order, determining training objectives and criteria for fulfilling
08:30	12:00	Execution of exercise
12:00	12:45	Consumption of food, evaluation of existing exercise
12:45	17:45	Execution of exercise
17:45	18:30	Completion of exercise, treatment material and weapons
18:30	19:00	Evaluation of exercise, identification of gaps during exercise
19:00	19:30	Returning to base, treatment and storing vehicle, returning weapons

Full-time job, which will be held in the military area Libavá, will be a total duration of 13.5 hrs.

**Calculation of direct expenses:**

- Wages

The monthly average salary (average salary across the battle group) of member of battle group is 23,500 CZK (without allowance for housing). Average hourly salary is:  $23,500 / 4.33 / 42.5 = 135.7$  CZK.

For that training during the period of 13.5 hrs. Thus, direct wages on 1 VZP is:  $13.5 \text{ hrs.} \times 135.7 \text{ CZK} = 1,832 \text{ CZK}$ .

This amount is not included wages during annual leave. Due to the economic analysis may just counting wages during annual leave somehow distort the whole economic model. In the case of planning activities for a certain period, work of all soldiers, who participated on various activities of the planning is included. In the event that wage labor costs of those workers who are on annual leave were in scoring included, it would increase the costs of the action. Costs arising from the grant of the housing allowance, are independent of the work performed. However, it is the portion of labor costs and hence must disband these costs among various activities. Costs associated with health and social insurance are included in the overhead costs. Health and social insurance paid by the organization is part of the overhead. Wage of 5 participants (included own driver):  $5 \times 1,832 = \text{CZK } 9,160 \text{ CZK}$ .

It is also necessary to involve salary of instructor among direct - this function is performed by commander of reconnaissance center no. 1. Monthly average salary in that place is 29,700 CZK.  $29,700 \text{ CZK} / 22 \text{ working days per month} / 8 \text{ hrs.} = 168.8 \text{ CZK}$ . For that training during the period of 13.5 hrs thus final wage is:  $13.5 \text{ hrs.} \times 168.8 \text{ CZK} = 2,279 \text{ CZK}$ .

Total direct wages for one day (13.5) carrying out special reconnaissance:  $(\text{CZK } 1,832 \times 5) + 2,279 = 11,439 \text{ CZK}$ .

- Material

Under direct material will be calculated costs associated with the material needed for the training:

- 150 x round to M-4 carbines Colt: price 6 CZK/1 pcs
  - The total price:  $6 \times 150 = 900 \text{ CZK}$
- 5 x M-4 Carbine Colt: price: 80,000 CZK (worn out after firing 20,000 pcs rounds).
  - Wear out after 50 shots:  $(80,000: 20,000) \times 50 = 200 \text{ CZK}$ .
  - Wear 5 pieces of M-4:  $5 \times 200 \text{ CZK} = 1,000 \text{ CZK}$
- 15 x smoke. Price: 140 CZK /1 pcs. A total of  $140 \times 15 = 2,100 \text{ CZK}$
- 10 x chemical light. Price: 8 CZK/1pcs. A total of  $8 \times 10 = 80 \text{ CZK}$

- 6 x camouflage colors (40 ml): Price: 120 CZK/ 1 package (10x camouflage colors)
  - Price per one soldier: 12 CZK.
  - The total price  $12 \times 6 = 72$  CZK
- 6 x other gear and equipment (clothing, pouches, vests)
  - Total cost CZK 60,000. Wear of after 800 hrs reconnaissance activities.
  - Price for 1 hour exploration activities:  $60,000/800$  CZK = 75.
  - Over 13.5 hrs:  $13.5 \times 75 = 1,012.5$  CZK / 1 soldier.
  - Total  $1,012.5 \times 6 = 6,075$  CZK.

**The total cost of direct materials for participants 6 job is: 10,227 CZK.**

- Other direct expenses

This area includes other costs such as protective preparations for equipment and weaponry, wear the other components of weapons, containers of various components etc. Costs for food, which is provided free of charge to soldiers are also included.

Total other direct costs are 180 CZK /1 soldier. Total:  $180 \text{ CZK} \times 6 = 1,080$  CZK.

Calculation of partial activities in production entity

For purposes of this calculation will be broken down only activities that are directly related to the specified cost object, ie. one-day carrying out the reconnaissance, which was attended by 5 soldiers + 1 instructor.

- Planning exercise

Before leaving the crew commander of reconnaissance center no. 1, must approve a training plan to carry out reconnaissance in the military training area. Each battle group conducted this type of training 1x per month, ie. 12 times a year. The training plan handles the chief of the department of training of staff. The average wage of a soldier in that place is 27,400 CZK (155.7 CZK / 1 hr.). The time spent on processing directive is 15 hrs. (180 hrs. / 1 year). Labor costs per unit of activity is 155.7 CZK. Other costs are related to planning of training that is in relation to the unit activities enumerated in the amount of 35 CZK. Among these costs are classified mainly office equipment. Overall the cost per unit of activity determined in the amount of CZK 190.7 CZK.

**Table 2: Calculation on planning exercise**

Activity	Cost per activity	Total annual range of activities	Cost per unit of activity	Relation value	Number of monitored activities	Cost of monitored activity
Planning exercise	491,400 CZK	180 hod.	190.7 CZK	Value of planned exercise	1	2,861 CZK

The amount of CZK 2,861 is required throughout the year gradually accrued on each employment, which will take place within a defined training plan.

- Command and administration

Here will be calculated cost per unit of activity as a proportion of overhead costs of command and administration of the centre, which are engaged in four soldiers, ie.  $4 \times 8 \text{ hrs.} \times 22 \text{ days per month} \times 12 \text{ months} = 8,448 \text{ hrs.}$  of command and administration, those engaged in the activity in favor of the 54 remaining members of reconnaissance center no. 1. The disposable working hrs are:  $54 \times 8 \text{ hrs.} \times 22 \text{ days per month} \times 12 \text{ months} = 114,048 \text{ hrs.}$  The performance of 1 person / 1 hour is:  $(8,448/4) / 114,048 = 0.018 \text{ hrs}$  of command and administration. Training takes 13.5 hrs, command and administration therefore account for  $0.018 \times 13.5 \text{ hrs}$ , ie. 0.243 hrs. Because there are 5 trainee on the reconnaissance exercise, total value attributable to the field of command and administration is  $5 \times 0.243 = 1.22 \text{ hrs}$ . Total cost for this activity were a calculated an aggregate amount of 2,534,400 CZK ( $8,448 \text{ hrs} \times (300 \text{ CZK} / 1 \text{ hrs})$ ).

These group of costs include, in particular, labor costs of commander of reconnaissance center no. 1, his deputy, chief of staff and executive warrant officer. Costs incurred by the depreciation of tangible assets are also included. Other costs associated with this activity are also linked to the cost of training courses and training mentioned above functionaries center which can result in higher quality of subordinated soldiers or language courses. In this field of activities are also includes costs for other activities, such as serial preparation, consultation and follow-up inspections. An important part of this field is also administration, which includes mainly the activities of the executive warrant officer, which provides all logistical activities of the center. We must not ignore the costs associated with energy intensive operations staff and administrative areas relevant centers such as the costs of water and energy. Except of cost for wages were identified other costs in amount of 831,600 CZK. Total costs of command and administration are 3,366,000 CZK. Average cost per 1 hour of one person providing command and administration is:  $3,366,000 \text{ CZK} / 8,448 \text{ hrs} = 398.44 \text{ CZK}$ .

**Table 3: Calculation on command and administration**

Activity	Cost per activity	Total annual range of activities	Cost per unit of activity	Relation value	Number of monitored activities	Cost of monitored activity
Command and administration	3,366,000 CZK	$5 \times 8 \text{ hod} \times 22 \text{ days} / 1 \text{ month} \times 12 \text{ months} = 10,560 \text{ hod.}$	398.44 CZK	1 hour of command and administration	$0.243 \text{ hod.} \times 5 = 1.22 \text{ hod}$	486 CZK

### 2.3 Support entity

The support entity is represented by the support centre. Its activity mainly aims to providing logistic support especially for production entity. For purpose of model calculation is important especially element of field aid station, but also a workplace that provides transport people and material. In this centre with a mainly logistical character acts and other workplaces, but those not directly involved in our chosen training. It would be possible to include for instance the cost for washing vehicles, the cost of armament workshop, the cost of repair work, but due to the extent of our model, this information is redundant.

- Transport people and material

As mentioned hereinbefore, the transport of people and material is provided by the support center. Due to the number of trainees and the amount of material will be transport of people and material carried by truck Tatra. The driver of this car is one of the trainees. Cost of 1 km of operation (depreciation, fuel, service inspections, MOT, emissions, etc.) of this type of truck was a calculated on 60 CZK / 1 km.

**Table 4: Calculation of transport people and material**

Activity	Cost per activity	Total annual range of activities	Cost per unit of activity	Relation value	Number of monitored activities	Cost of monitored activity
Transport people and material	3,000,000 CZK	50,000 km	60 CZK	1 km of transport	2 x 55 = 110 km	6,600 CZK

110 km x 60 CZK (value of 1 km) = 6,600 CZK

## 2.4 Overheads entity

Overhead entity is represented by command and staff, which generally falls below 69 persons. Total annual costs were estimated at 30,000,000 CZK. These costs primarily include labour costs, material, depreciation, energy, travel costs, health and social insurance paid by the organizations, and other items that are in any way inflate overhead cost instead. The activity of members of the command and staff is mostly indirect nature. To simplify the model we will take all the activity performed as an activity purely overhead. Calculated costs further include depreciation on tangible immovable property and cost of energy and water.

The charting base is determined by available number of worked hours, therefore the available working hours for all members of the production entity (rec. centre no. 1), in addition to five members who are involved in training, ie. 54 people: 54 x 8 hrs. X 22 days per month x 12 months = 114,048 hrs. For one hour of work for any member of the production entity therefore seems: 30,000,000 CZK / 114,048 hrs. = 263 CZK. For purposes of calculation, however, count only the cost for the 5 VZP trainees. On the set employment to be reckoned with VZP 5 x 13.5 hrs. X 263 = CZK 17,753 CZK overhead.

### 3 Paper results

As a cost object was chosen one day reconnaissance of 6 members of our model military unit. This training was held in the military training area Libavá.

Table 5: Calculation formula

Direct wages	11,439 CZK
Direct material	10,227 CZK
Other direct expenses	1,080 CZK
Productive overheads (planning + command /administration)	3,347 CZK
Support overheads	6,600 CZK
Staff overheads	17,753 CZK
<b>Total</b>	<b>50,446 CZK</b>

Complete own costs will therefore be at the calculated cost object in the amount of 50,446 CZK. A similar calculation formula is applicable to any employment of a similar character that according to the nature of training, we will modify the individual components of the calculation formula (such as the outline of medical security in case shootings). Complete own custom costs will vary depending on the nature and scope of training, especially in the number of persons involved in the training, but also logistic complexity and other factors. It is necessary to remark, this calculation formula is not designed only for this military exercise. As mentioned in the first part of this paper, it is important to determine variable and fixed cost. In case, we can describe each cost, we are able to use this calculation formula for each activity or set of activities by changing input information and indexes. Ideally, identification of each input pointer and subject and its severity (time, amount of consumed material atc.) is a sufficient information for adjustment calculation formula for each activity. It means, this calculation formula is not useful only for military training in Libavá.

The main goal of this paper is to propose possible instrument for the representatives of military element in their decision-making process, especially in the field of effectivity of planned expenses and for planning process. Based this paper representatives of military elements have partial concept that help them in planning process and in evaluating of each military training. Some examples of using this tool are mentioned below.

In case of using outputs of ABC method, representatives can plan every military training, foreign operation, transport, support services then we can talk about partial economic controlling. In connection with this information is possible to decide about outsourcing some services (especially cleaning, catering, IT). Nowadays is situation very different. We can find some military units, that are located relatively close and one of this unit provides catering through its own employees a second unit provides it through civil firm. A question is, what are the reasons for this decision? In case of knowledge of supposed expenses (providing catering through own employees) representative can determine rate of efficiency of each variant. Planning resources for next year is another reason for need of knowledge of expensiveness each activity. Nowadays planning process is based on previous years. In case of getting new goals for next years, we can only plan supposed expenses, but we can't calculate them.

## 4 Discussion

Based this paper, it is important to deal further this issue, because to find a suitable way how to solve problem of measure cost, is important to know answers at least for following questions?

- Is suitable to implement activity based costing in a public sector, or should we use another instrument?
- What is the significance of advantages of implementation ABC in comparison with possible obstacles?
- How can we measure rate of effectiveness of representatives without using ABC method, when we are not able to analyse input cost of each activity?
- What is the most suitable tool for measuring effectiveness in the public sector?
- For determine a rate of effectiveness, how can we determine and measure output of each activity or process, that is created in specific conditions of public sector, especially in the field of defence.

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# FORECASTING MONETARY SYSTEM INDICATORS IN THE TRANSITION TO A FLOATING EXCHANGE RATE THROUGH A COMPREHENSIVE ECONOMETRIC MODEL

**Yulia Y. Finogenova**

*Plekhanov Russian University of Economics, Russia  
jjfinogenova@gmail.com*

**Denis V. Domaschenko**

*Plekhanov Russian University of Economics, Russia  
dendv@rambler.ru*

**Edward E. Nikulin**

*Plekhanov Russian University of Economics, Russia  
edvardnikulin@gmail.com*

**Victor A. Krylov**

*Plekhanov Russian University of Economics, Russia  
climber.victor@mail.ru*

## **Abstract:**

The study aims to evaluate the effectiveness of ruble floating exchange rate policy introduced by the Bank of Russia in late 2014, based on the relationships between the main macroeconomic indicators of the RF monetary system. This article describes the developed and validated integrated econometric model for forecasting the dynamics of macroeconomic indicators of the monetary system and financial markets in the Russian Federation, and offers a forecast of short-term dynamics of the main model variables using vector autoregression and nonlinear autoregressive neural network modeling.

## **Key words:**

Forecasting, Exchange Rates and Intervention, Neural Networks

**JEL Classification:** C53, F31, C45

## **1 Introduction: Overview of vector autoregressions and neural network modeling implementation cases in economic research and forecasts**

The majority of the modern large-scale econometric models, such as stochastic general equilibrium models (DSGE) or agent-based model (AB), are artificial in nature, which often results in the erroneous application in the framework of large-scale crisis economic phenomena, such as the Great Recession 2008. The issues of adequate specification and parameterization of the model are the key challenges for the further successful development and application of sophisticated mathematical techniques in economic modeling. In view of this, it is of particular importance to develop methods to detect modeling errors and features that are sensitive to the baseline parameters estimation errors. The attempts to create an integrated model for the resolution of these problems were made in a number of economic studies. In particular, so-called DSGE-VARs approach (VAR - vector autoregression), proposed

by economists Del Negro and Schorfheide (Del Negro and Schorfheide, 2006), who suggests identifying DSGE model specification errors using VAR modeling, which allows easing restrictions imposed on the equation of DSGE models. Combining different econometric models enables not only to identify parameterization errors, but also to increase the flexibility in their use, to eliminate the disadvantages arising from the independent use of the models. In addition, such integrated modeling makes it possible not only to identify the mutual relationships between the model variables and explain the nature of its development, but also to forecast model parameters for different time horizons.

Interesting research by Eastern economies was done by Darvas Z. (Darvas, 2013), where he studied the transmission of monetary policy to macroeconomic variables with structural time-varying coefficient vector autoregressions in the Czech Republic, Hungary and Poland, in comparison with that in the euro area. There were discussed various factors that can contribute to differences in monetary transmission, such as financial structure, labour market rigidities, industry composition, exchange rate regime, credibility of monetary policy and trade openness.

Another researchers D'Agostino A. (D'Agostino A. et. 2013) assessed whether modeling structural change can help improving the accuracy of macroeconomic forecasts. They conducted a simulated real-time out-of-sample exercise using a time-varying coefficients vector autoregression (VAR) with stochastic volatility to predict the inflation rate, unemployment rate and interest rate in the USA.

Some researchers (Naser, 2015) utilized simple regression estimates and factor-based models to produce forecasts gross domestic product growth.

Białowolski P. (Białowolski, et., 2014) develop a methodology, based on the Bayesian averaging of classical estimates method, for forecasting key macroeconomic indicators, based on business survey data. They estimated a large set of models, using an autoregressive specification, with regressors selected from business and household survey data.

From recent research in the field of application of VAR neural network modeling we can mention Taylor&Yu (Taylor and Yu, 2016), who applied auto-regressive logit models for forecasting the probability of a time series of financial asset returns exceeding a threshold. We incorporate the exceedance probability forecasts within a new time varying extreme value approach to value at risk and expected shortfall estimation.

## **2 Methods: Vector autoregression block (VAR) and nonlinear autoregressive neural network block (NAR)**

Considering the goal of the research, we propose time series forecasting model based on two blocks: vector autoregressions block (VAR) and nonlinear autoregressive neural network block (NAR).

We choose NAR block for a model because it forecasts punctual values of time series. However, NAR does not provide probability estimation for predictions, what arise the problem of results reliability enforcing decision maker to take not estimated risk. In order to face this problem, we decide to use VAR block, which provides predictions expressed in expected value and standard deviation. Moreover, employment of two blocks, which presents results independently, give a possibility for model estimation. For instance, if results of NAR and VAR coincide one may consider results as more reliable. Thus, decision maker obtains a reliable tool for decision making which allows him to forecast time series and estimate results of forecasting.

The selection of the analyzed time series, calibration and validation of the developed model was carried out in view of the transformation of exchange rate regimes established by the Bank of Russia.

In order to evaluate the effectiveness of the floating exchange rate policy of the Bank of Russia, five variables were selected. According to these variables, corresponding time series within three time frames were built: 2008-2016, 2012-2014, 2014-2016. The selection of time frames is preconditioned by the transition of the Bank of Russia from the managed floating exchange rate regime to a floating exchange rate regime. To calibrate and validate the model, 2008-2016 timeframe was selected.

We use the following time series for forecasting and analysis:

- 'Var1' (abbr. *variable*) – USD/RUB;
- 'Var2' – Brent oil (US\$/bbl);
- 'Var3' – Demand foreign currency deposits of individuals (expressed in million rubles);
- 'Var4' – Term foreign currency deposits of individuals (expressed in million rubles);
- 'Var5' – Current foreign currency deposits of legal entities (expressed in billion US dollars)

Historical data is downloaded from: Thomson Reuters Eikon, Central Bank of Russia ([www.cbr.ru](http://www.cbr.ru)).

For mathematical modelling, we use MATLAB Econometrics Toolbox.

## 2.1 Vector autoregression

VAR (p) has the following form:

$$y_t = a_0 + A_1 y_{t-1} + A_2 y_{t-2} + \dots + A_p y_{t-p} + \varepsilon_t = a_0 + \sum_{n=1}^p A_n y_{t-n} + \varepsilon_t ,$$

where

- $a_0$  – constant vector;
- $A_1 \dots A_p$  – matrices of model parameters (autoregression coefficients);
- $y_t$  – vector of time series;
- $y_{t-p}$  – vector of previous values of time series;
- $\varepsilon_t$  – vector of random errors.

Data preparation. VAR model requires stationary time series as input. Hence, we should examine whether input data comprise trend component. For this purpose, we employ Dickey-Fuller (DF) test. The test fails to reject the null hypothesis with raw data (see results in appendix A), therefore, input data are not stationary time series. In order to reduce given time series to trend stationary we calculate first differences. DF test rejects the null hypothesis for all series (see results in appendix B). Thus, we have integrated time series of the first order –  $I(1)$ . Since we have prepared data for model, we may fit it.

Model fitting. Further we use Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) to determine optimal lag order in terms of model accuracy. According to both criterions 1 lag is an optimal one (see appendix C).

We apply root mean squared error (RMSE) for estimation of the model (see appendix D).

After fitting VAR, we are able to forecast. For this purpose, we employ Monte-Carlo method, which generates 1000 sample path for each next period. With generated path, we calculate expected value and standard deviation. Results of VAR forecasting are presented at the fig. 1 in combination with results of NAR.

In order to estimate the dynamic of time series we employ impulse response function (IRF) analysis (Pesaran H. H. et al, 1998), we use 'Var2' variable as an oil shock (see appendix F). The value of the shock is one sigma.

## 2.2 Nonlinear autoregressive neural network

NAR is defined by the following expression:

$$y_t = F(y_{t-1}, y_{t-2}, \dots, y_{t-p}) + \varepsilon_t$$

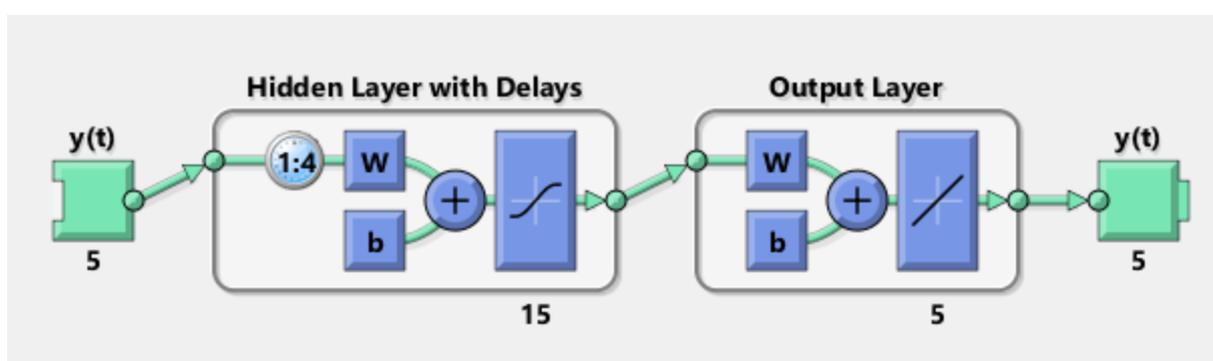
where

- $y_t$  – vector of time series;
- $y_{t-p}$  – vector of previous values of time series;
- $\varepsilon_t$  – vector of random errors.

### Model fitting

In order to train the neural network, we divide raw data into three groups: train (75%), validation (15%), test (10%). We choose mean squared error (MSE) as parameter for neural network performance estimation and levenberg-marquardt algorithm for training.

Figure 1: Chosen architecture for the neural network



Indicators (MSE, error autocorrelation, regression) of model estimation are presented in appendix E.

## 3 Paper results

After the final stage of modeling the correlation analysis of the model's variables was carried out with the subsequent assessment of efficiency of the floating exchange rate policy.

As one can see from the visualization of the variables' reaction to the oil price shock, under the conditions of the exchange rate transition period of 2012-2014 (Appendix F) the increment of dynamic rates of the variables exceeds significantly the corresponding indicator of the floating exchange rate regime period of 2014-2016. It is also important to note that it takes a longer period in order for the values of the variables analyzed to return to the state of a sustainable trend. That can be explained by the fact that during the period of interim exchange rate regime the Bank of Russia carries out foreign exchange interventions in order to stabilize the exchange rate and maintain it within a certain exchange rate band. The sale and purchase of foreign currency in the framework of a foreign currency intervention allow stabilizing the exchange rate quite efficiently in case there are no powerful and long-term external shocks; however, in case they occur the fast and short-term changes in exchange rates cause destabilization of the foreign exchange market that is accompanied by inflation pressure and market members massively preferring foreign currency, which in its turn has a negative impact on long-term dynamics of macroeconomic indicators.

It is also worth mentioning that the decrease in oil prices is accompanied by a sharp increase in foreign exchange deposits of both natural persons and legal entities. Such a high level of foreign currency predominance creates excessive growth of foreign exchange indebtedness and contributes to the flight

of capital which, in turn, might lead to destabilization of both banking system of Russia and whole economy at large.

The strong correlation detected between oil prices and sharp growth of the percentage of foreign currency denominated bank accounts confirms that the behaviour of economic agents in Russia is similar to that in countries where the transition from the managed float exchange rate regime to floating exchange rate regime was carried out, which is usually accompanied by a strong mistrust of the national currency in case sharp external shock occur that are related to the collapse of raw-material markets.

However, it is worth adding that the transition to the floating exchange rate is a positive step made by the Bank of Russia to stabilize the national economy. This fact is confirmed by the results of the shock scenario analysis of the VAR model.

After modeling the vector autoregression and evaluating the responses of the model's variables to the impulse shock a neural network model (NAR) was elaborated and tested with the purpose of short-term forecasting of the indicators of time series of variables "Var1" (USD/RUB) and "Var2" (Brent oil)

The model was built basing on the statistic data through October 2016, three values of the forecast obtained (an 8-month forecast) were compared to the actual values of the time series. The results are shown in Table 1.

**Table 1: NAR forecast**

Date	Indicators, name and code in the model						
	USD/RUB exchange rate (model forecast)	USD/RUB exchange rate (actual)	Brent oil (model forecast)	Brent oil (actual)	Demand deposits of natural persons denominated in foreign currency (RUB billion)	Fixed-term deposits of natural entities denominated in foreign currency (RUB billion)	Demand deposits of legal entities denominated in foreign currency (USD billion)
	Var1		Var2		Var3	Var4	Var5
1.11.2016	63,93	63,22	50,18	47,90	745	5337	44,79
1.12.2016	62,28	65,24	51,22	53,70	755	5207	45,06
1.01.2017	60,22	60,66	54,32	56,75	765	5213	45,74
1.02.2017	59,14	-	57,02	-	754	5207	46,21
1.03.2017	58,8	-	59,06	-	739	5200	44,76
1.04.2017	58,91	-	59,77	-	722	5215	43,95
1.05.2017	59,33	-	59,62	-	702	5197	43,37
1.06.2017	60,01	-	58,73	-	681	5174	42,72

Graphical visualization of the short-term forecasting dynamics of the variables' values in vector autoregression model (VAR) and neural network model (NAR) is shown in the figures 2-6.

Figure 2: 'Var1' – USD/RUB Exchange rate

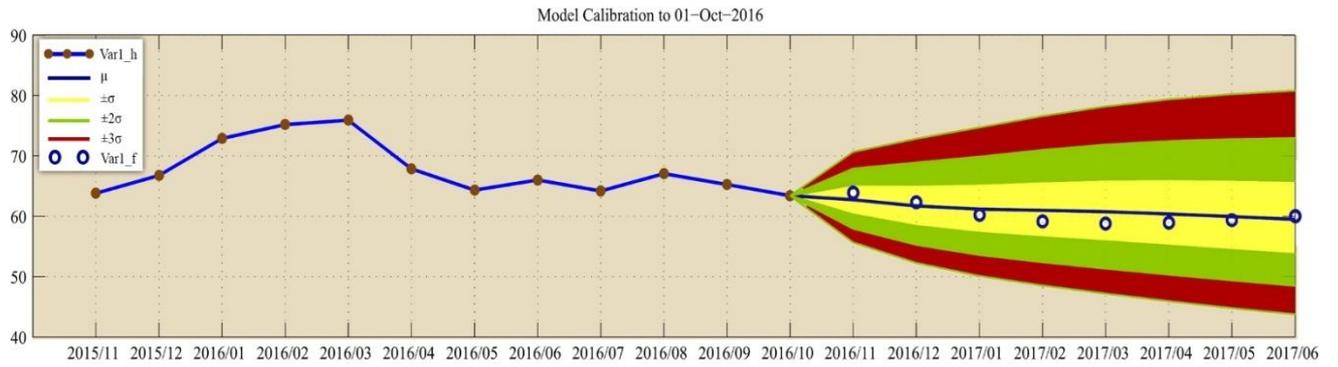


Figure 3: 'Var2' – Oil Bret price (USD per a barrel)

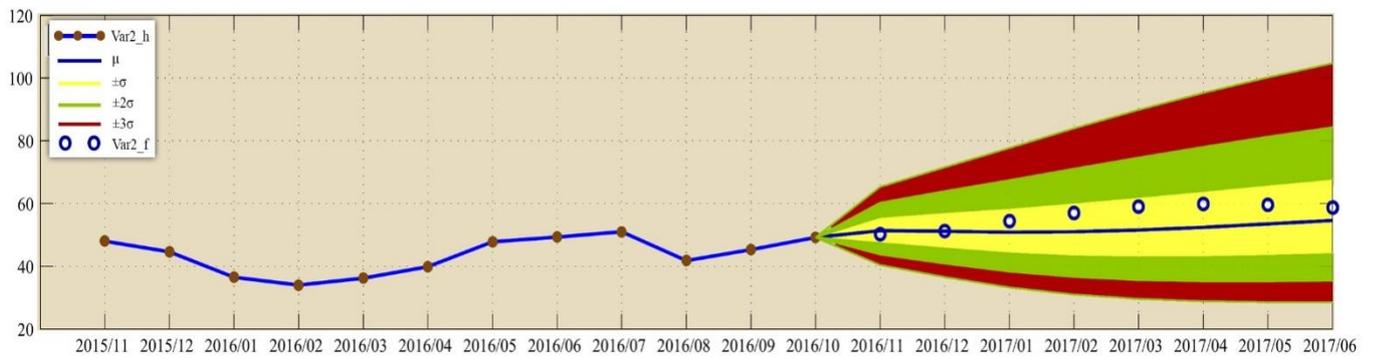


Figure 4: 'Var3' – Demand deposits of individuals in foreign currency (mln. Rub.)



Figure 5: 'Var4' – Term deposits of individuals in foreign currency (in mln. Rub.)

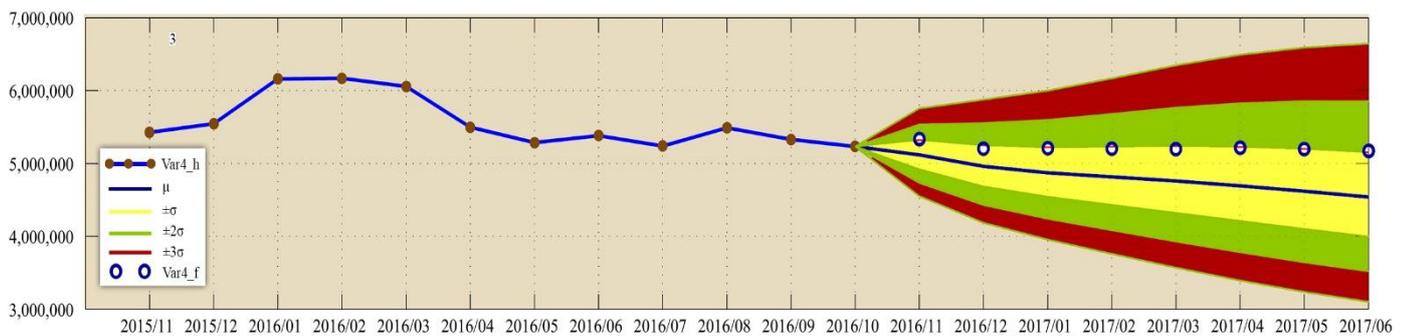
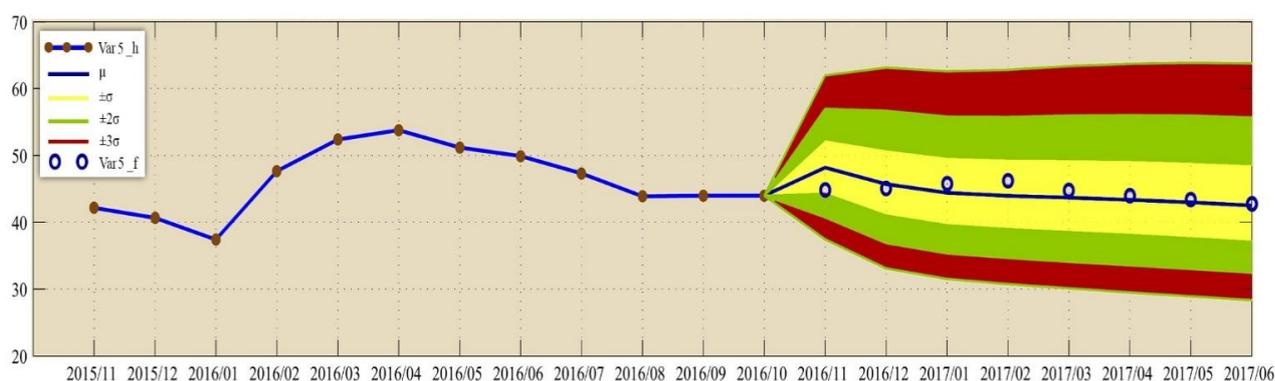


Figure 6: 'Var5' – Current deposits of legal entities in foreign currency (billion USD)



Figures 2-6 shows a short-term forecast of the main macroeconomic indicators of the Russian monetary system and oil prices. The forecast indicates stabilization of oil prices and the ruble -US dollar exchange rate in the next 6 months. As at 01. 12. 2016, the maximum discrepancy of the dynamics of the actual ruble exchange rate and the forecasted values obtained during the implementation of an integrated model amounted to 4.7%. As at 01. 12. 2017, the discrepancy between the actual ruble rate and the forecasted values amounted to 0.7%.

It should be mentioned that the model shows reliable results according to three sigma rule and the fact that two blocks functioned separately and provided codirected results in terms of closeness of NAR predictions to expected value provided by VAR and the majority of predicted values by NAR fell in the area of one sigma.

#### 4 Discussions

As a result of modeling, we came to the following issues:

1. The dynamics of the Rub. exchange rate in the studied time frames is strongly inversely related to the dynamics of oil prices. This confirms the continuing weak diversification of the Russian economy, which continues to focus on energy exports.
2. The fall in oil prices was accompanied by a sharp increase in foreign currency deposits of both individuals and legal entities (in the currency corridor regime). Strong foreign currency predominance created excessive growth of foreign currency debt, which contributed to capital outflow and destabilization of the banking system.
3. The transition to a floating exchange rate of the Bank of Russia turned out to be a positive step for the stabilization of the majority of monetary system indicators. This fact is confirmed by the results of the shock scenario analysis of VAR-model. In particular, the modeling showed that the volatility of macroeconomic indicators of the Russian monetary system declined significantly after the introduction of floating exchange rate regime. Return to the stable volatility values of majority of the monetary system indicators after the oil shock of 2014-2015 was more rapid than that observed in 2009-2010.
4. A short-term forecast of the main macroeconomic indicators of the Russian monetary system was received with help of the model including two blocks: VAR and NAR.

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## Appendix

### Appendix A

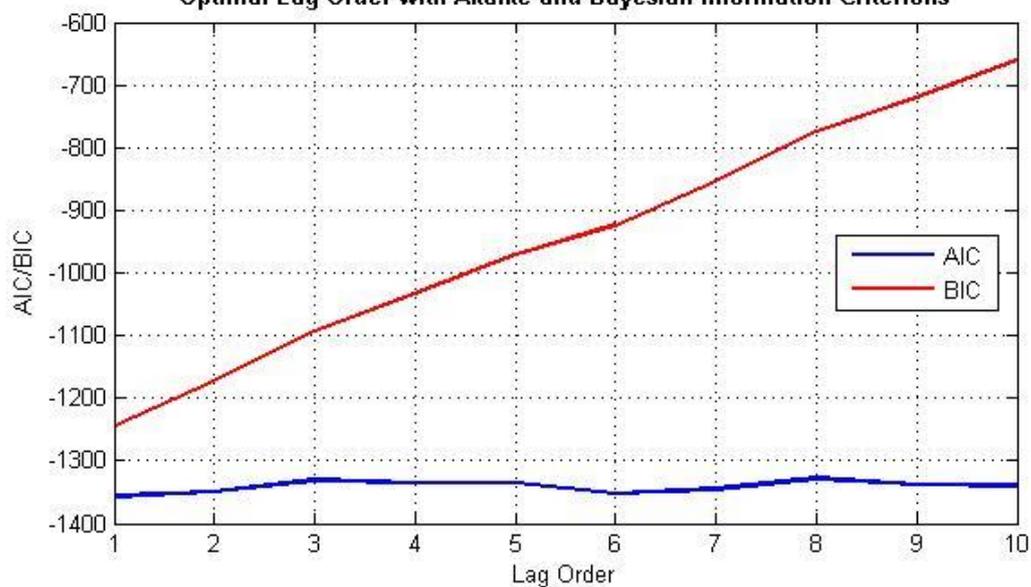
Time series №	h	pValue	stat	cValue
1	0	0.95	1.32	-1.94
2	0	0.35	-0.83	-1.94
3	0	0.99	3.08	-1.94
4	0	0.99	2.06	-1.94
5	0	0.72	0.19	-1.94

### Appendix B

Time series №	h	pValue	stat	cValue
1	1	0.001	-20.57	-1.94
2	1	0.001	-21.87	-1.94
3	1	0.001	-18.44	-1.94
4	1	0.001	-17.67	-1.94
5	1	0.001	-23.22	-1.94

### Appendix C C

#### Optimal Lag Order with Akaike and Bayesian Information Criteria

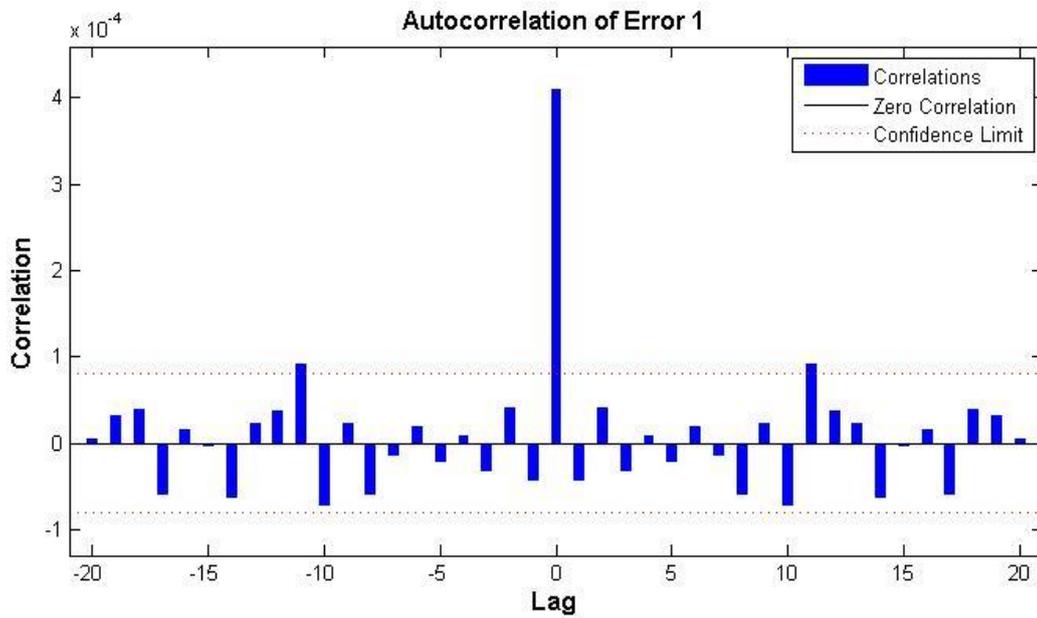
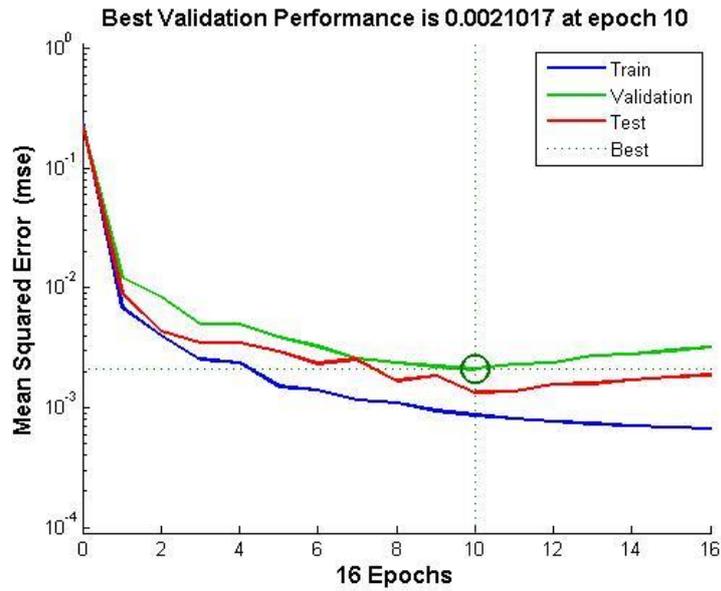


cr.\lag	1	2	3	4	5	6	7	8	9	10
<b>AIC</b>	-1356.9	-1350.1	-1331.5	-1335.4	-1335.8	-1352.1	-1344.6	-1327.9	-1337.5	-1340.1
<b>BIC</b>	-1243.4	-1173.6	-1091.9	-1032.7	-970.1	-923.4	-852.8	-773.1	-719.7	-659.2

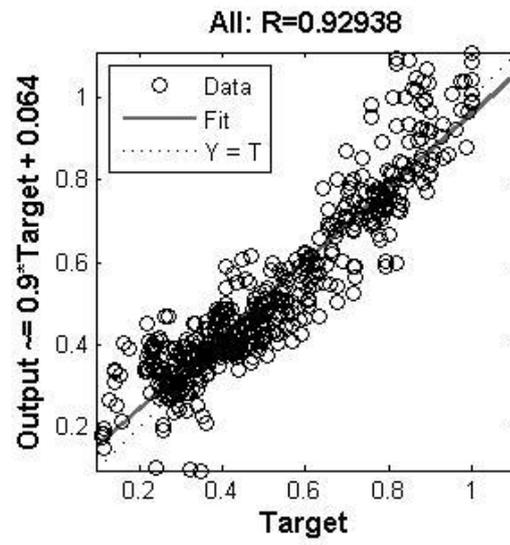
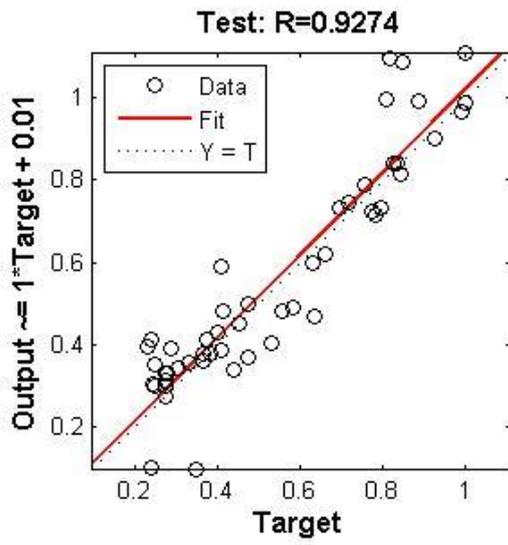
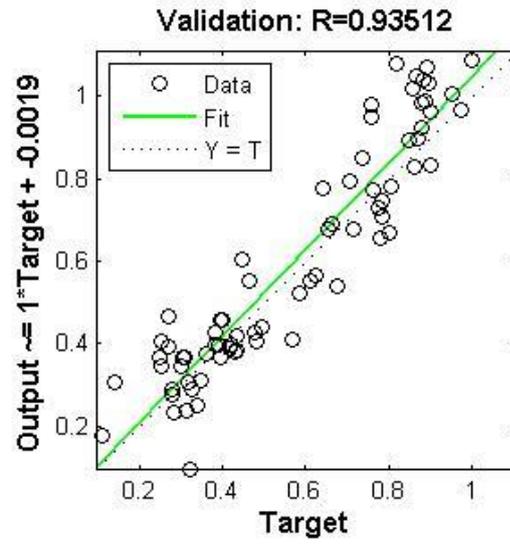
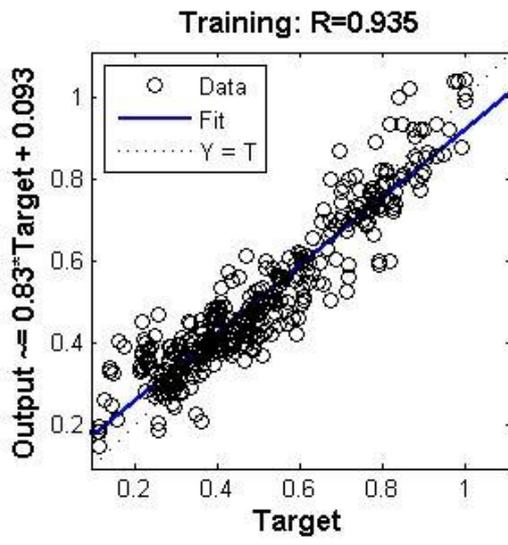
Appendix D

	Var1	Var2	Var3	Var4	Var5
31/01/2012	0.015	0.065	0.040	0.031	0.225
31/01/2013	0.089	0.019	0.201	0.107	0.386
31/01/2014	0.121	0.166	0.158	0.102	0.142
31/01/2015	0.096	0.170	0.043	0.136	0.282

Appendix E



Appendix F



# IMPACT OF VISUAL MERCHANDISING ON CONSUMER BEHAVIOUR: A STUDY OF CLOTHING STORES

**Paulina Gajewska**

*University of Bielsko-Biala, Department of Management, Faculty of Management and Transport, Poland  
pgajewska@ath.bielsko.pl*

**Katarzyna Piskrzyńska**

*University of Bielsko-Biala, Department of Management, Faculty of Management and Transport, Poland  
kpiskrzynska@ath.bielsko.pl*

## **Abstract:**

The modern consumer as a result of globalization and technological progress needs additional incentives to make purchasing decisions. One of the tools of marketing communication is visual merchandising, so that the consumer is more motivated to buy. The article focuses on the concept and essence of visual merchandising and its impact on consumer's behaviour. It is contained in the analysis of the impact of merchandising purchasing decisions of buyers selected network of clothing stores.

## **Key words:**

Visual merchandising, merchandising, marketing communication, consumer's behaviour.

**JEL Classification:** M310

## **1 Merchandising – review of literature**

The term merchandising comes from the Latin word *mercari* or *trade*. In English it is a source of merchandise, or goods intended for sales- goods, but also to sell. In Polish the term merchandising does not have a proper counterpart, and therefore the original concept is used (Binsztok, Zuzanski, 2013: 11). Merchandising is granting point marketing characteristics so that it becomes a commodity. This means that the functions of merchandising is to interpret and process information about the needs of consumers to create the most favourable conditions to satisfy them (Szulce, 1998: 227). Merchandising can also be understood as "actions related to the commodity, which is a function of management mass goods at the point of sale, and includes: purchasing, inventory management, pricing policy and exposure" (Borasiak, 2009: 165). Visual merchandising is a narrower concept than merchandising. The impetus for the development of merchandising was the rise of self-service stores, but as a watershed for visual merchandising 1840 is to be accepted when technology that enables the production of glass panes of very large sizes was introduced. Thanks to such glass panes department stores could "amount to the art of arranging sites to the next level. From now on the big display windows took on a theatrical character, reminiscent of a scene straight from Broadway" (Morgan, 2008: 11). Visual merchandising is a set of activities whose job it is to cause visual impressions with purchasers (Witek, 2007: 12).

"Visual merchandising is a presentation of the store and its goods sold in such a way as to attract the attention of potential customers and motivate them to purchase" (Diamond J., Diamond E., 2007: 33). The actions of visual merchandising are based on the implementation of the communication model AIDA. AIDA model is a basic movement of the marketing and advertisement resulted from the perception of

customers. It was first developed by E. St. Elmo Lewis in 1898. The AIDA Model is in fact an acronym for attention, interest, desire and action and describes a cognitive journey of a consumer that travels through four main stages (Strong, 1925). Visual merchandising should be received as a physical form of presenting goods at sales point in a manner so attractive to effectively encourage customers to buy them (Gębarowski, 2007: 74). It includes promotional activities relating to the visual aspect of arranging the sales. Well thought-out use of visual merchandising tools is to elicit buyers sensory experience. The main areas are: (Gębarowski, 2007: 74; Witek, 2007: 13)

- interior commercial buildings,
- products exposure on the shelves,
- development of the retail outlet,
- graphic materials at the sales point, the so-called POS materials,
- display window arrangement,
- communication system inside the store,
- the system impacting a customer's senses.

Convenience of shopping, physical facilities (French, et al, 1972: 3) or attributes, etc may influence buying decision of consumers. Environmental dimensions such as air quality, lighting, layout, carpeting, etc are also important (Engel, et al, 1995; Seock, 2013: 174 - 187). Quality of merchandise, price, assortment, atmosphere, location, parking facility and sales people are important dimensions for a store (Bearden, 1978). Layout as a dimension of visual merchandising is also important because it consists of space utilization, aisle planning and area arrangement (Banot, Wandebori, 2012: 84-89).

## 2 Research methodology

The study used the following research tools: an observation questionnaire, a survey questionnaire and interview. The aim of the study was to assess the level of implementation of the instruments of visual merchandising in selected clothing networks and assess their impact on the purchasing decisions of customers. The authors put forward the following research hypothesis:

### **H1: Customer's purchases are influenced by the visual merchandising.**

The subjects of research were included in the selected clothing chains. Participant observation was selected as first. The following stores were first to attempt the research:

- Reserved,
- Cropp,
- House,
- Mohito,
- Sinsay.

The establishments were located in Sfera shopping mall in Bielsko-Biala. The observer carrying out the survey answered the questions in the earlier prepared observation questionnaire. The questionnaire included the observation of the following criteria:

- |   |                                       |
|---|---------------------------------------|
| – store layout,                                 | – information and products labelling, |
| – assortment and display of goods,              | – checkout area                       |
| – colours in the store,                         | – staff,                              |
| – lighting in the store,                        | – promotion at the sales point,       |
| – music in the store,                           | – fitting rooms,                      |
| – smell in the shop,                            | – seasonal products,                  |
| – other factors (temperature, air conditioning) | – exhibition.                         |

Each of the criteria for evaluation included several aspects - the questionnaire contained 47 points, which were assessed by the authors. A total of 20 observations, taking into account the 5 shops in 4 terms, i.e. 8. 12. 2015., 18. 12. 2015., 30.12. 2015. And 15. 01. 2016.

The next stage was the research pilot study. The sample was comprised customers of clothing stores network and they were 50 respondents. Electronic questionnaire survey was served by those participating in the study indirectly by posting it on the website [ankiety.interaktywianie.com](http://ankiety.interaktywianie.com). in the period from 01/05/2016 to 12/05/2016. In the research an interview with an employee of a clothes shop Cropp was also used. The interview was conducted on 13.05.2016. The studies were part of a broader research through a dissertation Daria Galuszka, in the Department of Management, University of Technology and Humanities in Bielsko-Biala, under the guidance of engineer Paulina Gajewska, PhD.

## 2.1 Analysis and findings

The conclusions of the study are presented below. **Surveys:**

- The main role while shopping plays: the offered assortment, special offers and discounts, while more than half of the surveyed after entering the store approached the “sale” area.
- All of the surveyed use fitting rooms while shopping. Important elements for them are: sufficient space to move around, the opportunity to bring many products at the same time, the right amount of hangers, chair or ottoman, and more than one mirror.
- When moving around the store, customers adhere to certain rules, which often they do not realize, for example, trying to shorten one’s way, pay most attention to products that are within range of their vision (***the principle of eye level***), or stop in front of a bookcase in its central portion to have a view of the entire shelf (***base agent***).
- Customers feel monitored when there is a person behind them, which is conditioned by the narrow alleys between the shelves (***brush ass effect***).
- Customers:
  - compare products assembled next to each other (***the principle of contrast***),
  - seeing attractive exhibition, they attribute positive characteristics to individual products (***the imitation effect***),
  - buy products that give promise of implementing cherished values, qualities (***the rule of consequences***),
  - when donated their time to make the decision to purchase the product, they repeat this step and buy the same product the next time the (***rule of engagement***),
  - making purchases they want to get as much as possible at the lowest price (***the rule of maximizing their own profit***).
- In a somewhat lesser extent, customers are under influence of:
  - ***rule of reciprocity***, associated with feeling liabilities to the person who has previously endowed them with something, eg. in the form of tastings and special offers,
  - ***rule of liking and sympathy and authority***, based on the tendency to yield to people they know, like, respect,
  - ***social rule the proof***, based on the impact of the decisions of other consumers on our decisions / behaviour,
  - ***rule of unavailability*** where limited editions products are attributed higher values.
- Customers benefit from groups of related products and complementary substitution therapy.
- When making purchases, customers buy products on impulse which is usually due to pricing reductions.
- More than half of those surveyed had happened to enter the store only because of the pretty storefront.
- The vast majority of surveyed buys products found at area offices.
- Proper lighting in the store does not affect the decision to purchase the products.

- Pleasant odour in the store encourages to enter. Respondents can indicate shops with noticeable smell, respondents indicated Mohito store as a place with a palpable, intense vanilla scent.
- Music emitted in the store makes shopping more enjoyable, the kind of music is important as well. Respondents overwhelmingly pointed Cropp, a shop with a louder and more dynamic music.
- Reserved is frequently visited by buyers. The shop storefront has also been indicated as the most interesting one.
- More than half of the surveyed said that they were familiar with the term visual merchandising, but only 14% indicated the correct definitions. Most of the surveyed understand visual merchandising as an art exhibition of goods and the impact on a customer through visual experience. Thanks to this ignorance sellers can manipulate customers more easily during their stay in the store.

Because of the breadth of research results, the paper presents the results of **observations** of only one of the chain stores - House. They are as follows:

- store is aimed at young people aged 13- 25,
- there are many possible routes, but the alleys are narrow, causing discomfort,
- arrangement of the shop refers to the principle of movement in the right direction,
- goods are arranged in sets and groups, also complementary and substitutionally.

**Figure 1: Position of the range sets in the House store**



Źródło: Source: Own.

- colours in the store, although they are diverse, they are well thought-out: masculine section is dark, while the ladies section is in bright colours,
- adequate ventilation and air conditioning are advantages to this store,
- hardly visible male and female sign departments is a drawback - to reach the cash one needs to go through the whole shopping area
- staff do not wear uniforms, identification of employees is possible by compulsory leashed badges,
- exhibition concerns the winter period (observation date: December 8th 2015) during the subsequent observation, the exhibition took the form of factory outlet
- broadcast music is characterized by a fast pace, it is modern and loud,
- store lacks seasonal products,
- fitting rooms hard to locate, and they have little space; the advantage, though, is their design: youth-like and colourful wallpapers and adequate lighting,

- two types of lighting are used: different in the exposures section and different in the alleys between the exposure sections:

**Figure 2: Various lighting in House store**



Source: Own.

- variety of the so-called POS materials as used, such as **posters, stands** for displaying goods, **topper** – exchangeable advertising, **promotional stands, signboard, T-sings** – neon internal **LCD monitors**.

**Figure 3: POS materials, the LCD monitor in House store**



Source: Own.

In contrast, based on an **interview** conducted, the following conclusions are put forward:

- Goods purchased are usually issued in the most visible places, while products sold least frequently are exposed to special offers.
- Products with a potentially high sales are set under better lighting.
- Depending on the time of day manipulation of the volume of the background music takes place; store has its own mix of music that is rarely changed.
- Factors such as temperature, ventilation, and air conditioning are subject to change during the day. In the morning the temperature is lower, to discourage customers to buy and thus give workers time to prepare the store.
- The LCD screens located above the cash registers broadcast music videos, in the compilation video promoting clothes that are in the room sales is integrated.
- The individual collections are marked with special plaques, which depict different logos. Logos are created by artists working with Cropp. Clothing signed with such logos are usually more expensive and made of better materials than others.

### 3 Paper results

The results of the research show clearly that the visual merchandising tools have significant influence on the purchasing decisions of customers. The customer is very often unknowingly subjected to merchandising activities that affect the perception of the products and the desire to purchase. Due to ignorance of buyers, stores have great leeway in applying tools of merchandising. The analysis of the Company's facilities LPP allowed to get familiar with visual merchandising tools applied to effectively attract customers. The interview, in turn, allowed for in-depth knowledge of the principles prevailing in the store, the customer is not even aware of, such as e.g. temperature and music volume manipulation or issuing products with the least demand as a special offer. Hypothesis thus placed in the article is confirmed: **Customer's purchases are influenced by the visual merchandising.**

### 4 Discussion

In papers a lot of confusion regarding merchandising and visual merchandising can be found. For most Poles, visual merchandising is perceived as mere merchandising, and this is only the narrow approach (merchandising is a broader concept). This is due to the fact that in Poland, much more impressive concept turned out to be a narrow approach, which surpassed the original version of merchandising. Proper use of visual merchandising tools helps to improve the image of the company, increasing the number of customers, and hence revenue growth retail outlet. At very high competition in the clothing sector, the correct and thoughtful actions of visual merchandising applied can distinguish retail outlet from the competition. Visual merchandising is one of the most important marketing tools used in chain stores, not just clothes. Appropriate use of its tools makes it possible to manipulate the consciousness of the customer when making his purchases. Findings that can summarize this part of the article:

- Visual merchandising starts with the store design to reflect the products - the store and window display can act as a magnet and encourage the entrance or may be imperceptible to the consumer. Windows display is positively related to purchase intention.
- Through the various elements of visual merchandising, it is able to influence purchasing decisions - with appropriate music, lighting, temperature, layout or other elements.
- It helps to understand human behavior, but it can also have a strong impact on this group of consumers who make compulsive purchases.
- It is a useful and effective tool to support purchasing decisions.

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# THE GENERAL GOVERNMENT DEBT AND BUDGET DEFICITS IN THE VISEGRAD GROUP COUNTRIES

**Grzegorz Górniewicz**

*Faculty of Finance and Management, WSB University in Gdańsk, Poland*

*ggorniewicz@wsb.gda.pl*

## **Abstract:**

The article aims, first of all, at the presentation of the scale and reasons for the national debt and budget deficits in the Visegrad Group countries. In order to achieve such aims, comparative and statistical analysis has been applied.

## **Key words:**

General government debt, Visegrad Group, budget deficits

**JEL Classification:** H62, H63

## **1 Introduction**

Problems which refer to public finance, or strictly speaking: to the general government debt and budget deficits affect many countries. They were particularly intensified during the last crisis which was started by a decline in the subprime mortgage market, caused by the collapse of the speculation bubble in the housing market in the United States in August 2007. As a result of the crisis, the finance of numerous European countries suffered considerably. The crisis also hit the Visegrad Group countries (the Czech Republic, Hungary, Poland and Slovakia) which are discussed in the article. The choice of that group for the topic of the article has been based on similarities observed among these countries. They have come through similar transformations, from real socialist economy towards market economy.

## **2 General government debt in the Visegrad Group countries**

During the 1970s the general government debt in most countries of the world did not come as a major problem – also for the countries of the Visegrad Group. After that period, however, the general government debt started to grow rapidly. The reason for such a situation was rooted in the oil shock (1973-1974) when the prices of oil in the world grew three- or even fourfold. Having become more and more affluent, the OPEC countries located their financial surplus in American and Western European banks. Subsequently, with such high deposits, banks started to compete in offering as many credits as possible. Such a situation resulted in a quick growth of debts in numerous countries. Furthermore, considering the countries which later became the members of the Visegrad Group, their general government debts grew also because of inefficient socialist economy, dominated by political nomenclature<sup>1</sup>.

Initiated in the last decade of the 20th century, transformation processes contributed to the reduction of the general government debt (by approximately 50% in Poland), but at the same time, they triggered another process of running into further debts. Considering very little capitals owned by the countries of the Visegrad Group, they willingly took advantage of foreign credits, and they started to issue domestic and foreign bonds. The situation resulted in a relatively fast increase in debt. It was mainly justified by the requirements of economies going through their transition period<sup>2</sup>.

<sup>1</sup> G. Górniewicz, *Dług publiczny. Historia, teraźniejszość, przyczyny i perspektywy*, Oficyna Wydawnicza Mirosław Wrocławski, Bydgoszcz 2012, pp. 80-81.

<sup>2</sup> G. Górniewicz, *Konsekwencje międzynarodowych przepływów kapitału dla gospodarki światowej ze szczególnym uwzględnieniem Polski*, Wydawnictwo Uniwersytetu Kazimierza Wielkiego, Bydgoszcz 2007, pp. 69-84.

Among the Visegrad Group countries, Poland – the largest and the most populated country - was the one which incurred the highest general government debt. At the end of 2015 it reached the level of EUR 215 billion. The second highest general government debt was incurred by Hungary (over EUR 80 billion), and the third position was taken by the Czech Republic (nearly EUR 68 billion). The lowest level of debt in the discussed group was observed in Slovakia (the details are presented in Table 1).

**Table 1: General government gross debt in billions euro**

<b>Country</b>	<b>2007</b>	<b>2010</b>	<b>2014</b>	<b>2015</b>
Czech Republic	40,0	60,1	65,6	67,9
Hungary	66,0	78,4	77,7	80,4
Poland	145,9	193,2	202,1	215,7
Slovakia	17,0	27,8	40,7	41,3

Source: The author's own work on the basis of the data by Eurostat. <http://ec.europa.eu/eurostat/tgm/refreshTableAction.do?tab=table&plugin=1&pcode=teina225&language=en> (2nd January 2017)

The real burden for the country caused by the general government debt cannot be viewed through the amount of the debt itself, but through its relation to the gross domestic product. In accordance with the Maastricht Treaty, such a relation should not exceed the level of 60%. During all the analysed years, all the discussed countries met that requirement, except for Hungary, where the discussed relation reached the level of almost 75% at the end of 2015 (see: Table 2).

**Table 2: General government gross debt in % GNP**

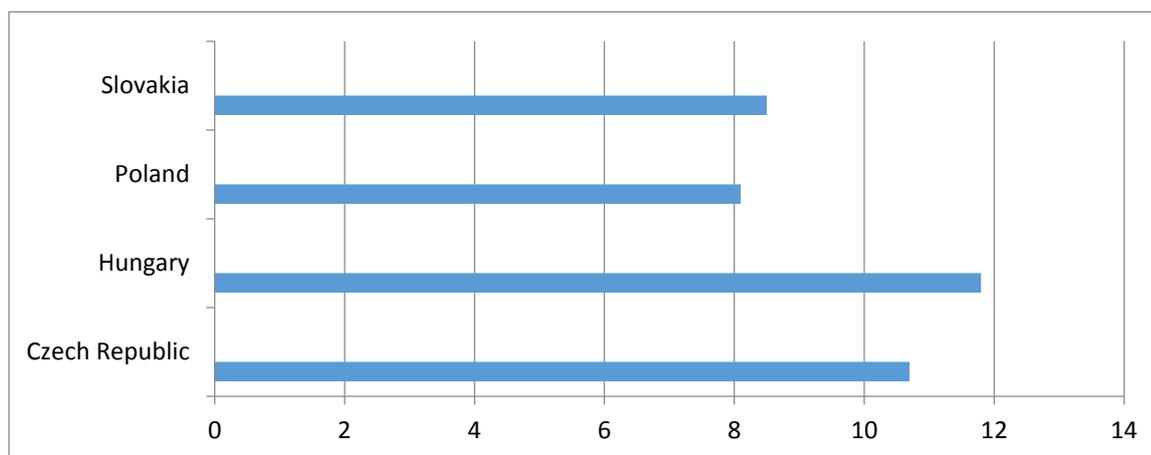
<b>Country</b>	<b>2007</b>	<b>2010</b>	<b>2014</b>	<b>2015</b>
Czech Republic	27,8	38,2	42,2	40,3
Hungary	65,6	80,5	75,7	74,7
Poland	44,2	53,1	50,2	51,1
Slovakia	30,1	41,2	53,6	52,5

Source: The author's own work on the basis of the data by Eurostat. <http://ec.europa.eu/eurostat/tgm/refreshTableAction.do?tab=table&plugin=1&pcode=teina225&language=en> (2nd January 2017).

Having been on the verge of insolvency, Hungary was the first country of the Visegrad Group, or even of the European Union, which applied for international support in 2008. Hungary, which was ruled by the socialists at that time, was offered a loan at the amount of EUR 20 billion. The financial support came from the International Monetary Fund, the World Bank and the European Union. After Victor Orban had seized the power, in 2010 his government decided not to prolong the agreement with the IMF, the institution which was criticised by the Hungarian Prime Minister on numerous occasions for the methods applied to fight the crisis. Hungary used totally EUR 7.5 billion of the part of a financial support package provided by the IMF. In July 2013, Hungary early repaid the last tranche at the amount of approximately EUR 720 billion. The tranche was actually due in March 2014<sup>3</sup>.

<sup>3</sup> E. Cieślak, E. Jankowska, G. Górniewicz, A. Piotrowicz, J. Redo, M. Redo, P. Siemiątkowski, *Ekonomiczne aspekty integracji wybranych państw Europy Środkowo-Wschodniej*, Wydawnictwo Naukowe UMK, Toruń 2015, p. 66. DOI: 10.12775/TIS.2015.100

**Figure 1: General government debt per capita (in USD thousand)**



Source: The author's own work on the basis of the data The Economist. [www.economist.com/content/global\\_debt\\_clock](http://www.economist.com/content/global_debt_clock) (10th June 2016)

Apart from the fact that the relation of the general government debt and the GDP was the worst in that country, Hungary also incurred the highest general government debt per capita. At the end of 2014 it reached the level of nearly USD 12 thousand. The second position was taken by the Czech Republic with the amount of USD 10.7 thousand. The lowest general government debt per one inhabitant was incurred by the country with the highest debt, namely: Poland (see: Figure 1).

### 3 Budget deficits

The primary reason for incurring the general government debt is generally related to budget deficits. In accordance with the Maastricht Treaty their relation to the GDP should not exceed the level of 3%. In the time period analysed in the article, all the countries struggled with budget deficits which were higher than that. Particularly poor results were recorded in 2010, when the consequences of the world crisis affected the situation in many countries. During the recent years, however, the situation has been improved. In 2014 Poland was the only country which did not meet the EU criterion, and in 2015 all the countries met the required criterion (see: Table 3).

**Table 3: Budget deficit in % GDP**

Country	2007	2010	2014	2015
Czech Republic	-0,7	-4,4	-1,9	-0,6
Hungary	-5,1	-4,5	-2,1	-1,6
Poland	-1,9	-7,3	-3,4	-2,6
Slovakia	-1,9	-7,5	-2,7	-2,7

Source: The author's own work on the basis of the data by Eurostat. <http://ec.europa.eu/eurostat/tgm/table.do?tab=table&plugin=1&language=en&pcode=teina200> (2nd January 2017)

During the recent years, the countries of the Visegrad Group have tried to improve their situation in terms of budget deficits. For example, since 2011, the budget deficits in the Czech Republic have been limited mainly by the changes made at the expenditure sides. There have been some attempts at a decrease in remuneration for public administration, capital expenses, pensions and disability pensions. Furthermore, the government has suggested an increase in the VAT. The Polish government has tried to find some remedy for the situation in the expenditure side as well. The government has taken over and redeemed bonds collected in the open pension funds, which allowed it to decrease the general

government debt by PLN 152 billion. In Slovakia, there were some concerns that the situation could get worse because of joining the Eurozone in 2009. Similarly to other countries, the worst results were recorded in 2010, however they were caused by the general economic conditions in the world rather than by the adoption of a new currency<sup>4</sup>.

#### 4 Credit ratings

The financial situation in the particular countries is defined by, among others, so called credit ratings. Rating agencies systematically collect information on institutions which issue bonds, and then they evaluate the creditworthiness of such entities (the ability to pay interests and principal instalments in due time); they also assess debt instruments which are traded in the secondary market. Among numerous rating agencies the most renowned are three of them: Moody's, Fitch and Standard&Poor's.

**Table 4: Credit ratings (January 2017)**

Country	Moody's	Fitch	Standard & Poors
Czech Republic	AA-	A1	A+
Hungary	BBB-	Baa3	BBB-
Poland	BBB+	A2	A-
Slovakia	A+	A2	A+

Source: the author's own work on the basis of the data by Trading Economics. <http://pl.tradingeconomics.com/country-list/rating> (10th January 2017)

At the beginning of 2017, among the countries of the Visegrad Group, the best ratings were recorded for the Czech Republic and Slovakia. Poland was on the third position and the financial situation of Hungary was assessed as the weakest. The prospects for all the countries were defined by three agencies as stable. The Moody's Agency was the only agency which defined the prospects for Poland as negative.

#### 5 Final conclusions and comments

Apart from other problems of economic nature, the countries of the Visegrad Group, which have been recently integrated with the European Union, have also encountered some problems related to public finance. During the analysed years, all the countries struggled with permanent budget deficits. In the year of the crisis, 2010, they did not meet the criterion of the Maastricht Treaty referring to the relation between the deficit and the GDP (3%). However, later on they managed to achieve relatively positive results. Comparing to 2007, all the countries have recorded a considerable increase in the general government debt, the acceptable level of which has been exceeded only by Hungary.

Among the most important problems related to public finance faced by the most members of the European Union, including the Visegrad Group, the following ones are listed in expert literature:

a narrow tax base, which means that numerous business entities or phenomena avoid paying taxes;

- relatively high taxes and social insurance premiums which come as a burden for employment; such a situation hinders the development of new jobs;
- the collection of budget revenues and the functioning of tax administration which is characterised by numerous drawbacks;
- the control of expenditures at all the levels of administration, the improvement of the quality of services provided by public administration, more investment into material and human capital in order to create more favourable conditions for economic development;

<sup>4</sup> Ibidem, pp. 61-62.

- the improvement of the condition of public finance in order to face the future challenges related to an increase in budget expenditures which will result from the process of society aging<sup>5</sup>.

Public debt may have both a negative and a positive impact on the economic growth. Debt might prove to be an important stimulus for the economic growth providing that it will be used for the sake of increasing the number of investments. However, if the purpose of incurring the debt is to cover budget deficits, then in the long run it will prove to be an obstacle to economic growth.

Economist have long-standing debates on whether the debt is an obstacle to economic growth. Carmen Reinhart and Kenneth Rogoff try to prove in their research that public debt is not a big issue until it exceeds 90% of GDP<sup>6</sup>. This opinion was often cited in the disputes over the direction in economic policies in the world.

The above-mentioned authors divided the states into four groups:

1. the ones in which the debt-to-GDP ratio does not exceed 30%,
2. the ones in which the debt-to-GDP ratio ranges from 30 to 60%,
3. the ones in which the debt-to-GDP ratio ranges from 60 to 90%,
4. the ones in which the debt-to-GDP ratio exceeded 90%.

Note that Czech Republic (economic growth rate in 2015 was 4,5%), Poland (3,6%) and Slovakia (3,6%) were belonging to the second group and Hungary (2,9%) to the third one. The above results should be considered as the relatively positive phenomena. Summing up all of the above we conclude that the economic growth of Visegrad Group countries gives the possibility of developing.

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<sup>5</sup> L. Oręziak, *Finanse Unii Europejskiej*, PWN, Warszawa 2009, p. 81.

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# THE IMPORTANCE OF LOCALIZATION FACTORS FOR ALLOCATION OF SELECTED ENTERPRISES IN CONDITIONS OF THE SLOVAK REPUBLIC

**Monika Gubáňová**

*Slovak University of Agriculture in Nitra, Department of Public Administration, Slovakia  
monika.gubanova@uniag.sk*

**Denisa Hanáčková**

*Slovak University of Agriculture in Nitra, Department of Public Administration, Slovakia  
denisa.hanackova@uniag.sk*

**Martina Fusková**

*Slovak University of Agriculture in Nitra, Department of Statistic and Operation Research,  
Slovakia  
martina.fuskova@uniag.sk*

## **Abstract:**

The main aim of this paper is to identify important location factors and location categories in location decision making of enterprises. We analysed 67 location factors which belong to 6 main location categories. Data was obtained in 2015 by questionnaires from 275 enterprises located in different regions of Slovakia. The approach for determination of a significant localization factor, together with the results of questionnaires, can be considered as the main benefits of this research. We proved a significant difference in importance of location factors within corresponding location category and also differences in importance of location categories by Friedman test. In location category (1) Labour, 45.45% of analysed enterprises consider Qualified workforce supply as extremely important location factor. In location category (2) Market, four main location factors were evaluated as extremely important: Purchasing power of households, Intensity of competition in the sector, Proximity of purchasers and Knowledge of the local business environment with share of 36.00%, 34.91%, 33.45% and 31.64%, respectively. Some location factors belonging to category (3) Land and natural resources and location factors within category (5) Environment were only important for enterprises in primary sector. Complexity and costs of Road transport belonging to category (4) Infrastructure were it was evaluated as extremely important for 31.64% of enterprises. Location factors belonging to category (6) Law and socio-economic conditions were mostly irrelevant in location decision making of enterprises. In general, the most important location category was (2) Market followed by location category (1) Labour.

## **Key words:**

Allocation of the enterprise, location factor, localization process

**JEL Classification:** D70

## **1 Introduction**

Localization factors can be defined as certain forces that influence the process of localization of the enterprises in the area. Localization factor means an advantage, which is obtained if the enterprise locates at the certain place and not at another. Economically, this advantage means cost savings. Optimal

place of allocation of the enterprise can be found by using a combination of suitable location factors. Establishment of a location with the best location factors promises the most favourable conditions for their activities. These conditions represent a summary of the economic, social, legislative, technical, natural and many other attributes specific to the territory. Finding acceptable locations is based primarily on identifying important location factors. Most organizations do not try to immediately identify the best location, but rather to identify several acceptable locations from which it can later be selected and these locations are called location alternatives (Maier, Tödttling, 1997).

The term "location" is defined as placing a business, facility or group of facilities of a specific size and type in an area. A location of an enterprise emerges as a significant source of competitive advantage. The theory of location may be considered both in microeconomic and macroeconomic terms. In microeconomic terms, the location theory applies to an enterprise which, in consideration of its costs and benefits, is searching for the best location for its business. The theory of location in macroeconomic terms forms a part of broadly understood spatial economy. The theory is based on the assumption that production costs and income of an enterprise are dependent on its location. Scientists who made a significant contributions to development of this branch of science were German economists J.H. Thünen, W. Laundhart, A. Weber, A. Predohl, A. Lösch, Swedish economists: B. Ohlin, G. Myrdal, T. Palander and American economists: E.M. Hoover, W. Isard (Budner, 2004 and Szymańska, Płaziak, 2014). *At the beginning of 20th century, German economist A. Weber first dealt with factors influencing the location of the enterprise. He introduced the concept of localization factor into economic theory. He distinguished three location factors: a Transport factor, a Labour factor and an Agglomeration factor* (Maier, Tödttling, 1997).

A choice of location for the enterprise is one of the key decisions in terms of strategic planning. Such a decision is not made often. It is made particularly in the establishment of the enterprise, in case the enterprise has increasing demand for products or services, in expanding into new markets (Výrostová, 2010). Since the location can only be changed with high costs, the choice of location is relatively irreversible. Location decisions are almost complex due to a number of factors which need to be considered. An incorrectly chosen location can significantly reduce the chances of survival of a newly established enterprise (Maier, Tödttling, 1997). When making a strategic decision with respect to the risk and uncertainty it is possible to use various methods and tools, whereas every one of these methodology elements has some advantages and disadvantages. Their implementation in practice must correspond to the environment in which the enterprise operates, to the character of industry, selected strategy and type of management. In present time, it is very difficult for the enterprises to achieve their primary goal, that is a profit and other partial goals since the market environment in which the enterprises operate is constantly changing. The enterprise has to respect the socio-economic conditions of the state, e.g. political, legal, tax and social norms (Dočkalíková, Klozíková, 2016).

According to Buček, Reháč, Tvrdoň (2010), localization is an important factor for the enterprise if it has an impact on costs and benefits of the enterprise and also if availability, quality or price factor is spatially differentiated. The importance of location factors depends on the type of product and the type of technology. Furthermore, the localization factor importance depends on the level of localization and from its mobility. Resources differ with regard to their ability to be transferred and to create value in foreign contexts (Cuervo-Cazurra et al., 2007). Some resources (soil, raw materials) are more location bound and are only transferable and deployable in specific locations providing necessary host country characteristics such as sufficient property right protection systems or complementary production assets (Fang et al., 2007 and Rugman, Verbeke, 2001). Other resources (energy, financial capital) are less or non-location bound, and thus can easily be transferred and deployed internationally (Rugman, Verbeke, 2001). We therefore argue that, based on their value creation and value transfer potential (Cuervo-Cazurra et al., 2007), resources may produce different effects in different contexts (e.g., a resource may generate value in one location but not in another location). Fitness of a location for specific purposes is dependent on characteristics of the area, i.e. internal conditions, as well as on its surrounding (external conditions) (Budner, 2004).

In the spatial and regional economy, the localization factors are divided as follows (Maier, Tödttling 1997 and Belajová, Fáziková, 2005): Land, Natural resources, Capital, Labour, Technological progress/innovation. According to Maier, Tödttling (1997) and Hoover Giarratana (1999), another important criterion for the classification of location factors is the relationship of the enterprise with the socio-economic surrounding. Majtán et al. (2012) states that the reason for the location of the enterprise is the lack of natural and economic homogeneity of area. Different distribution of supplies, raw materials, differences between legal norms, different taxes, lack of mobility of production factors, transport costs etc., affect the location of enterprise. Neumann et. al. (2012) divided location factors into general, and special, depending on whether the factors operate in all sectors of the economy, or only in some. The first cause dispersion of economic activity into the area, and the other leads to the concentration of activities in places with already agglomerated activity. Maier, Tödttling (1997) and Buček, Rehák, Tvrdoň (2010) distinguish location factors at different spatial levels: national, regional and local.

According to Blažek, Uhlíř (2002) the most important location factors for the allocation of foreign investors in particular are macroeconomics factors and political stability in price levels, market potential, quality of infrastructure and the price of land and labour. Buček, Rehák, Tvrdoň (2010) state that foreign investors follow several factors while choosing new location. The first factor is monitoring the differences at national level. It assesses the country according to the specificities of the business, particularly with regard to the political system, business support, business environment and prices of input factors. The second step identifies regional specificities. Among the best known regional specificities are: attractiveness of region, proximity of inputs and quality of transport services. Therefore, location factors motivate, respectively do not motivate investors to decide to invest abroad.

Lin (2010) found that market seeking SMEs prefer to invest in developing countries providing attractive, rapidly growing markets and a large market potential for firms. In contrast, Svetličič, Jaklič, Burger (2007) report that SMEs prefer to invest in developed countries when seeking for new markets, as developing countries typically provide a lower GDP per capita and are less reliable with respect to forecasts and prognoses (Pascal Huett, 2014).

## **2 Methods**

In our research work we focused on the importance of location factors in localization decision making of selected enterprises. Analysed location factors belong to six main location categories: (1) Labour, (2) Market, (3) Land and natural resources, (4) Infrastructure, (5) Environment, (6) Law and socio-economic conditions (Gubáňová, Hanáčková, 2014). Both location factors and location categories were chosen according to previous researches and studies. We analysed basic location factors which were extended with various factors reflecting specific conditions in the Slovak Republic. Therefore, each location category contains different number of location factors according to their importance.

Analysed data were obtained from 275 enterprises allocated in different regions of the Slovak Republic and collected by questionnaires. Questionnaires were sent over the Internet during the period from January to April 2015. The number of enterprises was 350 and they were chosen randomly. Return ratio was 78.57%. The importance of location factors was defined on a scale from 0 to 4: 0 – not important, 1 – less important, 2 – mediumly important, 3 – very important, 4 – extremely important.

Location factor which had decisive importance for the enterprise was evaluated the highest score and factor without significance for the enterprise was assigned the lowest score. Location factors with the highest percentage share within the highest rating had crucial importance in locating the enterprise. The evaluation methodology of localization significance factor mentioned above was used in the questionnaire survey named "The importance of location factors for allocation of enterprises", which was realized in 2015.

Results are presented in contingency tables for each location category. Rows are formed by location factors belonging to corresponding location category and columns represent various degrees of specified scale. According to the main aim of this research, results in tables allow to compare percentage distribution for each location factor and its relevance for enterprises in localization process. Different

importance of factors was analysed by Friedman test in SAS® 9.3 software. If there was a significant difference between analysed factors probability of ANOVA (row mean scores) statistic in Cochran-Mantel-Haenszel (CMH) Statistics was less than 0.05. This result means that with 95 % confidence enterprises evaluate selected location factors differently. The CMH option in the TABLES statement allows a stratified statistical analysis of the relationship between the row and column variables after controlling for the strata variables in a multiway table. Our strata variables were enterprises, rows represented location factors and columns represented degrees of importance. Analogically, we analyzed importance of localization categories in localization decision of selected enterprises. We assumed significant differences between localization categories according to degrees of importance.

### **3 Paper results**

Each analysed enterprise evaluated all 67 specified location factors belonging to 6 different localization categories. By questionnaires realised in 2015 we obtained 275 various opinions on importance of location factors but also about importance of localization categories in localization decision making of enterprises in different regions of the Slovak Republic.

#### **3.1 Importance of location factors**

To evaluate importance of location factors we defined ordinary scale from 0 to 4. Each enterprise evaluated all location factors. To express high importance, enterprises chose higher value number (e.g. 3, 4). On the other hand, number with lower value identified no relevance or low relevance evaluated location factor (e.g. 0, 1).

First, we analysed different importance of location factors which belong to corresponding localization category. The aim of this partial analysis was to identify relevant location factors in location decisions made by enterprises. Each localization category was analysed separately from the others. The results are presented in contingency tables.

We also consider primary, secondary and tertiary sector as determinant which could influence importance of location factors. Most results were similar in all analysed sectors. If there was any significant difference due to the sector we mentioned it within particular location factor.

In all analysed location categories, we proved by Friedman test that individual location factors were considered of different importance. There are differences between selected location factors and also in the order of importance within factors.

##### **a) Labour**

Within location category (1) Labour, there are significant differences in importance of chosen location factors confirmed by Friedman test. As we can see in table 1, the analysed location factors are clearly defined as important or not important in location decision. Enterprises require qualified workforce supply and flexible workforces with high emphasis. These two location factors were evaluated as extremely important by more than 45% of enterprises and more than 34% of enterprises, respectively. Another approximately 31% of enterprises evaluated the upper mentioned location factors as very important in location decision making. Labour costs could be considered as the third most important location factor, evaluated by 21.82% of enterprises as extremely important, 39.64% as very important and 21.82% as mediumly important. The most unimportant location factor was Supply of workforce with disabilities.

Particularly within location category (1) Labour we assumed different importance of chosen location factors according to sector of national economy. By using Friedman test we compared distribution of importance within each location factor. Differences in results we found only in factor Seasonal workforce supply. Result of analysis without impact of sector of national economy show Seasonal workforce supply as unimportant due to the share of not and less important more than 70 % (see table 1). By considering sector of national economy results showed that 23.8% enterprises operated in primary sector evaluated

this factor as extremely important, 30.77% as very important and 26.92% as mediumly important. On the other hand enterprises in the secondary and tertiary sector evaluated Seasonal workforce supply as not important with share 58.87% and 68%, respectively In this particular situation we can proved significant impact of sector of national economy on importance of location factor.

**Table 1: Labour**

LOCATION FACTORS	DEGREES OF IMPORTANCE					GRAND TOTAL
	Not important	Less important	Mediumly important	Very important	Extremely important	
Qualified workforce supply	7.64%	8.00%	8.00%	30.91%	45.45%	100.00%
Non-qualified workforce supply	40.73%	20.73%	21.82%	9.09%	7.64%	100.00%
Temporary workforce supply	30.55%	28.36%	20.00%	16.36%	4.73%	100.00%
Seasonal workforce supply	58.55%	12.36%	12.73%	10.55%	5.82%	100.00%
Supply of workforce with disabilities	62.55%	17.82%	12.00%	4.36%	3.27%	100.00%
Flexibility of the workforce	10.18%	6.55%	17.09%	32.00%	34.18%	100.00%
Labour costs	7.64%	9.09%	21.82%	39.64%	21.82%	100.00%
Lack of other job opportunities	42.18%	23.27%	17.09%	9.09%	8.36%	100.00%
<b>GRAND TOTAL</b>	<b>32.50%</b>	<b>15.77%</b>	<b>16.32%</b>	<b>19.00%</b>	<b>16.41%</b>	<b>100.00%</b>

Cochran-Mantel-Haenszel Statistics (Based on Table Scores)				
Statistic	Alternative Hypothesis	DF	Value	Prob
1	Nonzero Correlation	1	2.7269	0.0987
2	Row Mean Scores Differ	7	713.1204	<.0001

Source: Own research.

## b) Market

In market economy is information very valuable. Our results confirm this known fact. For more than 63% of the analysed enterprises, the Knowledge of the local business environment was very or extremely important (table 2). This location factor was slightly exceeded by Intensity of competition in the sector. More than 66% of enterprises evaluated Intensity of competition as very or extremely important. Next location factors are Purchasing power of households, Proximity of purchasers and Size of local market with total share of very or extremely importance in localization decision 60.73%, 57.81% and 53.45%, respectively. It is important for enterprises not only to produce or provide services better than competitors but also to operate on the large market of customers with purchasing power, which is necessary for their success. The Existence of firms producing complementary products was evaluated as an unimportant location factor (37.82%). Results of Friedman test confirmed different importance of location factors. Sector of national economy had no effect on percentage distribution of factors' importance. The results were similar as in analysis without sector.

**Table 2: Market**

LOCATION FACTORS	DEGREES OF IMPORTANCE					GRAND TOTAL
	Not important	Less important	Mediumly important	Very important	Extremely important	
Proximity of suppliers	17.45%	16.36%	21.45%	23.27%	21.45%	100.00%
Proximity of purchasers	11.27%	13.09%	17.82%	24.36%	33.45%	100.00%
Existence of support services	21.09%	16.73%	23.27%	27.27%	11.64%	100.00%
Organization of distribution network	22.55%	13.45%	23.27%	21.45%	19.27%	100.00%
Intensity of competition in the sector	10.55%	9.45%	13.45%	31.64%	34.91%	100.00%
Existence of business opportunities (holes in the market)	20.36%	17.09%	21.82%	24.36%	16.36%	100.00%
Existence of firms producing complementary products	37.82%	17.82%	18.18%	16.00%	10.18%	100.00%
Knowledge of the local business environment	8.00%	9.45%	18.91%	32.00%	31.64%	100.00%
Size of local market	12.00%	10.55%	24.00%	32.00%	21.45%	100.00%
Purchasing power of households	13.45%	12.00%	13.82%	24.73%	36.00%	100.00%
Costs and difficulty of storage	16.00%	18.55%	19.64%	25.09%	20.73%	100.00%
Cost of transporting materials	22.55%	16.00%	21.09%	24.00%	16.36%	100.00%
<b>GRAND TOTAL</b>	<b>17.76%</b>	<b>14.21%</b>	<b>19.73%</b>	<b>25.52%</b>	<b>22.79%</b>	<b>100.00%</b>

Statistic	Alternative Hypothesis	DF	Value	Prob
1	Nonzero Correlation	1	0.0604	0.8058
2	Row Mean Scores Differ	11	227.3873	<.0001

Source: Own research

**c) Land and natural resources**

In our research set of enterprises, an opinion of no importance of chosen location factors belonging to category (3) Land and natural resources prevailed (table 3). But this location category is closely linked with sector of the national economy which increases or decreases importance of location factor. Therefore, results must be interpreted according to sectors. In general, enterprises in primary sector increase importance of factors and enterprises of tertiary sector decrease importance of location factors.

Friedman test proved differences in importance of location factors despite the fact that the most used evaluation of importance was “not important”.

**Table 3: Land and natural resources**

LOCATION FACTORS	DEGREES OF IMPORTANCE					GRAND TOTAL
	Not important	Less important	Mediumly important	Very important	Extremely important	
Price of land	41.82%	12.00%	12.73%	14.91%	18.55%	100.00%
Rental price of land	41.82%	7.27%	10.55%	18.55%	21.82%	100.00%
Availability of land	36.00%	9.09%	17.09%	18.18%	19.64%	100.00%
Size of land	30.55%	12.73%	14.55%	20.73%	21.45%	100.00%
Soil quality	76.73%	5.82%	4.36%	4.73%	8.36%	100.00%
Use of land for agricultural purposes	86.18%	3.27%	1.82%	1.09%	7.64%	100.00%
Use of land for non-agricultural purposes	65.45%	9.09%	10.91%	7.27%	7.27%	100.00%
Property rights to land	54.18%	9.09%	8.73%	11.27%	16.73%	100.00%
The proximity of water source	56.36%	9.82%	6.91%	12.36%	14.55%	100.00%
Price of service water	51.27%	17.45%	17.45%	7.64%	6.18%	100.00%
Price of potable water	44.00%	24.00%	18.18%	10.18%	3.64%	100.00%
Quality of water	46.18%	13.45%	14.91%	12.36%	13.09%	100.00%
Resources and price of the minerals	75.27%	6.18%	7.27%	3.27%	8.00%	100.00%
Possibility of mining and quarrying	90.55%	3.64%	2.18%	0.73%	2.91%	100.00%
Costs of mining and quarrying	90.18%	2.91%	1.82%	2.55%	2.55%	100.00%
<b>GRAND TOTAL</b>	<b>59.10%</b>	<b>9.72%</b>	<b>9.96%</b>	<b>9.72%</b>	<b>11.49%</b>	<b>100.00%</b>

Statistic	Alternative Hypothesis	DF	Value	Prob
1	Nonzero Correlation	1	0.4450	0.5047
2	Row Mean Scores Differ	14	553.7374	<.0001

Source: Own research

#### d) Infrastructure

Similar to location factors belonging to category (1) Labour, chosen location factors within category (4) Infrastructure were clearly defined as either relevant or irrelevant in location decision of enterprises (table 4). Well-developed infrastructure leads to the overall development of the regions and thereby also increases their attractiveness for potential investors. Our results are very clear about that. The highest importance location factor was Complexity and costs of road transport. Total share made by rating very or extremely important was 66.19%. On the other hand, the most unimportant factors were location factors corresponding with another transport ways as Complexity and costs of water transport (89.82%), Complexity and costs of air transport (86.18%) and Complexity and costs of rail transport, which are closely linked with Slovak geographic conditions and common transport ways used by enterprises.

Possibility of Using own facilities for business was very or extremely important for more than 56% of enterprises, followed by Possibilities of the advertising, advertising agencies, exhibition (50.18%) and Availability of storage space (46.54%).

**Table 4: Infrastructure**

LOCATION FACTORS	DEGREES OF IMPORTANCE					GRAND TOTAL
	Not important	Less important	Mediumly important	Very important	Extremely important	
Complexity and costs of road transport	14.18%	7.27%	12.36%	34.55%	31.64%	100.00%
Complexity and costs of rail transport	73.82%	8.36%	8.00%	4.73%	5.09%	100.00%
Complexity and costs of water transport	89.82%	5.45%	1.82%	1.82%	1.09%	100.00%
Complexity and costs of air transport	86.18%	6.18%	3.27%	2.55%	1.82%	100.00%
Availability of storage space	26.55%	10.18%	16.73%	25.45%	21.09%	100.00%
Existence of pipelines (gas and oil)	67.27%	10.18%	11.27%	4.73%	6.55%	100.00%
Price and level of the financial services	26.55%	14.55%	32.00%	17.09%	9.82%	100.00%
The level of law and socio-economic conditions in the region	23.64%	22.91%	31.64%	17.82%	4.00%	100.00%
Possibilities of the advertising, advertising agencies, exhibition	13.09%	15.64%	21.09%	34.18%	16.00%	100.00%
Level of the institutions and services supporting regional development	43.27%	19.64%	24.36%	8.36%	4.36%	100.00%
Possibilities of social needs satisfaction (cinemas, ...)	37.09%	21.45%	24.36%	14.18%	2.91%	100.00%
The level of health care	30.55%	18.18%	25.45%	19.27%	6.55%	100.00%
Availability of recreational facilities and sports	55.27%	18.18%	15.27%	6.18%	5.09%	100.00%
Variety of the information channels (tv, inf. Networks,...)	30.18%	17.82%	20.73%	17.82%	13.45%	100.00%
Possibilities of the accommodation for workers	61.82%	12.73%	12.36%	8.73%	4.36%	100.00%
Proximity of the administrative and public-administrative facilities	28.36%	20.36%	30.18%	16.00%	5.09%	100.00%
The possibility of using its own facilities for business	24.00%	8.36%	11.27%	24.00%	32.36%	100.00%
<b>GRAND TOTAL</b>	<b>43.04%</b>	<b>13.97%</b>	<b>17.78%</b>	<b>15.14%</b>	<b>10.07%</b>	<b>100.00%</b>

Statistic	Alternative Hypothesis	DF	Value	Prob
1	Nonzero Correlation	1	2.7505	0.0972
2	Row Mean Scores Differ	16	1129.7129	<.0001

Source: Own research.

**e) Environment**

Despite the proved different importance of chosen location factors within category (5) Environment, enterprises included in our research did not consider chosen location factors as relevant (table 5). Nevertheless more than 46% of enterprises evaluated Possibilities of storage, disposal, recycling as very or extremely important. The influence of sector of national economy was also significant in this set of location factors. 53.85% of enterprises in primary sector considered Natural environment (hilliness, river network, and forestation) as extremely important but enterprises in secondary and tertiary sector identified this factor as not relevant (58.06% and 71.20%, respectively). Analogically Climatic conditions were extremely important for enterprises in primary sector (65.38%) and irrelevant for enterprises in secondary and tertiary sector (54.84%, 62.4%, respectively). Other location factors were evaluated similarly in each sector of national economy. The influence of sector was irrelevant and results were very similar as in table 5.

**Table 5: Environment**

LOCATION FACTORS	DEGREES OF IMPORTANCE					GRAND TOTAL
	Not important	Less important	Mediumly important	Very important	Extremely important	
Possibilities of storage, disposal, recycling	21.82%	11.27%	20.36%	24.73%	21.82%	100.00%
Local standards for discharged dangerous substances	59.64%	6.91%	13.82%	10.55%	9.09%	100.00%
Natural environment (hilliness, river network, forestation)	60.00%	12.36%	10.18%	7.27%	10.18%	100.00%
Climatic conditions	53.82%	12.36%	11.64%	10.91%	11.27%	100.00%
The attractivity of the region	41.82%	16.00%	20.73%	13.09%	8.36%	100.00%
Effect of protective associations	66.91%	14.55%	11.27%	5.09%	2.18%	100.00%
<b>GRAND TOTAL</b>	<b>50.67%</b>	<b>12.24%</b>	<b>14.67%</b>	<b>11.94%</b>	<b>10.48%</b>	<b>100.00%</b>

Statistic	Alternative Hypothesis	DF	Value	Prob.
1	Nonzero Correlation	1	84.1374	<.0001
2	Row Mean Scores Differ	5	178.9437	<.0001

Source: Own research.

**f) Law and socio-economic conditions**

Although (6) Law and socio-economic conditions define the framework for any action, in general they are considered by enterprises as not relevant (table 6). It does not mean that (6) Law and socio-economic condition are unnecessary but it means that mentioned conditions are not determining and restrictive in location decision of enterprises. With regard to our research we would state that overall (6) Law and socio-economic conditions seem to be good in the Slovak Republic because if not, bad conditions would lead to the increase of their importance. Only 26.18% of enterprises evaluated Economic and political stability of the region as very important. The most irrelevant location factor was National and ethnic structure of population (72.73%). Friedman test confirmed not only differences within chosen location factors but also different importance between them.

**Table 6: Law and socio-economic conditions**

LOCATION FACTORS	DEGREES OF IMPORTANCE					GRAND TOTAL
	Not important	Less important	Mediumly important	Very important	Extremely important	
Legislative tools to promote regional development	44.00%	15.27%	23.27%	12.00%	5.45%	100.00%
Financial support for the region (subsidies, tax breaks, ...)	42.55%	10.91%	14.18%	18.18%	14.18%	100.00%
Local tools to support regional development	48.36%	16.36%	20.00%	10.18%	5.09%	100.00%
Economic and political stability of the region	20.73%	14.18%	25.82%	26.18%	13.09%	100.00%
Local legislative restrictions on business	35.64%	19.64%	21.09%	15.64%	8.00%	100.00%
Level of crime	40.73%	20.36%	18.91%	16.00%	4.00%	100.00%
National and ethnic structure of population	72.73%	13.82%	8.73%	2.91%	1.82%	100.00%
Production and consumption habits of population	31.64%	12.36%	24.73%	21.09%	10.18%	100.00%
Proximity of industrial parks and business incubators	53.45%	14.18%	16.73%	8.73%	6.91%	100.00%
<b>GRAND TOTAL</b>	<b>43.31%</b>	<b>15.23%</b>	<b>19.27%</b>	<b>14.55%</b>	<b>7.64%</b>	<b>100.00%</b>

Statistic	Alternative Hypothesis	DF	Value	Prob
1	Nonzero Correlation	1	12.3673	0.0004
2	Row Mean Scores Differ	8	220.5873	<.0001

Source: Own research.

### 3.2 Importance of localization category

We analysed the importance of location category analogically as the importance of location factors. This analysis follows the results of percentage distribution of importance of location factors. We used rating scale from 0 to 4 to evaluate importance of six main location categories defined according to previous study and own researches. Results of importance distribution are presented in contingency table where rows present location category and columns present degree of importance. According to percentage share within rating scale we define relevant or irrelevant location category in location decision of enterprises. If there was higher share within the highest rating, the corresponding location category was defined as very important. Analogically, small share of higher rating signified irrelevant location category. To prove the expected different importance of location category we used Friedman test. It is important to notice that presented results are closely linked to chosen location factors belonging to corresponding location category.

Despite the fact that (1) Labour is a production factor with high necessity, its importance could be decreased due to the specific economic and demographic condition. Economy and especially primary and secondary sector of the Slovak Republic is nowadays characterized by a lack of qualified workforces and also by long-term unemployment. This could be a reason of lower importance of location category (1) Labour than location category (2) Market (table 7). Enterprises can train their employees but they are not able to create large and strong market with high purchasing power of households. The previously mentioned characteristics of market belong to very important location factors within category (2) Market. More than 48% of enterprises evaluated location category (2) Market as very or extremely important while category (1) Labour only 35.41%. Other location categories were more frequently rated as not relevant. Our research set of 275 enterprises evaluated location category (4) Infrastructure, followed by (5) Environment, (3) Land and natural resources and (6) Law and socio-economic conditions as irrelevant in their location decision making. Different importance of location categories were confirmed by Friedman

test. There are significant differences not only within location categories but also between them. Obviously by changing of set of enterprises or by changing of analysed location factors or location categories results would be different from ours. Therefore analysis of location factors in location decision of enterprises is very important and it is necessary to improved it and realise in different region and different time.

**Table 7: Importance of location categories**

LOCALIZATION CATEGORIES	DEGREES OF IMPORTANCE					GRAND TOTAL
	Not important	Less important	Mediumly important	Very important	Extremely important	
(1) Labour	32,50%	15,77%	16,32%	19,00%	16,41%	100,00%
(2) Market	17,76%	14,21%	19,73%	25,52%	22,79%	100,00%
(3) Land and natural resources	59,10%	9,72%	9,96%	9,72%	11,49%	100,00%
(4) Infrastructure	43,04%	13,97%	17,78%	15,14%	10,07%	100,00%
(5) Environment	50,67%	12,24%	14,67%	11,94%	10,48%	100,00%
(6) Law and socio-economic conditions	43,31%	15,23%	19,27%	14,55%	7,64%	100,00%
<b>GRAND TOTAL</b>	<b>41,57%</b>	<b>13,29%</b>	<b>16,12%</b>	<b>15,88%</b>	<b>13,13%</b>	<b>100,00%</b>

Cochran-Mantel-Haenszel Statistics (Based on Table Scores)				
Statistic	Alternative Hypothesis	DF	Value	Prob
1	Nonzero Correlation	1	372.7054	<.0001
2	Row Mean Scores Differ	5	1356.8043	<.0001
3	General Association	20	1731.6792	<.0001

Source: Own research.

#### 4 Discussion and conclusions

Location decisions making is one of the key decisions in the strategic planning of the enterprise. Rating of the locality by enterprises based on the analysis of location factors is an excellent tool in the process of locality selection. Finding acceptable locations is primarily based on identifying important location factors.

The evaluation of the questionnaire results shows that the location factors within the category (1) Labour are the most important factors, namely it is Qualified workforce supply and Flexibility of the workforce. Quality labour force has an effect on the production process: by experience, efficiency and versatility of employees. Flexible workforce is not only prepared to respond to changes in the performed work, but also accept such changes. At the present, performance or time flexibility are essential requirements for high-quality workforce. We can state that domestic enterprises prefer quality and flexibility of the labour force to labour cost factor. On the contrary, foreign investors, in choosing locations for their operations, prefer cheap labour and financial benefits such as tax breaks or subsidies, as Buček, Reháč, Tvrdoň (2010) indicated in their publication. As an example, a number of multinational companies have allocated their operations (electronics manufacturers Sony, Samsung and enterprises for the production of Kia cars, Peugeot or Jaguar - Range Rover) in the Slovak Republic mainly because of cheaper labour force and financial support.

Within the category (2) Market, Intensity of competition in the sector and Purchasing power of households were referred to as the most common factors of respondent enterprises. It is understandable that enterprises are trying to maintain a stable position in the market among enterprises producing substitution products and competition moves them forward. Enterprises seek to get the best position in a competitive environment. The Knowledge of the local business environment has great importance for companies because the knowledge of the market leads to greater efficiency in communication with other market operators, and to the knowledge of opportunities and production planning as reported in a previous research Gubáňová, Hanáčková (2014). Domestic enterprises established at regional or local markets

usually prefer market factors such as lower Intensity of competition, Proximity of suppliers and customers, Purchasing power (Buček, Rehák, Tvrdoň, 2010).

Infrastructural factors are also important in locating of enterprises, especially Complexity and costs of road transport. The quality of the business environment increases significantly with the availability of motorways and first-class roads, mainly due to the efficient transport of inputs and outputs, resulting in a reduction of transport costs. In their publication Belajová, Fáziková (2005) highlighted the development and quality of transport infrastructure as a development factor immediately conditioning the location of enterprises, their performance and effects.

Location factors within the categories of (5) Environment and (3) Land & Natural Resources considered demand factors less important than the other categories. As significant they thought mainly Size of land and Rental price of land.

We concluded that the most important location factors in the allocation of observed enterprise are factors from category (2) Market and Labour. Cifranič (2016) in his paper "Localization of factors in decision making of location of selected enterprises" also emphasizes Market factors and Labour factors as the most important factors that companies consider when deciding their allocation.

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# OPTIONS AND BENEFITS OF AUTHENTICATION SYSTEM VIA DYNAMIC BIOMETRIC SIGNATURE

**František Hortai**

*Brno University of Technology, Faculty of Business and Management,  
Department of Informatics, Czech Republic  
hortai.frantisek@gmail.com*

## **Abstract:**

The new information technologies alongside its benefits also brings new dangers. Dangers of online services are growing in terms of attacks faced and their volume. The majority of detected threats use specialized remote access or hacking tools during at least one stage of the attack. Alongside malware-driven attacks, different fraudulent schemes based on social engineering methods, as well as attempts to misuse the application or bypass application business logic and limits, are starting to appear much more often. One of the possible answers to these threats will be changing how online communication services can authenticate users. For this cause the main aim of this paper is to provide a complete information about one of the most natural biometric authentication methods: the use of dynamic biometric signature (DBS). Dynamic signature contains biometric information that reflects the characteristics of the signing person, i.e. the habits and behaviours. These properties represent a biometric footprint, which is unique to each individual and cannot be reproduced by counterfeiters. This technology can provide the same level of security as is in the case of electronic signatures employing certificate-based cryptographic methods. Based on the public inquiry research the most users cannot distinguish among signature recognition systems, electronic signatures, and dynamic biometric signature. So this paper also deals with the technological differences to clarify the technological differences among these methods.

## **Key words:**

Dynamic biometric signature, electronic signature; signature recognition, authentication; cybersecurity

**JEL Classification:** K24, L63

## **1 Introduction**

Handwritten signatures are commonly used to approbate the contents of a document or to authenticate a financial transaction. Signature verification is usually done by visual inspection. A person compares the appearance of two signatures and accepts the given signature if it is sufficiently similar to the stored signature (e.g. on a credit card). In the majority of situations where a signature is required, no verification takes place at all due to the amount of time and effort that would be required to manually verify signatures. Automating the signature verification process will improve the current situation and eliminate fraud.

Individual's authentication and verification in the electronic environment brings new challenges to solve. We got used to that the document was confirmed by the signature of the authorised person, which resulted in signed original of the document. By inspecting the document we could determine the authenticity of the document, as well as verify the signature in relation to of the signatory.

The same process in the electronic world uses exclusively cryptographic tools for the security and verification of electronic documents, which include electronic signature, electronic mark and timestamp. Meanwhile the disadvantages of the certificates, which form integral part of the process of signing associated with the properties of asymmetric cryptography, are increasingly becoming more problematic.

The certificates have a restricted lifetime - usually one, or maximum of two years. The expiration of the certificate leads to the inability to verify the authenticity and validity of the document over a prolonged time interval. It is well known that to the standard users the work with certificates brings considerable worries and difficulties [1].

The handwritten signature is a biometric attribute. Biometric identification and verification systems are being increasingly adopted in our environment. Well-known biometric methods include iris-, retina-, face- and fingerprint based identification and verification [2]. While attributes like iris, retina and fingerprints do not change over time and thus have low intra-class variation, they require special and relatively expensive hardware to capture the image. An important advantage of the signature over other biometric attributes is its long standing tradition in many commonly encountered verification tasks.

Recent years discussions about the use of biometric methods, which, in the case of their static form, still contain significant execution risk of accepting spurious persons based on the stolen or fraudulent (counterfeit) biometric information (fake fingerprint, iris image, etc.). Hence in light of the listed reasons, the focus has shifted on the dynamic biometric methods based on the human expressions, such as voice analysis, dynamics of pressing computer keys [3], mouse movements [4], our screen touch dynamics [5], walk or handwritten signature [6].

To propose a user friendly, highly secure tool, protected against errors and failures of users that will provide these features for reasonable price, will be very difficult. This paper addresses the dynamic biometric signature in terms of its usefulness and limits in the authentication of persons and documents.

## 2 Methods

Based on the introduction the basic hypothesis were created:

- One the one side is technology: DBS can be used as a secured effective tool for communication.
- One the other side: Is the signature so stable that it could be used for authentication?
- Still on the other side: Are people willing to use their signature for authentication? What is their knowledge and opinion about this topic?
- What are the main advantages for using the DBS for communication?

Questionnaire survey of public opinion of 182 respondents was made about their knowledge of authentication systems and about their approach and opinion of signature based authentication. This survey showed the respondents lack of knowledge of authentication systems and minor knowledge of electronic signature. The survey also indicated the respondents' positive attitude to use of their signature (in case of completely secure method) in communication and authentication.

Secondary research is using scientific papers as resources that were previously collected for other purposes for clarifying the benefits and pitfalls of signature based recognition technologies.

The research includes the possibilities of user authentication via signature. Comparative Method shows the advantages and disadvantages of signature based authentication methods. The end process research summaries the advantages in implementing and using the DBS.

### 2.1 Questionnaire survey

182 individuals were asked about their knowledge of authentication systems and their approach to them. Respondents were active computer users (PC, notebook, etc.) from 16 to 68 years old with arithmetical average 32 years. Respondents were individuals with a primary, secondary and tertiary education (university students, university graduates including postgraduate education) and working manually or mentally.

To the question 1: *"Do you have experience with electronic signature or using device which scans your signature?"* the respondents answered 90% YES (3 most answers in order of frequency: bank (or financial services), delivery service, electronic signature).

To the question 2: “Do you assume that the use of electronic signature or electronic capture of written signature is a trusted tool for communication or authentication?” the respondents answered 76% YES (the conclusion for this question is that the older generation trusts only written signatures).

To the question 3: “Do you know the difference between a standard electronic signature (given by the legislation of the country), optical signature recognition and use of dynamic signature biometric signature? (With short explanation included) the respondents answered 68% YES. But after some questionnaire with examples (e.g. Can be a document electronically signed without handwriting, etc.) The respondents failed to answer correctly. Only 21% could acceptably answer the given examples.

To the question 4: “By properly secured technical solutions would you use your signature signing electronic documents?” the respondents answered 84% YES.

After a short neutral explanation of DBS the question 5 was: “The mentioned dynamic biometric signature technology as an communication or authentication tool would it be for you or your company beneficial (simplification and increasing effectivity of communication) or rather would it be a obstacle and threat. Answer “Yes” means beneficial “No” means obstacle and threat. The respondents to this question answered 82% YES. This was the main point of the research to investigate further about the options of DBS.

**Table 1: Risks of authentication and authorization [7]**

Scenario	Authentication risks	Authorization risk
1. mutual knowledge of users	Practically none	middle – both sides can expect authorization, that has not to be truthful
2. authentication centre knows checked user	Authentication centre can be spurious (there is a countermeasure based on direct checking of identity or behaviour); low level of risk	middle – both sides can expect authorization, that has not to be truthful
3. user (client) knows authentication centre	Checked person can be a counterfeit; (there is a countermeasure based on direct checking of user identity (control of identity paper)); low level of risk	low – due to possibility of person “screening”
4. no mutual knowledge	High risk - if the verification tools and procedures are not applied	middle – both sides can expect authorization, that has not to be truthful

Authentication during direct contact based on different attribute from personal knowledge, the security of authentication process is directly proportional the maturity of applied procedure. While evaluation of signatures written on credit cards is considered as example of minimal guarantee, authentication risks based on verification of personal documents depend on quality of work executed by check body and possibility of forgery of these documents.

Remote communications situations look more difficult because of high probability of identity counterfeit. In case of voice communication (phone banking) the level of risks moves within a large scale – from high risk in case of identification based on repeating passwords or their weaknesses (e.g. limited number of digits obtained from personal number) to insignificant ones (use of one time pad or authentication calculators). When technological tools are used level of risk is usually middle or high where the risk is a function nor used methods or tool parameters and conditions of their use, behaviour of users (the technological tools can be lost or stolen, etc.). The required level of security also the current authentication methods must also meet the requirements for variability both from the point of view of the used technology and systems and from the point of view of the actual users. [7]

Using remote authentication and authorization the following conditions should be kept [8]:

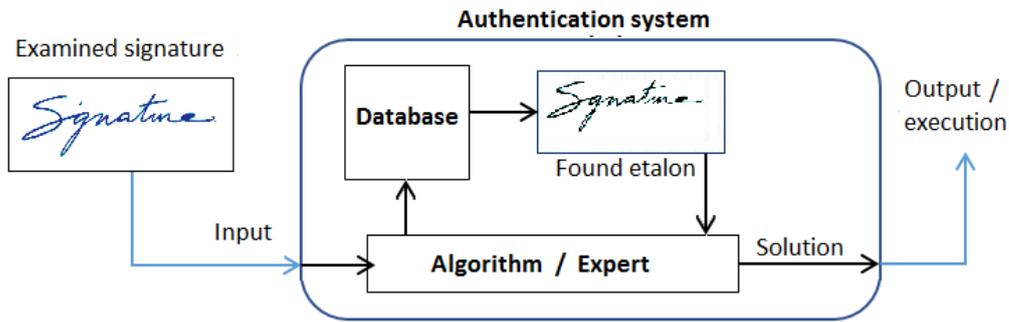
- Design and solution is recommended to be neutral considering technology.
- Authentication policy should be separate against security policies related to data protection area.
- Technological solution has to respect modularity to allow effective improvement of security models.
- Proposed solution shall respect requirements of present legal regulations and keep the conditions of internal instructions.
- Proposed solution should be user friendly and cost-effective. More advanced authentication methods refer to the use of two parameters. These parameters can be linked with:
  - Ownership – something that we have, such as a token, smart card, authentication calculator;
  - Knowledge – something that we know, such a password;
  - Features – something that we are, such biometric information.

Successful solution depends upon (to some measure) the sophisticated process for utilization of these authentication parameters. Present orientation leads to a strong or multiparameter authentication. Some of the authentication parameters (ownership, knowledge, and features) are also called authentication factors combining then with one another can be multifactor authentication [9].

### **2.3 Dynamic biometric signature**

This paper addresses the dynamic biometric signature in terms of its usefulness and limits in the authentication of persons and documents. The biomechanical processes involved in the production of the human signature are very complex and not yet fully understood. In vastly simplified terms, the primary excitation is thought to occur in the central nervous system, more specifically in the human brain, with predefined intensity and duration describing the intent of the movement. The signal of the intent (or the movement plan) is passed through the spinal cord to the particular muscles which are activated in the intended order and intensity. As a result of such activation and relaxation of the muscles and whilst holding a pen, the resultant arm movement is recorded in the form of a trail on paper – the resultant handwritten signature. Despite the complexity and limited understanding of this process, recent research shows that some basic properties of the conducted signature, specifically its characteristic parameters, can be mathematically and computationally described and derived, and thus automatically reproduced. [10]

Figure 1: Off-line systems function block

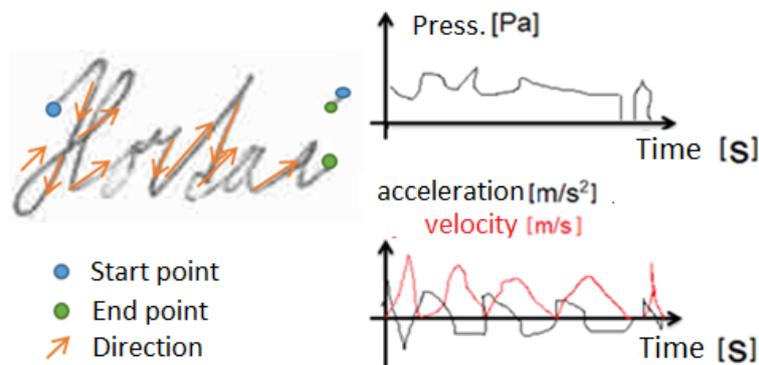


**Offline** systems for person verification according to his signature. Off-line systems utilize the classic method of on-paper signature for person verification. The obtained signature is digitized by an optical scanner or camera. An alternative is to input the image through a tablet or any other suitable device. Subsequently, respective application determines the match of the person's signature with a reference sample by comparing the overall trace (image) of the signature. Based on this particular principle, the current very unreliable methods, commonly practiced in banking and retail for example, are utilized to verify handwritten signatures, relying on the human factor in the form of a calligraphy expert.

**Online** signature verification systems (dynamic evaluation):

Basic dynamic characteristics as speed, acceleration, timing, pressure, direction of the thrust are recorded in a multi-dimensional coordinate system [12]. E. g. two dimensions signature the moves and are used to determine the speed of the pull direction, the third coordinate determines the pressure taken on the surface [1].

Figure 2: Representation of dynamic biometric signature evaluation



The advantage of this technique is that it can be easily integrated into already existing systems (PDA or smartphone with appropriate software). The scanning unit from different manufacturers vary the number of members of the vector biometric information [13].

**Table 2: Channels in accordance with ISO/IEC 19794-7**

Channel name	Interpretation
X	x coordinate (horizontal pen position)
Y	y coordinate (vertical pen position)
Z	z coordinate (height of pen above the writing plane)
VX	velocity in x direction
VY	velocity in y direction
AX	acceleration in x direction
AY	acceleration in y direction
T	time
DT	time difference
F	pen tip force (pressure)
S	tip switch state (touching/not touching the writing plane)
TX	tilt along the x axis
TY	tilt along the y axis
Az	azimuth angle of the pen (yaw)
EI	elevation angle of the pen (pitch)
R	rotation (rotation about the pen axis)

Scanning dynamic parameters when creating a signature is done through a special signature tablet. During the retrieval of signature data the tablet acquires biometric data (usually  $x(t)$ ,  $y(t)$ ,  $p(t)$ ,  $t$ ). These biometric data are also used to calculate other parameters defined by ISO/IEC 19794-11 [15]. The standard describes the mandatory parameters and formats of biometric data. The system then reads the signature parameters and attaches them to the information of the signed document, such as user name, current time and date. The data are then encrypted and they form the so-called biometric mark, which is sent for further processing.

An important attribute of DBS is that it already within itself contains not only an element of "aliveness" of the entity (writer), but the fact that the writer created the signature consciously, and hence there is no need to develop other mechanisms for testing whether the entity is alive or not contrary to the static biometric methods (scanning the fingerprint, eyes, etc.). We can also make the refutable assumption that the person knew what was being signed.

The static image signature that can be imitated by observing the end state of the created signature. The dynamics (biometric information) of the created signature is not possible to learn from the image. DBS composes of two parts: 1) signature image, 2) biometric signature data. Therefore, we can verify the signatory utilizing both the comparison of signature image against signature pattern (manually or automatically) and the evaluation of compliance of the currently performed DBS with the etalon stored in the database. Additionally, it is possible to perform the second step either every time (online verification), or only on demand (off-line verification).

## 2.4 Dynamic biometric signature stability

According to [16] the dynamic biometric signature by individuals can be assumed as constant. Another source [17] confirms that stress has no influence on the stability of a signature (at a significance level of 0.01).

A further conclusion which arises from the realized experiments is that to make the system more practical, the companies should be recommended to ensure that the client's first signature is merely a practice signature and that it is not used. This will increase the degree of acceptance of the authentic signatures during the automatic evaluation [16]. The quality of recognition of a signature rises with the length of the information written down [17].

Signature-creation process could be changing in long time perspective. This can be caused via aging effect of the user. Empirically a significant change in signature do not change as quickly as the

passwords borderline are changing or the certificates restricted lifetime ends. Further research could prove what is the optimum time or case for creating new etalon for DBS authentication.

### **3 Paper results**

#### **3.1 Questionnaire survey conclusion:**

Answers of question 1 assume that the most correspondents assume they have some experience about the given topic.

Answers of question 2 and question 4 assumes that there are people with “technophobia” who would not prefer to use the discussed technology.

From the answers of question 3 we can conclude the correspondents even when they think they are experienced they have lack of knowledge about authenticating systems. It can be concluded that the respondents do not differ methods of differentiate among the depth of signature recognition.

Question 5 is an indicator that public would prefer (or at least has positive attitude) to use DBS for authentication in case there is a secured solution for authenticating.

#### **3.2 Conclusion of using DBS**

Dynamic Biometric Signature (DBS) can be used as a strong form of authentication and it can be combined with other authentication factors and methods. By implementing DBS as authentication system due to the uniqueness of biometric signature the fraud signing threat can be eliminated. This method in online mode ensures high reliability and accuracy respecting the fact that no two signatures of the same user cannot be identical.

High accuracy can be achieved by recording all the movements and the effects while the handwriting signing process. In short term the DBS looks as stable. To ensure the long term signing compatibility the dynamic changes of each individual signature can be accumulated and based on those create a new etalon for the user. A further conclusion which arises from the realized experiments (from secondary research) is that to make the DBS system more practical the client’s first signature is merely a practice signature and would be wise not to use while creating the first etalon. On the technology manufacturer depends in which depth they analyses the process of signing. Generally the standards are given by the legislation. Higher accuracy requirements increase the cost of developed technology.

The user’s decision in purchasing such technology should be based on two basic error values and these are the: FAR (False Acceptance Rate) and FRR (False Reject Rate).

The risk of biometric signature data theft causes the database server with the signature etalons. This is the main reason which prevents widespread of using DBS to authenticate people.

The advantage for users in DBS is that the process of signing is intuitive and a familiar activity for them. There is no issue as by the authentication knowledge that forgets they secret password or PIN. Advantage over the authentication by ownership is that DBP is difficult to lose or steal compared to something you have (e.g. token, calculator).

DBP has the advantage over other biometric authentication method that is a natural form of authentication. The user do not need to put their body parts in scanners or sensors. These biometric authentication methods mostly require special and relatively expensive hardware to capture the biometric data. While attributes like iris, retina and fingerprints do not change over time but have low intra-class variation (high FAR). Some non-dynamic biometric data are prone to counterfeits by fake biometric models (e.g. synthetic rubber with a copy of fingerprint, facial imitation).

Implementing DBS the electronic circulation of documents may not be interrupted because of handwriting signature anymore. By this way business processes can accelerate which increases communication efficiency and mainly document security and transparency is assured. Another advantage is the environmentally due to the paperless signing.

DBS can be integrated into the existing information system and so enable the biometric signature authentication to be included in applications. The database of biometric signature etalon is easily maintainable because users are using intuitive procedures. The size of biometric signature specimen is only a few hundred bytes, regardless of the size and complexity of signing.

Based on the advantages it is considerable for companies to use electronic signature or electronic mark defined by the legislation of the given country. DBP provides other advantages so the coherence between these technologies such electronic signature or electronic mark should be bound together.

#### 4 Discussion

Costs related by implementing an authentication system (purchasing, service, user training, etc.) depends on the types of authentication technology used (accuracy, options, multifactor authentication, etc. of the system), the size of the company, number of employees, etc. The importance of communication and the sensitivity of secured data also plays a role. It makes no sense to implement strong authentication to secure data that in case they would be lost or abused would have caused less damage than the costs of implement of the chosen authentication system. In this case other risk reduction or risk retention should be used.

We can conclude that each type of security can be undergo to attacks. These threats can be reduced by using different authentication methods in combination with each other. The use of dynamic biometric signature as a natural and easily accessible tool for one factor authentication and combination with other factors can achieve strong security authentication.

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# NEW MODEL OF MANAGEMENT AS A METHOD TO OVERCOME THE PHENOMENON OF „SEPARATION FALLACY”

**Elżbieta Jaszczurowska**

*The University of Economics and Humanities, Poland  
ejaszczurowska@wseh.pl*

**Iwona Kłóska**

*The University of Economics and Humanities, Poland  
ikloska@wseh.pl*

## **Abstract:**

There would be no development or growth of modern organizations without the set of socio-economic values, one of which, the one that has always been called for, the freedom of an organization. This has enabled the strengthening of the position of an organization as an influential and successful system. In a traditional approach the role of an enterprise was solely the one to „do business” and that was to be treated as a contribution to the development of the society. Friedman claims that enterprises should care only for themselves and for those who provide financial input in their activities. In this particular way, an organization could have functioned in a seeming separation from the rest of the society, which lead to the of „separation fallacy”- business on one side of the barrier and the society on the other. In the 70s of XX century, important changes started and reformulated previous rules and traditions. Globalization and outsourcing of activities and technology reshaped the economy, communication and the world social scene. Consequently, due to globalization the balance between values and national states changed. Modern organization has become an institution with more economic power, while the states ( with less important position due to changes) weakened the system of norms and values, which had ensured safety and stability of local communities. Presently national states with their institutions can no longer offer *modus vivendi* for more and more globalized world. This position is now occupied by modern organizations which have now taken over the responsibility for the common good. The new status gained by the organization bases on such rules like optimization, creating numerous values and partnerships both inside and outside of an enterprise. At present an organization not only has to multiply their profits but it is obliged to care for the transparency of actions and to be responsible for the natural environment and to support local communities. The aim of the article is to explore the methods of managing business in order to overcome „separation fallacy”.

## **Key words:**

Separation fallacy, product leadership, management

## **JEL Classification:** L21

### **1 The process of globalization versus the status of an enterprise at the modern job market**

In modern society the meaning of an enterprises and the way it operates has become a crucial question for both theoreticians and practitioners. The aim of the debate over this matter is to analyse the social responsibility and sustainable development in modern enterprises. The debate stems from the increasing global awareness concerning the needs of the natural environment and from the vanishing non-renewable energy sources, as well as from growing pressure on combining these with the issue of social inequality around the world. The actions and initiatives are undertaken simultaneously in many

areas of human activities( business, politics, technology etc.). One of the priorities is the way businesses operate. Accepting the necessity of profit generation, the firms are expected to become engaged in actions directed towards the society in the scope which would meet the needs and expectations of the stakeholders from the economic, social and ecological areas. The values and ethical norms connected with the running of an enterprise, in large extent, deserve the advantage of commonness. Nevertheless, there are some specific features attached to managing an enterprise in the era of globalization. As a result of this process, new opportunities and threats, temptations and challenges emerge. Also dilemmas calling for the ethical reflections arise. The process of the internationalization of economy is nothing new, it can be noticed throughout the history of mankind. Yet, at the end of the XX century this process accelerated significantly. The conditions which largely influenced the acceleration of changes can be listed in few categories.

The key category is connected with so called „second industrial revolution”, which resulted in the huge development in the communication techniques. The information technology and the acceleration of the development in transport lead to unprecedented facilitation and the lowering of prices in the movement of commodities.

The changes in politics in the 60s and 70s of the XX century also favoured globalization of the economy. It was connected with the retreat from the protectionism, deregulation concerning trade, financial instruments and job markets.

After the disintegration of the communist system in 1989, also the Eastern Europe joined the process. [Dylus 2012, p.90]

The factors presented above caused fundamental changes in economy, which in the global circumstances, revealed the features never seen before.

In contrast to the globalization in previous periods in the history, when the” national economies” prevailed, contemporary economy dynamics is governed by transnational corporations. These are the „global actors” who undertake global competitions and in order to minimize costs, relocate their activities to places where they expect to make significant savings due to cheap labour or low taxes. [Aniol 2002, p.64]

Unusual mobility volume of the competing businesses, force some presumptions of globalization. Such mobility has become possible due to the development of technology in communication and transport and as a result of the weakening of dependence on huge industrial structures. In globalized economy knowledge has become a major factor in production, while others became less important. The economy based on knowledge develops dynamically which results in changes in the social structure. [Thompson2006]

Under the circumstances, the relationship between the state and a business entity, has changed fundamentally. Owing to the fact that a lot of goods take the form of information or knowledge transmitted through electronic media, the level of the state control has been minimized. Moreover, the” global actors” frequently avoid control of the jurisdiction and regulations of the state which are in force only within the borders of the country. Presently, the territory is becoming a matter of choice for the transnational corporations and governments frequently accept the terms proposed by foreign investors, this being the opportunity to accelerate domestic economy. Forced to divest itself to competences enabling to shape the economy independently, the state is losing the features of the „social state”. [Thompson 2006; Saul 2006]

The apprehensions which accompany globalization of the economy are connected with increasing disproportion between two production factors: labour and capital. The growing demand for the capital is accompanied with the surplus of the work force which results in unemployment. This is contrary to 60s and 70s of the XX century when there was the deficit of workers in highly industrialized countries with overabundance of capital. Presently one can observe the phenomenon of the „ reversal of the rarity relationship”. [Stiglitz 2004, p.68]

However, despite the smaller mobility of work force in comparison to the capital, job markets can see dynamic changes. The lack of job opportunities, at the home market, a great economic migration has been triggered.

Corporate social responsibility (CSR) and the sustainable development are two very important tendencies in the fast changing social and organizational landscape. In their very fundamental nature these two concepts pose important questions concerning institutional tissue of the society. Under these circumstances the slogan "think globally, act locally" becomes more valid. In order to apply this catchword to real life, it is important to reformulate the method of thinking of businesses in terms of management of economic and social obligations towards consumers, suppliers and other stakeholders.

## **2 The evolution of the enterprises in the light of corporate social responsibility**

As mentioned above, both concepts: CSR and the sustainable development refer to activities of modern enterprises. The enterprise itself, as a certain type of organization, has undergone transformation from the moment of the start. Corporate social responsibility evolved simultaneously. The concept of responsibility is not new, as a notion itself, it was known in the Roman Empire. At that time it was mainly used to describe the features of a person's character. Initially the notion referred to legal cases, and the consequences were directly connected with the social context. In the current meaning, responsibility has become a universal concept, in which everybody bears some kind of responsibility. [Gasperski 2007]

Responsibility holds the function of the relationship between people, societies and organizations, but it is also connected with harmony and conflict between them, or even a mutual adjustment which, in turn, creates the process of social existence.

It is a specific requirement concerning business, that it should manage economic system in the way to meet the expectations of the public opinion. This is to be understood that the means of production should be engaged in the production and distribution with the view to increase the social and economic prosperity. Social responsibility means the readiness to perceive the use of resources ( human and economic) in the light of broader social aims, not just a narrow interests of private people and businesses. [Rok 012, p.424]

While analysing the role of business in the society we can take it as a specific continuum. On the one hand there is an extreme approach which assumes that the only interest of business is to make profit which is considered to be the contribution to the wellness of the society. Such an approach has been presented by M. Friedman, who claims that the main objective of each business is to take care of itself and of those who provide financial contribution enabling its functioning. Friedman's economy maintains the assumptions concerning general stability of the system and makes it „real" by the attitude that free market economy, not interrupted by the politicians, more precisely-financial politicians, will seek balance with the full use of all production factors and what is more, will secure socially accepted level of employment, the consequence of which are the stipulations to minimize the state intervention to the economy.[Blaug 1994, p.685]

This is a highly traditional approach based on the assumption that it is possible to maximize the profit according to the regulations and in consent with charity. Other institutions such as governments or non-governmental organizations are expected to fulfil the social space which has not been occupied by business. Such an approach was called „ separation fallacy", which is a silent assumption that functioning of business is not in any way connected with the society. This attitude results in a different perception of business and its functioning and is estimated by economic outcomes in separation from its actual influence upon the society and the natural environment. Consequently, such businesses are perceived as abstract creatures with no tangent point with reality. [Jonker, Rudnicka 2011, p.146]

On the other extreme point, there is more modern approach to the role of enterprises, which now should take responsibility for the commonwealth (once it was the duty of the state). In the last few decades a gradual transfer from the owners oriented to the stakeholders oriented attitude can be observed. The key theory for this process is the " theory of the stakeholders" by R.Freeman, published in 1984. The

foundation of the concept is a simple, practical intuition, that in order to achieve success in business, one should take into account external stakeholders but not only those in a traditional meaning (customers, suppliers), but also non-market ones, such as media, local authorities or governmental organizations. The formula of referring to the external subjects in decision making assumes their prior analysis and observation, sometimes even a kind of dialogue which should be implemented to estimate their expectations or possible actions. Consequently, the communication with external stakeholders has been built in the process of the business strategy. The dialogue is a continuous process referring to expectations of the stakeholders and it should be generated by the business and should not be just a simple reaction to the threats coming from the external environment. [Freeman, McVea 2001]

Modern attitude concerning the perception of the role a business plays in the society stands in opposition to the myth of „separation fallacy”. It is emphasized that modern enterprises need a healthy society in order to achieve success.

Main factors concerning the efficiency of employees are among others: good education, health care and equal opportunities. Eventually, it is the healthy society that creates the demand for business, proportionally to the increase of ambitions and needs. No social scheme can compete with the business sector and its possibility to create work places, wealth and innovation, which significantly influences the improvement of the life standards and social condition.

### 3 New model of management based on building plural values

The perspective of a modern firm functioning requires the development of a new meta-theory rooted in the values and principles which form a foundation of each organization. Those values are stable in their character and present the desired aims in a non-material way. Enterprises present many aims simultaneously within the framework of their culture. However, some of them are of more dominant nature and they form groups or sets of values. The strategies of organizations as well as their policies are built on the foundations of so categorized values. Each organization bases on three key configurations of values( rationalities):

- **functional rationality** – connected with the diversification of activities, roles and processes. It offers direct, practical instructions to design and shape the behaviour enabling to reach the aims,
- **substantial rationality** – addresses the values which base on the organizational identity, indicating the desired behaviour both inside and outside the organization,
- **communicational rationality** – addressing language artefacts, enabling mutual understanding inside the organization and supporting the feeling of community. [Jonker, Rudnicka, Reichel 2011, p. 49-50]

Building the set of values is directly connected with the business offer. This process is based on the following objectives:

goods produced( material and non-material) which are perceived and recognized by one or more stakeholders;

- an organization must possess adequate potential (competence, abilities and means) to be able to build a promised value;
- the act of building values is based on the use of means / methods which enable the creation of the desired goods;
- building the values assumes transformation (commodities, knowledge, ideas, concepts etc.);
- in the process of transformation some parts of the capital are destroyed while others are developed. [Jonker, Rudnicka, Reichel 2011, p. 53]

Each business offer is based on the strategy. Business offer refers to the way how enterprises organize their activities and it bases on the building of various values for the customers. Among current strategies we can identify five major categories:

- operational excellency,
- product leadership,
- closeness to customers,
- experience,
- virtuality. [Penc 1997, p. 48]

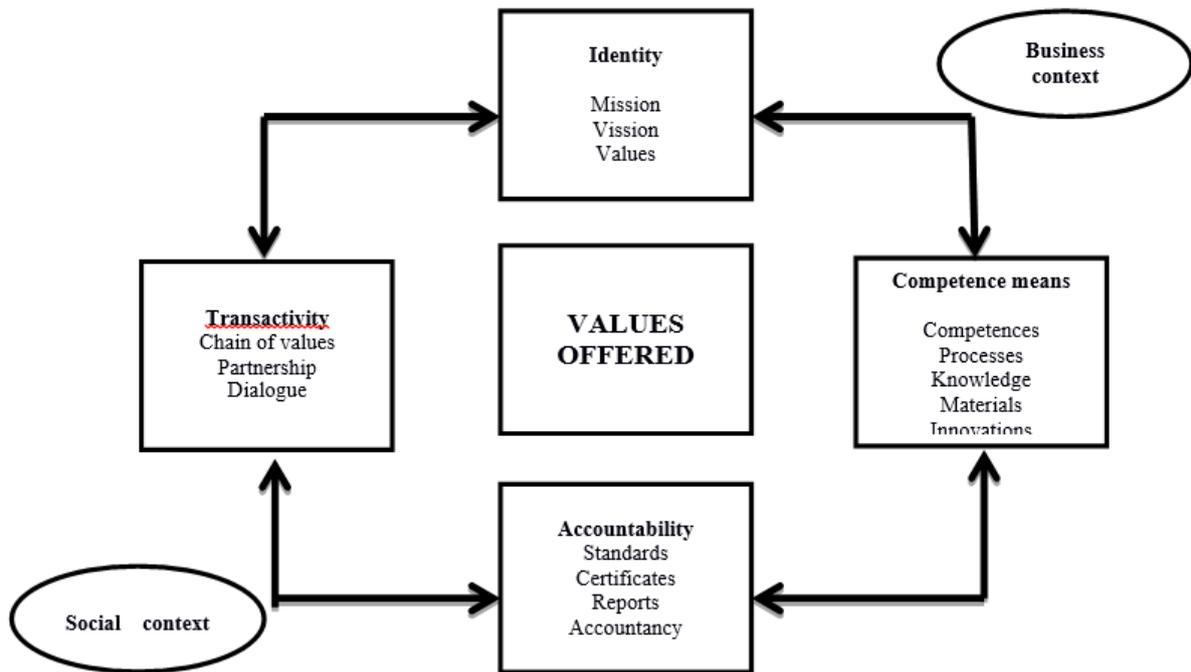
All the above mentioned strategies focus on building economic values while the creation of an effective strategy requires the adjustment of the offer to what is expected by the stakeholders in relation to both products and services and to the social and community aspects. New expectations imposed on the enterprises by the consumers and other stakeholders, require a new strategic perception. It is worth emphasizing that an enterprise can be perceived as socially responsible, only if it represents values on various fields (economic, ecological and social) and for many stakeholders simultaneously. The answer to the challenges concerning management adequate to the demands of the market, is the model of management, which will combine social responsibility, the sustainable development and the functioning of the organization. Such a model bases on the assumption that all the organization activities are shaped according to the process of building and applying of a strategy. The division should be made into an economic and social aspects an enterprise introduces into the strategy. Both aspects are becoming more and more interdependent and they develop dynamically to reach a complex area for contacts and contracts .

Business context is built by those stakeholders who relate their business to the enterprise (consumers, suppliers, potential partners). These actors are treated as conventional stakeholders. Social context refers to the stakeholders who have a wider interest of social and ecological character connected with the enterprise. These are, among others, non-governmental organizations, trade unions and local communities. This categorization helps understanding needs and expectations of the customers. It also forces the necessity to consider various orientations leading to different strategic approach.

First element of the model is *the transactivity*. It is used to describe the dynamics of the connection between the organization and its context, and it is treated as a significant indicator of the way the organization manages the chain of values and how it maintains the dialogue to build partnerships with the key stakeholders. Reasonable organization and management of the transactions generate the flow of information and knowledge of the environment which, in turn, enables the organization to communicate its identity to other groups.

The second element of the model is *means of competence*. This element includes the means, resources and methods of activity which are at the organization disposal and which are engaged in the values building process. This is a set of assets such as human, ecological and intellectual ones, which enables reaching the aim.

Figure 1: New model of management



Source: [Jonker,Rudnicka, Reichel 2011, p.69]

*Accountability* refers to the matters pertaining the evaluation of how the organization is building its values and what actions were undertaken for their dissemination.

Standards, certificates, reports and accountancy can be enumerated as the components of this element. Certified standards are treated as the normative guideline for the activities on the basis of which, an external audit can be conducted. Reports mean that the information concerning activities undertaken connected with the social responsibility and sustainable development, is disseminated willingly. While accountancy is understood as mandatory and they concern all the financial activities.

The fourth element is *the identity*. This element indicates the way in which the organization perceives itself and the way the organization is perceived by others. The identity is shaped by the values inscribed in the culture of the organization. They define the way of thinking, actions and reactions of the participants.

The model of management based on several values is the effect of the research by J.Jonker, conducted in 2004 in cooperation with C.Appels and L.van Duijn. It has been frequently used as the basis for many organizational projects, since it was published. In the process of verification it has been approved as an effective instrument of management. It enables the identification of activities in the enterprise which can incorporate the idea of social responsibility and sustainable development. It also enables a complex development of the vision concerning not only internal functioning of the organization, but it includes the external environment. The integration of social responsibility with the functioning of the enterprise calls for a new meaning of social responsibility. It is necessary to adopt the strategic perspective in the perception of processes, profits and limitations in the building of several values.

#### **4 Methodology and methods**

The main aim of the article was to demonstrate „a new model of management” with the emphasis on the fact that a socially responsible organization is the one which builds values in many various areas (economy, ecology, sociology) and for various stakeholders simultaneously. As mentioned in the article, the model of management which bases on many values, has been derived from the research conducted by J. Jonker in cooperation with C. Appels and L.van Duijn in 2004. From the very start the model has been used as the foundation for several organizations as a cornerstone for many business schemes in the process of practical verification. It has been found as an effective instrument in management improvement. The model enables the identification of the organizational activities in which the idea of corporate responsibility and sustainable development could be incorporated. Moreover, it enables the complex development of the vision related to not only the internal functioning but also taking into account the external environment of the organization.

„Separation fallacy” phenomenon (as mentioned in the article) frequently means the hidden assumption that the functioning of the organization has no connection whatsoever, with the activities of the rest of the society. Having assumed this, it is obvious that the evaluation of the organization will be disconnected from their real influence upon the environment, which transforms the organization into an abstract creature, with nothing in common with the reality. However, business needs a healthy society to operate comfortably and successfully. Crucial factors influencing the efficiency of employees, include good education, health care and equal chances. All in all, it is just the healthy society who create demand for business alongside the increase of aspirations and needs. Likewise the society itself needs a successful company. No other social program can compete with the business sector when it comes to creating work places, wealth and innovation which, in turn, greatly influences the improvement of life style and social conditions. The implementation of a new management model as an effective instrument into the functioning of an organization, enables the extension of the impact area onto social activities. This also leads to a conscious ejection of the notion of the „separation fallacy” taken as the organizational activity solely profit oriented, by both entrepreneurs as well as members of the society in the business environment.

#### **5 Discussion and conclusion**

The biggest difference between a modern enterprise and a classical one is the change in the perception of its role, function and responsibility. The classical approach focuses on the internal transformation, whilst the adoption of the new management model, which assumes the benefits for all stakeholders, makes enterprises becoming more and more aware of the fact that there are many subjects in their environment connected with business, this way or other. These are customers, suppliers, shareholders and others. Such a situation results in then gradual increase of social aspects in business operations. Although a modern enterprise still operates with the view to maximize profits, yet it takes into account a wider range of values and responsibility, by avoiding bad impact on the environment, i.g. by avoiding or reducing the amount of waste.

Consequently, multiple values are being built by the organizations. Adopting such assumptions means that the organizations are perceived as more responsible and being such they can be subjects to assessment and verification. We can discuss two trends in responsibility: economic and social. The economic aspects involves achieving profit and material satisfaction of particular stakeholders, whereas social responsibility encompasses interests of various groups of stakeholders. The latter approach is strictly connected with the relationship management being defined as the maintenance of relations with both entities as well as groups inside and outside the organization. This is an intended and planned process in line with the strategic vision which assumes engaging stakeholders in reaching strategic success, determining the directions of the development for firms, their influence on the environment and *vice versa*.

Stakeholders relationship management is a constant process of balance and integration of several aims and bonds. Presently each entity functions in a complex system of interests and influence. While making decisions the awareness of expectations from different stakeholders is essential likewise the determination of the extent in which they can influence the *status quo* of the organization. Instead of defining the strategy for every single stakeholder separately, the managers have to find the method to satisfy the needs and meet the expectations of many at the same time. The „new model” presented in hereby article makes a useful instrument to improve effectiveness of organization management to accommodate economic and social needs of various stakeholders.

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# DISPARITIES OF WORLD REGIONS – IS LATITUDE A CAUSE OF THE DIFFERENCE IN HUMAN DEVELOPMENT?

**Eva Jílková**

*Moravian University College Olomouc, Czech Republic  
eva.jilkova@mvso.cz*

**Adam Pawliczek**

*Moravian University College Olomouc, Czech Republic  
adam.pawliczek@mvso.cz*

## **Abstract:**

The globalization brings many economic and social impacts, which could be not only positive. The article contains an enumeration of main causes of different human development in world regions. It is really necessary to better understand the real quality of human life and not just to focus on economic growth only. This is the reason for using an indicator reflecting the quality of human life – the Human Development Index (HDI) – in the submitted paper. The aim of this article is to compare the level of human life in selected countries with their geographical location expressed by degrees of latitude using the Human Development Index (HDI). For comparison and analysis, the UNO data - the HDI development in selected countries of the world in 1990 and 2014 – have been used.

## **Key words:**

Region, development, Human Development Index, latitude, geographic location

**JEL Classification:** F02, F43, O10

## **1 Introduction: Regionalism in the World Economy**

Trends and processes called regional integration are an integral part of the whole world economy and the logical outcome of the colonial arrangement of the world as well as the economic and international development. The essence of the integration process has been a gradual removal of barriers between states and regions and the creation of their mutual cooperation on the basis of specialization and cooperation.

Besides the dynamically developing regions of the world, however, there are a number of regions where the international division of labour and mutual cooperation do not work. On the one hand, this means that in the contemporary world, there are regions where better conditions for mutual cooperation, prosperity and development are constantly being created and, on the other hand, there are regions, in which scarcely any or negligible cooperation exists and does not bring any positive effects.

## **2 The Aim of the Paper and Methods**

The aim of the article is to compare the level of human life in selected countries with their geographical location expressed by degrees of latitude using the Human Development Index (HDI). For comparison and analysis, the UNO data - the development of the HDI in selected countries of the world in 1990 and 2014 – have been used.

The graphical evaluation through a scatter plot has been utilized and linear regression trend lines have been drawn. Arithmetic averages and directions of linear trends as well as their differences have been calculated.

## 2.1 Ambiguity in Defining the Concept of Region

Professional approaches to the issue of world regions are rather different and defining the basic concepts is still undergoing its development. The basic concept of "region" is related to the geographical location in the classic concept, however, in terms of regionalism, the concept of region has a social, economic, political or organizational meaning and can be defined as "groupings (clusters) of two or more countries, which may have various forms of regional cooperation and integration" (Kunešová-Cihelková, 2006: 104). The definition in this way enables the view of a given region as a summary of selected members of a grouping. Although we consider the structure of bonds and the level of economic integration, there are a series of examples when countries do not belong to a given region or the membership of countries in different organizations overlaps, yet they are part of the region in terms of geography. An obvious example may be Norway or Switzerland or, if need be, the countries wishing to join the EU, namely Turkey.

A major trend in the world economy and the driving force of its development is a global phenomenon called regionalism, which *"seeks to integrate economies into as comparable level of the economic development as possible"* (Kunešová - Cihelková, 2006: 108). However, this international economic trend also carries the political and strategic context in itself and, at the same time, it is related to the concept of globalization, which is the natural tendency of convergence of economies.

Perhaps due to political reasons, there are two diametrically opposed groups of opinions related to the issue of regionalism, which are engaged in a dynamic and very intensive debate on the benefits and risks of this international trend. Its protagonists emphasize the benefits, such as increasing the region's competitiveness, market size, supporting the mobility of economic factors, etc., in the political sphere, then the ability of stabilization and the possibility of promoting reforms and structural changes in particular countries and enhancing the security of these regions. This view is opposed by the other group, which refers to the harmfulness of regional trends because it deviates from economy to politics and political interests in organizing the world through the regions, by which it blocks the space for the participation of poorer or less "powerful" countries and increases the complexity of mutual relations and set rules that the countries refuse or are reluctant to comply.

Baldwin, Tavares, Page and others agree that a lot of factors, such as legal, territorial, cultural, historical, social, political and economic aspects, influence the definition of the concept of region. Especially Baldwin (1997) emphasizes that the regional integration is a driving force of multilateral negotiations and has a positive effect on the standard of living in member countries (cf. Rehak, 2009).

Similar findings have already been published (Acemoglu, Robinson 2012), Acemoglu and co. focus on the origins of power, prosperity and poverty. Barro and co. concern more on religious and cultural aspects of the economic growth. (Barro, Mc Cleary, 2003)

In terms of geography, regionalism is perceived similarly and is demonstrated by the main centres of the world economy. There is a certain contradiction again: on the one hand, regionalism leads to creating world economic centres, which eliminate the differences between West and East or North and South; on the other hand, however, regionalism creates and deepens these differences itself due to its nature. From the economic viewpoint, therefore, it opens the so-called economic scissors and deepens the poverty and backwardness of the poorest countries of the world, which are becoming more unstable regarding security. The concept of regionalism must be distinguished from the concept of regionalization, which represents the process of creating regions on the basis of mutual cooperation and occurs as a result of mutual economic dependence of states. However, this trend proceeds autonomously, just as the cooperation among the countries arises and develops spontaneously. This formal tendency occurs mainly in border areas in terms of economic and social convergence.

## 2.2 The Economic Differentiation of Regions and States

A considerable differentiation among states is given mainly by the unequal allocation of natural resources and is the result of the earlier development of the society.

The profound differences between countries and regions are also caused by the historical inertia of colonialism and alternatively the settlement of colonies by the European and other settlers from the more developed parts of the world has a positive impact on the development of backward areas (Angeles, 2005).

Other aspects that contribute to an uneven global development are e.g. the abovementioned legacy of colonialism and different conditions in agriculture (Acemoglu et al., 2001) or different climatic conditions (Bonds et al. 2010) and also a different access to resources.

However, the different socio-cultural and political, but especially economic and industrial conditions do not necessarily indicate a negative development. If a country does not have sufficient supplies of scarce natural resources, the Ricardian theory of comparative advantages may work here successfully and the areas may have a very positive economic development (e.g. Hong Kong, Singapore).

Certainly, the position of power of states also has a certain influence and the economic dependence of the developing countries on the developed world is obvious, too (Novotny, 2006). However, widening the disparities among countries occurs here again since the developing countries are mainly used as a source of cheap labour or other production resources or, if need be, an outflow of profits and incomes back to the developed countries. Mainly the vastly different cost of labour is reflected in prices, which only deepens the inequalities within the whole world economy. The different labour costs are obviously reflected in the value of a product and the differentiation continues to increase. *"The unequal trade exchange helps maintain the technological backwardness of the countries with a cheap labour as their participation in world markets is not accompanied by a corresponding accumulated profit"* (Danek, 2000). Thus, from this point of view, the exacerbation of economic globalization and the further opening of the so-called economic scissors occur.

## 2.3 The Human Development in Regions and States

Generally, a developed country or a region considered to be one that exhibits high values of GDP per capita, has a highly developed energy industry, engineering and other sectors, especially the manufacturing industry. A high proportion of employment in the tertiary sector of the economy, the development of tourism and especially the focus on science and research belong to the signs of maturity. For assessing the maturity it is essential that a given country or a region develops equally in all areas of the economy. The requirements of adequacy, sustainability and permanence are imposed on the economic development and growth.

Based on the Human Development Report of the United Nations from 1990, a new indicator measuring the economic maturity called the Human Development Index (HDI) was created, which comprises three areas: a long and healthy life, being knowledgeable and have a decent standard of living. The HDI assumes the values from 0 to 1, whereas it is true that the higher the value, the higher level of development. Although the HDI is a summary measure of the development of particular countries, it is subject to critical discussions; in the article its values are used for comparing the level of development in particular countries and regions. The HDI includes two aspects of social life, i.e. both economic growth, which is a prerequisite to achieve a higher quality of life and the human development itself, which contains the so-called "soft data" discovered through the public opinion research on housing, health, plenty of safe water and good level of education.

**Table 1: The calculation of the Human Development Index (HDI)**

Human Development Index (HDI)			
Dimensions	Long and healthy life	Knowledge	A decent standard of living
Indicators	Life expectancy at birth	Mean years of schooling Expected years of schooling	GNI per capita
Dimensions Index	Life expectancy index	Education index	GNI index

Source: [http://hdr.undp.org/sites/default/files/hdr2015\\_technical\\_notes.pdf](http://hdr.undp.org/sites/default/files/hdr2015_technical_notes.pdf)

For comparison of the economic maturity and the geographical location of 188 countries, the HDI data according to the UN methodology for 2014 have been utilized. The following table indicates the HDI values of selected countries. For the analysis, the most developed 15 countries with the highest HDI and the last 15 countries, i.e. the countries with the lowest value of the HDI, have been selected. As an illustration, Table 2 contains 10 developed countries with relatively high values of the HDI and 10 countries exhibiting the mean index value.

**Table 2: The HDI of selected countries in 1990 and 2014**

HDI rank	Country	Value		HDI rank	Country	Value	
		1990	2014			1990	2014
<b>VERY HIGH HUMAN DEVELOPMENT</b>				<b>MEDIUM HUMAN DEVELOPMENT</b>			
1	Norway	0.849	0.944	106	Botswana	0.584	0.698
2	Australia	0.865	0.935	107	Moldova (Republic of)	0.652	0.693
3	Switzerland	0.831	0.930	108	Egypt	0.546	0.690
4	Denmark	0.799	0.923	109	Turkmenistan	..	0.688
5	Netherlands	0.829	0.922	110	Gabon	0.620	0.684
6	Germany	0.801	0.916	110	Indonesia	0.531	0.684
6	Ireland	0.770	0.916	112	Paraguay	0.579	0.679
8	United States	0.859	0.915	113	Palestine, State of	..	0.677
9	Canada	0.849	0.913	114	Uzbekistan	..	0.675
9	New Zealand	0.820	0.913	115	Philippines	0.586	0.668
11	Singapore	0.718	0.912	<b>LOW HUMAN DEVELOPMENT</b>			
12	Hong Kong, China (SAR)	0.781	0.910	174	Ethiopia	..	0.442
13	Liechtenstein	..	0.908	175	Gambia	0.330	0.441
14	Sweden	0.815	0.907	176	Congo (Democratic Republic of )	0.355	0.433
14	United Kingdom	0.773	0.907	177	Liberia	..	0.430
<b>HIGH HUMAN DEVELOPMENT</b>				178	Guinea-Bissau	..	0.420
50	Belarus	..	0.798	179	Mali	0.233	0.419
50	Russian Federation	0.729	0.798	180	Mozambique	0.218	0.416
52	Oman	..	0.793	181	Sierra Leone	0.262	0.413
52	Romania	0.703	0.793	182	Guinea	..	0.411
52	Uruguay	0.692	0.793	183	Burkina Faso	..	0.402
55	Bahamas	..	0.790	184	Burundi	0.295	0.400
56	Kazakhstan	0.690	0.788	185	Chad	..	0.392
57	Barbados	0.716	0.785	186	Eritrea	..	0.391
58	Antigua and Barbuda	..	0.783	187	Central African Republic	0.314	0.350
59	Bulgaria	0.695	0.782	188	Niger	0.214	0.348

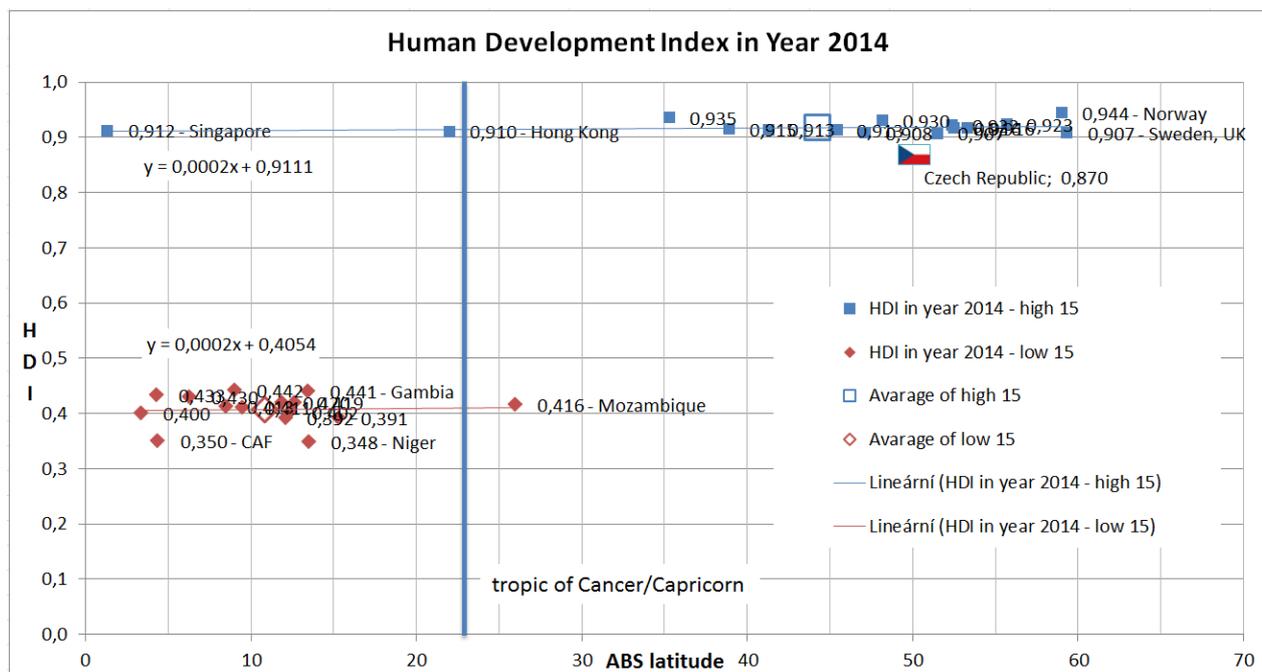
Source: Processed by the authors based on the UNO data available on: <http://hdr.undp.org/en/composite/trends>.

### 3 The Human Development of Selected Countries and their Geographical Location

Figure 1 shows the Human Development Index (HDI) in 2014 in two opposite groups of countries. The blue squares represent 15 countries with the highest HDI (and the Czech Republic) and the red diamonds represent 15 countries with the low HDI. The bigger marks in the Figure 1 represent the arithmetic averages of a particular group of 15 countries. The X axis is an absolute value of the Earth latitude. The blue vertical line is the tropic of Cancer, resp. Capricorn. For purposes of analyses we neglected the position of the Earth hemisphere with consideration that most of selected countries lie on the North hemisphere. Linear trend lines including equations are presented.

The data from Table 2 have been used for analysis and comparison.

Figure 1: The Human Development Index in the Year 2014



Source: Processed by the authors based on the UNO data available on: <http://hdr.undp.org/en/composite/trends>.

From the geographic point of view, we can clearly notice that almost all countries with the high HDI lie at a higher latitude than the tropic in a moderate or colder climate and almost all countries with the low HDI lie at a lower latitude than the tropic in a warmer or hot climate. There are three exceptions:

- Singapore and Hong Kong have the high HDI and lie at a lower latitude than the tropic.
- Mozambique has the low HDI and lies at a higher latitude than the tropic.

The direction of linear trend line of high HDI 15 countries is 0.9111 (the average is 0.918) and low HDI 15 countries is 0.4054 (the average is 0.407) which makes a difference of 0.5057 (the difference of averages is 0.511). We can say that the HDI value in the most developed countries is almost **double** than in less developed countries.

We can speculate on the causes of this significant difference and what they mean for the human development regarding the latitude of the territories where humans live. Most likely civilizations arose in hot climate territories, however, the expansion to colder territories on the Earth brought a vital necessity for strategic planning – arranging a place for living and energy (heat and food stores) to survive deadly winter seasons. Year after year, this experience helped in establishing human relations, cooperation, synergy and creating cultural cornerstone and effective equal-right based democratic system, which produces the best human welfare benefits.

## 4 Discussion and Conclusion

It is obvious that the issue of the uneven development of regions of the world has an enormously dynamic development. The enormous expansion and economic development of the world economy triad may be replaced by an accelerated development and socio-economic development in other parts of the world. The main driving forces are mainly the revolution in technologies, from the industrial revolution to the globalization trends.

The graphic chart presented shows the link between the latitude and the maturity of a given country indisputably. "The location of birthplace affects not only the future earnings and the probability to live to a ripe old age, but also a chance of a man to have adequate nutrition, housing, education, health care, paid employment, clean water, etc." (Danek, 2000).

Although there is a clear relationship between the geographic location of a country and its maturity, it is not possible to believe that this is a natural phenomenon or process. The different development may mean just the abovementioned historical experience of nations living in the temperate climate zone with the necessity of strategic planning and effective management of scarce resources.

The current disparities among regions of the world are not, however, only a result of the past development and empiricism, but this development is also affected by the development policy and different interest groups or major global players, who often enforce their goals very hard. The development policy and the aid to less developed countries can be considered to be the so-called moral hazard. The fundamental opponent of the foreign aid to less developed countries is Milton Friedman, who argues that "*this aid will not get mainly into the hands of those who would be able to use it effectively and it only weakens the motivations of governments and even people to help themselves*" (Holman, 2005: 434). Nevertheless, current trends point out to moving the problem of differentiation among the states from national to supranational level.

The phenomenon accompanying the disparities of world regions is, along with the population explosion and the availability of mass media, namely international (intercontinental) migration, which, in recent years, has significantly influenced events in Europe. Migration is often accompanied by cultural incompatibility given, among other things, by the different approach to strategic planning inherently contained in the Christian-Jewish cultural background.

Presented research can contribute to better understanding of lack of strategic thinking and conception in low developed countries and steps to the improvement or progress. Self-evident proposal for the improvement in this area is the higher quality and intensity of strategic education.

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# APPLICATION OF FIBONACCI NUMBERS ON TECHNICAL ANALYSIS OF EUR/USD CURRENCY PAIR

**Andrea Kolková**

*College of Entrepreneurship and Law, Department of Entrepreneurship and Management, Czech Republic  
andrea.kolkova@vspp.cz*

## **Abstract:**

The paper deals with the application of Fibonacci sequence of numbers, which is used in many fields of science and has been known since the 13th century, on a technical analysis of forex market. Forex as the most liquid market in the world offers a great range of options for trading. However, without the knowledge of analysis of selected markets, it is a very risky business. One of the most frequently used analyses in the recent times is a technical analysis. Graphical methods comprising Fibonacci numbers may be included in this analysis. The paper aims to verify the effectiveness of selected Fibonacci studies on the trades of EUR/USD Forex pair at the trading platform MT4 environment for a short period of time using binary options.

## **Key words:**

Fibonacci sequence, Forex, technical analysis, digital options

## **JEL Classification:** G14

## **1 Introduction**

Fibonacci sequence of numbers is a tool known for over 800 years. Its creator is Leonardo Pisano, who was nicknamed just Fibonacci. Pisano was an Italian mathematician who lived from 1175 – 1250 (Rozza, 2016). He toured the world and from the visited countries he was returning with knowledge of mathematical systems. He is also credited for introducing the final Arabic numerical series instead of the roman one. Pisano is attributed to a number of mathematical discoveries and wrote a lot of works. The most famous discovery is the definition of the Fibonacci sequence. Fibonacci Patterns have been known since the ancient Egyptians, Fibonacci, however, was the first who was able to describe this sequence.

The basis of Fibonacci's work is discovery of so-called Golden ratio. The golden ratio is 1,1618. On this scale there is built a number of natural laws, both in animal and plant kingdom. Pisano described this discovery in the book *Liber Abaci* (Germano, 2000). Today's mathematics applies also several other Fibonacci ratios, which are used in various fields of science.

One example is the sunflower seeds wherein the individual seeds can be seen arranged in spirals size of two consecutive sequence numbers.

Another example of Fibonacci numbers can be seen in ligneous petal spirals of artichoke fetus. These lead in two directions, whose number around the stem again consists of two consecutive Fibonacci numbers. Similarly, this property occurs in certain cones of coniferous trees (such as pine), there usually the number of spirals form the Fibonacci sequences (Pappas, 1989, p. 224).

The Fibonacci sequence also defines a genealogy of bees, as well as the composition of their gender. Pisano's discovery can also be found in the size of adjacent layers of cabbage leaves, which retains again the ratio of two consecutive numbers of the Fibonacci sequence (Coxeter, 1969).

The ratio of the size of the two shells chambers of some snails corresponds to the ratio of two consecutive Fibonacci numbers. A similar shape can be found at the horns of some Bovidae species.

Fibonacci sequence can be found in a wide variety of higher plants, e.g. in a ratio of the size of their leaves, or the angle from which the stems grow.

According to Kazlacheva (2016) the Fibonacci sequence is a symbol of beauty and harmony and by these reason geometrical objects in its proportions is used in the design.

This paper aims to apply the Fibonacci sequence also on the foreign exchange market (Forex). According to Greblatt (2002) is “the Fibonacci method one tool in a group of methodologies that seeks to tap into and exploit an underlying universal structure of all markets”.

## 2 Methods

Basic Fibonacci sequence according to Refik (2016) can be expressed by the definition:

$$F(n) = \begin{cases} 0 & \text{for } n = 0 \\ 1 & \text{for } n = 1 \\ F(n-1) + F(n-2) & \text{for others} \end{cases}$$

Basic Fibonacci sequence can thus be formed by numbers 0, 1, 1, 2, 3, 5, 8, 13, 21 etc. On the Forex market there is within instruments of technical analysis rather the logic of the golden ratio applied and so that the number following is always a multiple of 1.618 times the previous number, and at the same time a multiple of 0.618 times the following number.

On the Forex it is possible to use several tools based on the Fibonacci sequence, namely:

- Fibonacci Arcs,
- Fibonacci Fan Lines,
- Fibonacci Retracements,
- Fibonacci Time Zones,
- Fibonacci Expansion.

The most famous price levels applying the Fibonacci sequence on the Forex (Gaucan, 2011) are 23.6%, 32.8% and 61.8%, while the most important value is called Forex 61.8%. Among these sequences there is inserted even the value of 50%. Although it does not form a sequence, in practice it is frequently used.

### 2.1 Input data

Trades in this paper were executed in January 2017 for the EUR / USD currency pair. International Interbank Foreign Exchange (here only Forex) is the most liquid and largest market today. The first mention of Forex dates back to the period of about 700 BC, when Asia Minor began to cast the first coins of bronze. Coin-bound material (usually gold, silver or bronze) were not known until the late 19th century, when the world introduces so-called gold standard, and gold is used to cover single currencies and also as a currency converter. Since the beginning of the 20th century is no longer required to bind the exchange of money for gold but the currencies are freely transferred among themselves. Subsequently, the development of Forex was very dynamic and connected especially with the emergence of institutions such as the International Monetary Fund or the World Bank.

Forex trading history as we know it today began to be written in 1973. Forex takes place on the Over the Counter markets (OTC hereafter) and it is the market that is available 24 hours a day. Its turnover is estimated at more than \$ 5 trillion per day.

The most important currencies in Forex are the US dollar (USD) as the most used and most liquid currency today. Nearly 90% of currencies are traded in pairs with the USD. Separate US Dollar then can be traded by using the dollar index USDX, DXC or DXY. After the US dollar the most important currency is the euro (EUR), the official currency of 18 out of the 28 European Union countries and in 6 other countries outside the EU. Euro came into effect on 1 January 1999, and in the form of foreign currency since 1 January 2002. Major currencies are also Japanese yen (JPY), British pound (GBP) and Swiss franc (CHF). Other currencies are already ranked among the so-called secondary currencies and you can include here, for example, the New Zealand dollar (NZD), Canadian dollar (CAD) and Australian dollar (AUD). The least traded currencies are called Exotic currencies and they usually have little liquidity. Here belong for example, Turkish pound (TRY), Mexican Peso (MXN), the Brazilian real (BRL) Polish Zloty (PLN) and the Czech koruna (CZK).

When trading, there are of course naturally currency pairs which are traded. The most liquid currency pairs are called majors and among them there is Euro / US Dollar (EUR / USD). In this paper, the application is made just for this currency pair. Graphical representation is implemented using Meta Trader (MT4). Meta Trader 4 trading platform is designed for Forex and CFD (Contract for different) trading in indices, equities and commodities. Meta Trader 4 platform also enables the implementation of fully developed technical analysis. And both on the basis of already built indicators and linear instruments and allows the construction of new indicators. This contribution was used to import data in real-time mode.

## 2.2 Trade system

To start trading it is necessary to build a trading system that can according to Costa (2015) described as a set of rules that define conditions for the commencement or termination of trading. Murat (2016) defines, that trading system is based on technical indicators or pattern-based approaches, which produces buy/sell signals to trade in the market. Generally, we can interpret trade system based on Fibonacci so that when the exchange rate approaches the level of some of the tools created by the Fibonacci sequence, a change of trend can be expected and it can be a stimulus to trade execution.

As has already been defined in this Charting it is possible to use 5 options to define the trading system and that one based on the Fibonacci arcs, Fibonacci fan Lines, Fibonacci Retracements, Fibonacci Time Zones or Fibonacci Expansion.

Application of the Fibonacci sequence in this post will be implemented on a time frame of 5 minutes. And then after the signal to buy or sell, the trade will be implemented at the appropriate up or down digital option with 15-minute expiration. Trade system thus defines only the input to the trading on the basis of an unequivocal signal from the selected Charting.

According to Veselá (2015) Fibonacci Arcs are basically 3 circles whose centre is given by the plotted trend line. The trend line in this case combines two extreme points of the previous exchange rate development. Trade system in this case is the input to the trading on the basis of the down option in case of rebound from the top of the Fibonacci Arcs.

Fibonacci Fan Lines consist of three lines plotted again from the extreme point of the trend line. Touch of the upper line represents the impulse of buying down options, touch of the bottom line then buying up options.

Fibonacci retracements are most frequently used form of Fibonacci sequence on Forex and they are represented by the lines drawn on well-defined numeric levels. These levels are set by the numbers of the golden ratio in the range defined by the distance between the two extremes of the drawn trend lines. Touch in the upper level is a signal to buy down options, and vice versa.

Fibonacci time zones are vertical lines plotted over time at levels of basic Fibonacci sequence. At time zones levels there is often a change of trend and therefore, if the Time zone is in support it is an impulse to buy up options, if it is in resistance, then it is suitable to buy down options.

Fibonacci expansion is used similarly as retracements and it is possible thanks to it to portray maximum of the rate changes in the trend.

## 2.3 Binary options

In this paper, the business system based on the Fibonacci sequence is applied to the Binary Options. Binary options are popular in OTC markets for hedging and speculation. They are also important to financial engineers as building blocks for constructing more complex option products. Thus, binary options are simple but give important implication in considering various option pricing problems.

This nascent market is reminiscent of where the retail forex market was about 10 years ago. It is a new investment alternative with low cost entry where all trading is conducted over a web-based, real time platform on which customers can trade.

New generation of web-based electronic trading platforms, as well as efforts to simplify the trading decision, are generating activity in retail binary options trading. Connection old classic tools such as Fibonacci sequence and the new investment instruments is the main contribution of this paper to current scientific knowledge.

## 3 Paper results

In the following section there will be chosen a trading system through the MT4 applied to a selected time period trades with EUR/USD.

### 3.1 Fibonacci Arcs

Figure 2: Fibonacci Arcs with 1<sup>st</sup> Trend Line



The picture shows the application of Fibonacci Arts at selected time period of the development of the EUR/USD. Initially there was a trend line drawn that extends from 1,0771 to 1,0744 points. Subsequently there were applied Fibonacci Arcs. The arrow shows the input to the trading. Digital option expiration is 15 minutes. From the graph it is evident that the chosen trading system would be terminated in loss amounting to 2 pips.

Figure 2: Fibonacci Arts with 2<sup>nd</sup> Trend Line



If trend line will be from 1,0771 to 1,0754 only. Trading system will be end in profit 4 pips.

### 3.2 Fibonacci Fan Lines

Figure 3: Fibonacci Fan Lines



Another application is Fibonacci Fan lines. Here again we can see the same trend line drawn whose extreme points are based on the Fibonacci Fan Lines. This time we would enter the trade on the level 1,0759, as indicated by the arrow. The overall result would be a trade profit amounting to 4 pips.

### 3.3 Fibonacci Retracements

Figure 4: Fibonacci Retracements



On the next Figure we see a Trade system of Fibonacci retracement. The input to 1<sup>st</sup> trade is given by the value of 1,0762, as indicated by the arrow. Trade would again end in a profit this time amounting to 1,0758. The 2<sup>nd</sup> trade is profitability too.

### 3.4 Fibonacci Time Zones

Figure 5: Fibonacci Time Zones



Applied penultimate trading system is based on the Fibonacci time zones and the following basic Fibonacci sequence is applied here. To 1<sup>st</sup> enter the trade there has been selected a level 1,0758 and as indicated by the arrow, it would be the up option. Trade would be closed with loss 2 pips. 2<sup>nd</sup>, 4<sup>th</sup> and 5<sup>th</sup> trade would be closed with loss too. 3<sup>rd</sup> enter would be a trade profit amounting to 4 pips.

### 3.5 Fibonacci Expansion

Figure 6: Fibonacci Expansion



The last of the tools applied is Fibonacci expansion. The input to the trade is again indicated by an arrow. The 1<sup>st</sup> trade expires at a profit 1 pip only. 2<sup>nd</sup> trade is not profitable.

## 4 Discussion and conclusions

In the paper there was applied a trading system based on the Fibonacci sequence, respectively, on the Fibonacci golden ratio. This application was executed on the EUR/USD currency pair in January 2017. On the same market situation there were applied all the possibilities of using the Fibonacci sequence which can be applied to Forex. The results showed that all provided the some impulse buy or sell. Those trades were carried on the digital option up/down. The results show that the trades would achieve a profit of table 1.

Table 1: Trading results

	Signals in the Time Period	Profitable Signals	Maximum Profit	Maximum Loss
Fibonacci Arcs	2	2	4 pips	-
Fibonacci Fan Lines	1	1	4 pips	-
Fibonacci Retracement	2	2	4 pips	-
Fibonacci Time Zones	5	2	4 pips	8 pips
Fibonacci Expansion	2	1	1 pip	1 pip

Topic connection classic indicators, and specifically the Fibonacci sequence, with modern tools of financial markets, or binary options, not yet published. In further scientific work it would be appropriate to apply the Fibonacci sequence to other currencies, possibly on CFDs and other assets. Fibonacci number would be use in conjunction with other indicator technical analysis such as moving average, exponential moving average, MACD, Stochastic oscillator, RSI, ATR, ADX, CCI or for example Bollinger Bands or Parabolic SAR.

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The paper aims to verify the effectiveness of selected Fibonacci studies on the trades of EUR/USD Forex pair at the trading platform MT4 environment for a short period of time using binary options.

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# SIMULATION AND MODELLING OF CYBERSECURITY

**Jiří Konečný**

*Tomas Bata University in Zlín, Faculty of Logistics and Crisis Management,  
Department of Crisis Management, Czech Republic  
konecny@flkr.utb.cz*

**Martina Janková**

*Brno University of Technology, Faculty of Business and Management,  
Department of Informatics, Czech Republic  
martina.jankova@email.cz*

**Jiří Dvořák**

*Tomas Bata University in Zlín, Faculty of Logistics and Crisis Management,  
Department of Crisis Management, Czech Republic  
dvorakji@centrum.cz*

**Vladimír Šulc**

*The Police Academy of the Czech Republic in Prague, Faculty of Security Management,  
Department of Management and Information Science, Czech Republic  
lada.sulc@seznam.cz*

## **Abstract:**

Based on the current research tasks, this paper presents the possibilities of creating a model designed to simulate attacks and defence on specially created models in the Laboratory of Applied Cybersecurity (LAKB) now under construction. The structure of simulation and modelling of cyber-security (CS) is based on the resolutions and recommendations of the National Security Council and the Act on Cybernetic Security. The main aim of this paper is to inform the professional community on the possibilities of logic design and preparation of the creation of models, modelling and select options of CS simulation from a selected range of simulations of cyber-security in order to enhance the security of cyber-space and protect the selected portion of the infrastructure which as a target may be important for the functioning of the state. A partial result of the research is the focus of educational instruction and equipment of the modern laboratory base. Scientific and research contribution of this paper's authors is in the newly designed CS labs express options of CS's knowledge base by solving equilibrium state of attack-defence of CS with the possibilities of adapting the CS methodology in cyberspace of a secure system environment.

## **Key words:**

Cyber-security, cyber-attacks, cyber-defence, cyber-space

**JEL Classification:** C61, K14

## 1 Introduction

Much attention in the world is currently paid to "*Information and communication technologies*" and "*cybernetics - theoretical, technical and applied*". Their corresponding development as listed advances mainly in theory and in practical applications, particularly in cybernetics (the field designated for management and communication in living and non-living organisms) and applications, such as in cyber-security, cyber-terrorism and cyber-crime or cyber-incident, an attack and the like. Simulation (Dvorak, 2015), (Smejkal, 2015) on a model of cyber-security can contribute to the overall adaptability of the hierarchically structured cyber-security and also predict ways of responding to some cyber-threats or even the possible solutions of an incident (cyber-crime). In solving the research tasks for model CS, we now mainly draw on the modern methods used in systems theory, theory of models and modelling, theoretical, technical and applied cybernetics, theory simulations of large systems and capabilities of modern simulators, most recently also on information and cybernetic security, on the knowledge of the solved systems of concealment of sensitive information and data, on the use of modern cryptography, etc. The stated CS solution is connected with the modern concept of the design of future "*self-learning companies and organizations*," existentially contingent by cyber-security in the future.

## 2 Methods

The basic purpose of the stated scientific knowledge of CS simulation and modelling (Scientific Methods Project, 2016), as well as knowledge in general were conceived as an integrated systemic approach to the scientific research solved for the creation of the CS model and leading to the conception of the scientific research for the design and creation of CS simulation and modelling which is gradually implemented in the newly built laboratory of applied cyber-security (LAKB).

The applied scientific methods, as deliberate procedures (paths) were used as follows:

- empirical methods (data collection methods):
  - from the field of observation (purposeful, planned and systematic monitoring)
  - questioning – such as asking respondents questions using a questionnaire
  - measurement as an observation method
  - selected empirical methods
- logical methods:
  - analysis
  - synthesis
  - abstraction

### 2.1 Used modern methods of analysis

In the tasks solved of given research, we primarily prefer the method well-proven in the stated field of CS (Dvorak, 2015), (Smejkal, 2013) (Janková, 2013) (Janková, Dvořák, 2014):

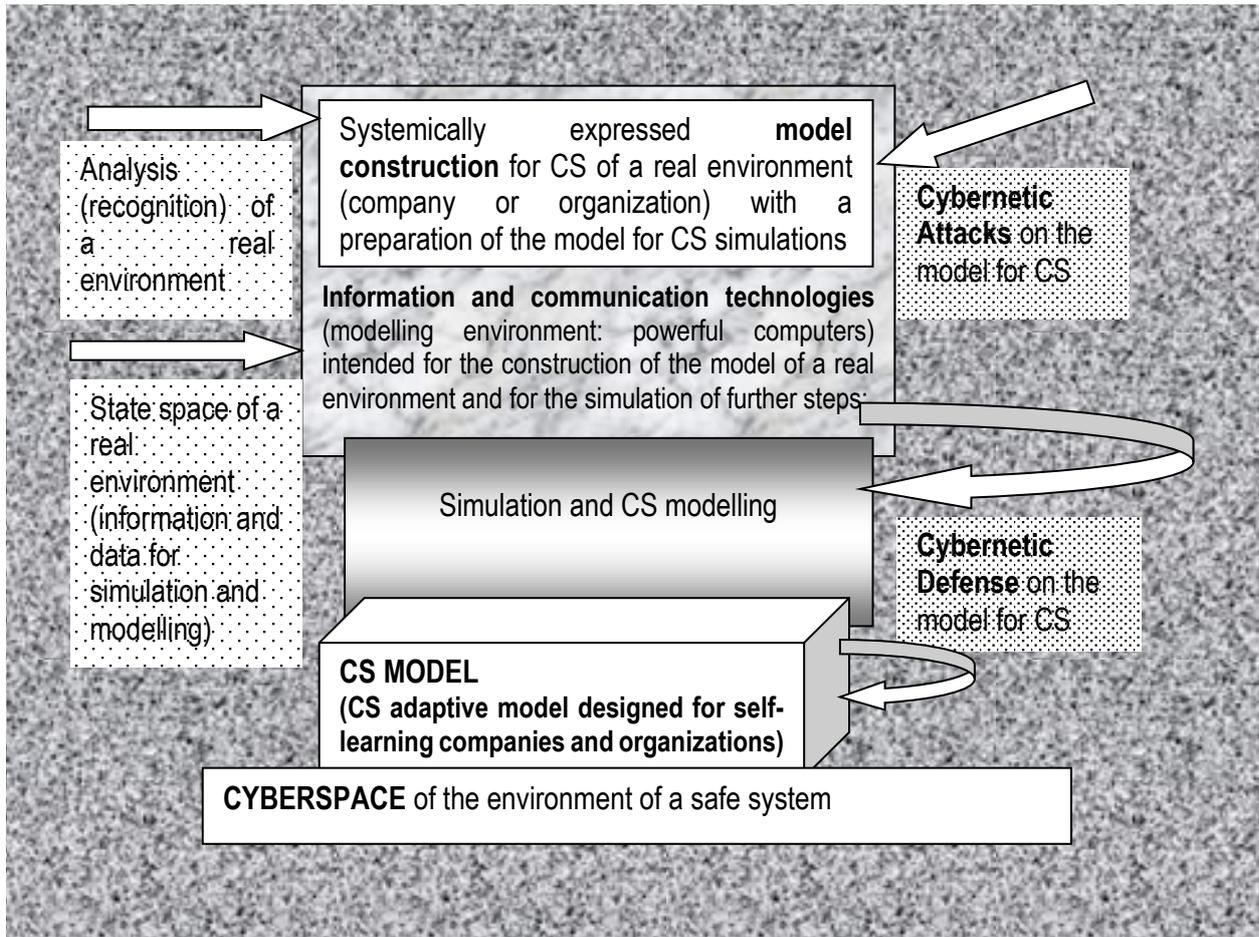
- **systemic approach and system defining** (modelling and simulation of cyber-security) according to the rules of general systems theory - in a chain of cybernetic understanding of the new modelling and creation of a model in accordance with the principles of general systems theory as a concept for thinking, analyzing real world situations, decision-making and acting in terms of complex reality, which gives us methodical basis for the solution of problems, but also allows to solve them in a more comprehensive manner with respect to other aspects that affect it. A systemic view of management in companies and organizations with CS provides greater possibilities, especially in understanding the relations of phenomena and processes. It further enables purposeful abstraction from certain factors and later description of reality by appropriate means. The aim of this used approach is to improve the

- existing system and the stated construction (design) of the new model (system) that will better meet the demands of modern CS placed on it,
- the process of modelling, model creation and simulation on a model with the prepared usage of the artificial intelligence methods for the stated chain of cybernetic understanding of new modelling. This process was developed in accordance with the principles of general systems theory as a concept for thinking, analyzing real world situations, decision-making and acting in terms of complex reality with respect to real-time conditions.

## **2.2 Possibilities of model creation, modelling and simulation of CS**

Construction, i.e. the creation of a model (Dvorak, 2004) (Janková, 2015), was the basis for modelling approach OR/MS. Therefore, the model is a representation of reality from the perspective of the one who creates it. It is an objectification of reality from a subjective point of view. An example of what may be considered as such a model is a mathematical one - here, theory of identification (recognition of scenes and environments) is used which now makes use of methods known from the theory of artificial intelligence (AI). The development of this promising field is now closely connected to and very well used thanks to the development of computers and socio-technical means of the detection of scenes and environments. Artificial intelligence technologies are currently modern and very diverse. In the task solved, they will be represented by applications stemming from biology (neural networks and genetic algorithms), physics, mathematics and logic (such as technologies modelling and identifying chaos and technologies using fuzzy sets). Modern understanding of model scenarios and the general approach to system modelling will be more focused on the systemic definition of the problem with the aim of creating new models, their optimization and integration into modern, especially cybernetic environments and here, into CS. In terms of general systems theory (Dolezal, 2009) (Janková, 2014), I define the characteristics of models as follows: interdisciplinarity and comprehensive view of all the circumstances and mutual relations, dynamics, integrating all activities in a total, meaningful system, uncovering of the set of mutual relations between individual subsystems, systematic compilation and adaptation (adaptability) of parts of systems into a unified (integrating) whole, search for the optimal solution (systemically most suitable with precise criteria of optimality), that is system structure or system behaviour, or optimal structure and behaviour of the system, modelling of reality (the modelling of a real system and of its environment through modelling).

Picture 3 : Simulation and modelling of the system and of its environment for a CS model



Source: Own (According to Janková, 2014).

### 3 Paper results

Modern information environment and the emerging knowledge society will increasingly prefer systemic and theoretical definitions of the environment of research and education with the aim of capturing of the significant impact on the real existence of reality-defined systems. New bundles of knowledge approach to lifelong learning will be circumscribed by the environment of spatiotemporal and bordering cybernetic spaces defined here by the dynamics of logistics and crisis management and also by risks derived from optimal and stable systems of the world with its real time and in the socio-technical environment called cybernetic space (cyberspace), fulfilling the accepted and implemented "Cyber netic Act". New technical and technological roles of the transformation of information have to be defined in the cyberspace of interest, particularly of the information in the area of today's applications of information and communication technologies (ICT). The objective of the course taught is to acquire basic and appropriate means of communication between systems and an understanding of modern principles of systemic and cybernetic approach to model creation and modelling of secure real systems, their simulations with the aim of diagnosis and recovery particularly in the applications of logistics and crisis management against the background of electronics and in future AI projects associated with the development of engineering approaches for interesting and needed systemic integration against the background of active cyber-security.

The modern world of engineering system design already primarily uses systemic approach to model creation and through modelling on powerful computers by modern methods, it gains an idea of the limit states of the designed, implemented and operated environment of possible and anticipated

emergency situations and their management by means of cybernetics. Part of the whole process modelling is also formed by the identification and recognition of risks in the cyberspace of information systems against the background of current cyber-security of system-defined environments. We accentuate the possibility of system-defined environment of real systems, their abstract conception from the perspectives of process engineering, selected possibilities of mathematical modelling of limit states of systems in engineering design and the possible separation of crisis and risk regions in subsystems and their modelling by selected means of applied cybernetics.

### 3.2 Model of laboratory base

The equipped existing "CS Laboratory" (LKB is designed as a specialized PC classroom with basic MS software and data projector and Internet at every PC workplace - the laboratory is designated for undergraduate studies for obtaining the necessary *cybernetic literacy*, not computer literacy):

- to supplement the SW with functional CS models, i.e. appropriate CS programs and control program equipment to acquire basic literacy in cybernetics, security, models and modelling environment of real environment for the CS,
- to further supplement the existing equipment of the LKB: SW (e.g. a 3D mouse etc.) designed for easy and prospective control tools of models.

"*Laboratories of Applied CS*" (LAKB) with a network of PCs and related departments (equipped with special SW for modelling and simulations such as SIMULA):

- supplement by one workstation designated to the creation of a CS model on a PC with the following equipment: new specialized software for the construction of CS models of real environment of a company or an organization *asa model of a cybernetic system* ,
- another 3 workplaces: adequately equipped with the required software and also with the corresponding HW: for cyber-attacks, for cyber-defense, for cyber-security on constructed models.

## 4 Discussion

The paper expressed some brief partial results of the scientific work and the research conducted in the systemic conception and the conclusions:

- the concept of systemic approach to sophisticated expression of simulation and modelling gives new suggestions for the development of necessary means of cybernetics and CS,
- the expression of cyber-security as the stated model also gives a comprehensive view of the possible use of state variables in the processes of data space use for the benefit of simulation processes and also for future new concepts and the use of the means of artificial intelligence and the modern conception of the creation of a basis for the area of cyber-security.

When processing the paper, we mainly capitalize on practical experience of given authors and their rich personal experience abroad and in the Czech Republic in this modern field. Furthermore, from the needs of the tasks being solved at given departments and increasing quality of education in CS.

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# HABIT OR CHOICE? THE DECISION - MAKING PROCESS OF YOUNG GENERATION IN PURCHASING DAIRY PRODUCTS IN THE SLOVAK REPUBLIC

**Andrea Kubelaková**

*Slovak University of Agriculture, Faculty of Economics and Management, Department of Marketing and Trade, Slovakia  
a.kubelakova@gmail.com*

**Michaela Šugrová**

*Slovak University of Agriculture, Faculty of Economics and Management, Department of Marketing and Trade, Slovakia  
michaela.sugrova@gmail.com*

## **Abstract:**

The current young consumers are much more product-aware and more inclined to search for all alternatives helping them make bargain purchases. The food market is saturated with homogeneous products, and consumers, in their decision - making, are often not only influenced by the real properties of selected products, but also by other factors, i.e. the product image, advertising, country of origin, or by word of mouth from their friends. The status of milk in the diet of people in Slovakia has become a highly discussed topic since milk is a natural food component. The consumption of milk in our country is low when compared with other countries of the European Union. It is therefore necessary to analyse the factors influencing the consumer behaviour of young people in buying dairy products, as well as their impact on the consumption of dairy products. The main objective of this scientific paper is to examine the consumer behaviour of young generation on the market with dairy products and the impact of various factors on their purchase decisions. The primary aim of submitted scientific paper was to find out if young people make purchases on a habit or choice basis. The main reason for the consumption of dairy products of respondents are taste (88.1 %) and habit (41.3 %). Based on respondents' answers of questionnaire survey we can state that the taste is the most significant factor for the young generation (4.3 points), and quality (4.2 points). Regarding to the price factor, respondents gave an average of 3.2 points, so the young generation this factor is not decisive when buying dairy products. On the other hand, in Focus Group discussions, we found that most young people are price sensitive. The results of the questionnaire survey and Focus Group discussions show that the young generation makes purchase decisions intuitively and not according to habits of its primary reference groups.

## **Key words:**

Consumer, consumer behaviour, consumption, decision – making process, Focus Group milk, milk products, young generation, Slovak Republic, questionnaire survey

**JEL Classification:** M31

## 1 Introduction

Consumers are the main target of each marketing management system. Their purchase decisions influence the direction of business plans and the success of corporate business activities [1].

Consumer behaviour is the decision process and physical activities of individuals involved in evaluating, obtaining, using or disposing of goods and services [2].

When we think about the consumer behaviour, we see consumers making decisions on their purchases under external factors, while being influenced by their own individual specific characteristics and the ongoing purchase situation [3].

Consumer behaviour can be described, in particular, as noticeable and obvious acts such as buying and consumption. [4]

Regarding purchase and consumption habits of consumers, they stopped blindly trust brands, they are prudent and look at the composition of products, compare the prices, prepare shopping lists and their loyalty is distorted to some extent. Existing consumers, especially the young, are seeking information about products, compare prices and specifications, read the reviews on the product, as well as browsing websites concrete producers [5].

In addition to demographic elements and eating habits, household consumption is formed by several factors, in particular by family household income and food prices [6].

The position of milk in the food of mankind is a very hot topic in discussions about the food in the Slovak Republic. Milk has been consumed for centuries and become a natural food component. Despite the above stated facts, however, the consumption of milk has decreased and currently is even below the daily doses of milk recommended by doctors.

The recommended dose of milk and dairy products annual intake is 220 kg (the level of rational intake is between 206 and 240 kg per capita, per year). Having taken this fact into account, we can consider the current development of the consumption of milk as negative. In the past decade we have observed a concave increase in the consumption of milk, in particular of dairy products with higher added value, mainly of yoghurts and cheeses [7].

Tradition and utilisation are two possible and mutually interconnected motives that may lead, in particular in Slovakia, to the consumption of milk [8].

The beginnings of the milk products production and consumption in Europe date back to the middle ages, where sheep milk was the first kind of milk in Slovakia [9]. Consumption patterns and choices influence our life quality in profound ways, having a considerable effect on both the individual and the society at large [10].

Currently, the most popular kind of milk - cow milk (accounting for 98 % of the Slovak milk consumption) started to be processed and consumed several years later after the start of sheep milk consumption [11]. Such a long tradition has left traces in the Slovak culture and especially in the Slovak national cuisine. The evidence supporting the above stated is the fact that milk and dairy products are one of the essential ingredients in the Slovak national cuisine [12]. The scientific studies and researches conducted to study and examine the motives for milk purchase and consumption revealed that the top motives for milk purchase by the Slovak consumers were taste, healthy life style, habit, product's availability and its utilisation in a household [13].

Determinants of the purchase of eco - labelled milk. Based on the research results, the perceived taste and attitudes of people important to consumers (i.e. family and friends) are statistically the significant motives leading consumers in Stockholm towards the purchase of eco-labelled milk [14].

Concerns about the health of the population due to inadequate consumption of milk and dairy products primarily affect the young generation who needs an optimum intake of calcium for the proper bone, bone density and teeth development, in particular during the childhood and adolescence age [15].

## 2 Methods

The objective of this scientific paper was to examine the consumer behaviour of young generation on the market with dairy products in Slovakia and the impact of various factors on their purchase decisions.

The objective of the scientific paper was to compare available theoretical knowledge, practical experience and primary information obtained through a questionnaire survey. The primary information was also supported by findings obtained through the Focus Group method.

The survey focused on the young generation respondents aged between 18 and 25 years.

The questionnaire survey consisted of two parts. The first part included the questions about the consumption of milk and dairy products and the factors affecting the consumer behaviour of young generation on the dairy market. The second part included the classification questions about respondents.

The questionnaire survey was conducted on-line in three months, from November and December 2016 to January 2017, and it was attended by 252 young generation respondents. Out of this number, 65.1 % were women and 34.9 % men.

The Focus Groups or group discussions are the qualitative research tools. The outcome of such discussions is information, not numeric data.

The target groups of the Focus Group survey were also young generation respondents, aged between 18 and 25 years, and all three groups were made up of 10 participants in each group. The duration of the Focus Group survey was about two hours. The whole course of the Focus Group survey was recorded. The responses were integrated into the groups according to similar or identical parameters, and then evaluated using descriptive statistics.

The questionnaire survey was evaluated graphically and by using selected statistical methods. We used the Pearson's Chi - Squared Test, Chi - Square Test of Independence and Cramer's V Coefficient. By using these statistical methods, we have researched the correlations within the obtained data and verified the accuracy of our scientific assumptions. While examining the correlations within the obtained data, we have developed the following scientific assumptions and used them as the basis for the formulation of null and alternative hypotheses:

**Scientific Assumption 1:** We assume that there is a correlation between the preference for dairy products and the gender of respondents.

**Scientific Assumption 2:** We assume that there is a correlation between the frequency of the consumption of dairy products and the gender of respondents.

**Scientific Assumption 3:** We assume that there is a correlation between the influence of the country of origin on respondents in buying dairy products and the gender of respondents.

**Scientific Assumption 4:** We assume that there is a correlation between the major motives for the consumption of dairy products and the education of respondents.

### 3 Paper results

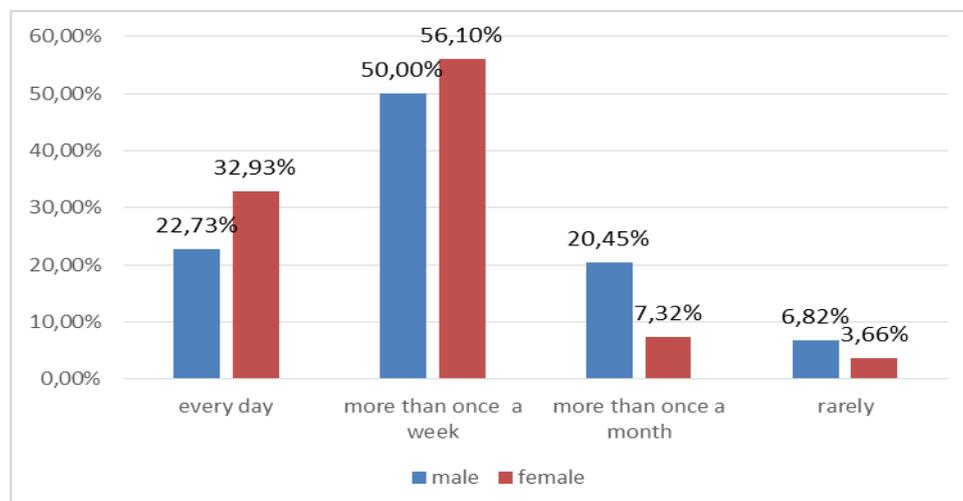
In order to achieve the main objective of this scientific article, we have selected several questions from the questionnaire survey and evaluated them graphically. We have also examined some of the selected questions by means of statistical methods with an intention to verify the accuracy of the scientific assumptions.

With regard to the consumption of dairy products: the young consumer generation mostly prefers yogurts (29.37 %), cheese (26.98 %) and milk (20.63 %), and, at the least, buttermilk, milk kefir, milk cream and yoghurt drinks (out of 1.59 % of respondents for each product). Specifically, men mostly prefer cheese (29.55 %), and women prefer yogurt (32.93 %). Therefore, we have also established a scientific assumption in order to determine whether the preference of dairy products depends on the gender of respondents. Based on the results of the statistical analysis, we can say that there is statistical dependence between the examined data. The value of the test characteristics was 41.5189, and the table value 15.5073. This means that we have confirmed the correctness of scientific assumption. Therefore, our next step was to quantify the detected influence of statistical dependencies. We can say that the proven dependence can be considered as a moderate correlation (0.4059).

The main reason for the consumption of selected dairy products in the majority of respondents are taste characteristics of products (88.1 %), and habit (41.3 %). The young generation of respondents are least interested in the price of selected dairy products (3.2 %).

As part of our survey, we have also investigated the frequency of consumption of dairy products among the young generation consumers (Figure 1). The majority (53.97 %) of respondents consumes dairy products more than once a week (50 % of men and 56.1 % of women). Only 4.76 % of young people consume dairy products rarely (6.82 % of men and 3.66 % of women).

Figure 1: Frequency of milk products consumption by gender



Source: Own processing, 2017.

In terms of the above stated questionnaire questions, we also determined the scientific assumption through which we investigated whether the frequency of consumption of dairy products depends on the gender. Based on the statistical analysis, we found the existence of statistical dependence, so we confirmed the correctness of our scientific assumptions. The value of the test characteristics was 11.9269, and the table value 7.8147. Having taken into account the proven dependence, we subsequently examined its influence and concluded a small correlation among the examined data (0.2175).

Based on the results of the questionnaire survey, we can say that the country of origin affects 65.08 % of the young generation respondents (68.18 % males and 63.41 % females) in buying milk and dairy products. Based on the above stated and by our third scientific assumption, we investigated if there was a correlation, in buying dairy products, between the influence of the country of origin on our respondents and their gender. Through our statistical analysis, we proved the non - existence of statistical dependency among the examined data, so we have not confirmed the accuracy of our scientific assumption. The value of the test characteristics was 0.5726, and the table value 3.8414.

Through our last scientific assumption, we investigated whether the main motives (taste, healthy aspect and social status) for the consumption of dairy products depended on the respondent's education. Our findings show no statistical dependence among the examined data, and therefore the accuracy of our scientific assumption cannot be confirmed. The value of the test characteristics was 8.3593, and the table value 9.4877.

Based of the questionnaire survey respondents had the opportunity to express their views on the factors with the greatest impact on the purchase of selected dairy products. On a scale of 1 - 5, where 5 was the greatest importance, respondents had the opportunity to highlight the importance of individual factors. Based on respondents' answers, we note that the most significant factor for the younger generation's was taste (4.3 points) and quality (4.2 points). The least important factor is products advertising (1.9 points) and references about product (2.7 points). Regarding the price factor, respondents gave an average of 3.2 points, so the young generation this factor is not decisive when buying dairy products. Overall view of the individual factors is presented in Table 1.

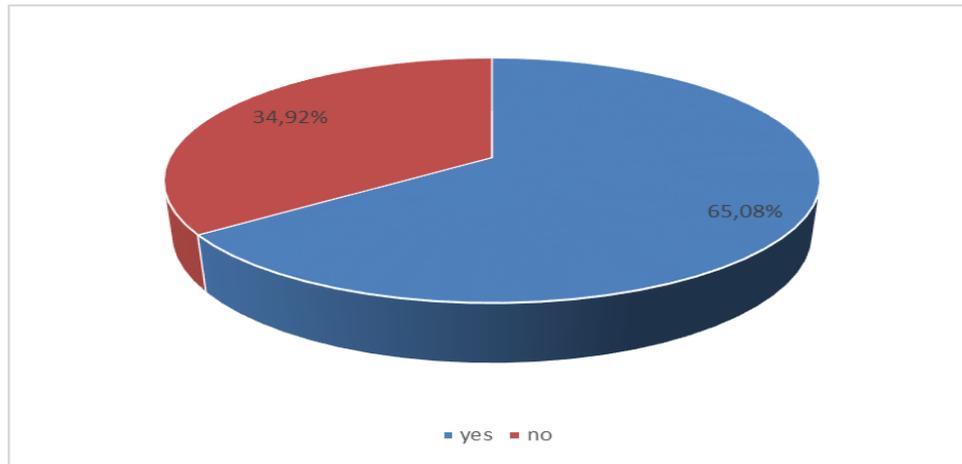
**Table 1: Factors affecting respondents at dairy products purchase**

<b>Factors</b>	<b>Average number of points</b>
Utility value	3.6
Taste	4.3
Quality	4.2
Price	3.2
Brand	2.8
Producer	3.1
Country of origin	3.3
Product advertisement	1.9
References	2.7
Special offer (leaflet)	3.2
Discount	3.1

Source: Own processing, 2017.

According to our questionnaire survey we have examined also impact of the country of origin products on the young consumers in purchasing dairy products (Figure 2). As you can see in Figure 2, 65.08 % of young consumers is influenced by the country of origin. However, this factor was one of the options in the previous examined question (Table 1) and in this case it held only average value. Based on these facts, we can conclude that the impact of the country of origin of products is important in this case that is evaluated individually and the respondents have no choice other factors that could affect the decision- making process.

**Figure 2: Impact of the country of origin**



Source: Own processing, 2017.

By means of the Focus Group Method, we collected the primary information from the participants of young generation aged between 18 and 25 years, divided into three groups of ten people in each group. The first Focus Group discussion was attended by 5 men and 5 women, the second by 10 men, and the third by 10 women. All respondents were single and university students.

The following table shows the selected results from the Focus Group discussion (Table 2).

**Table 2: Selected results from the Focus Group discussions**

	Group 1 - 10 respondents		Group 2 - 10 respondents	Group 3 - 10 respondents
	Men (5)	Women (5)	Men (10)	Women (10)
<b>Consumption of dairy products</b>	Yes - 4 No - 1	Yes - 4 No - 1	Yes - 6 No - 4	Yes - 8 No - 2
<b>Motives for consumption of dairy products:</b>				
Taste qualities	Yes - 5	Yes - 5	Yes - 10	Yes - 10
Habit	Yes - 4 No - 1	Yes - 3 No - 2	Yes - 9 No - 1	Yes - 7 No - 3
Price	Yes - 4 No - 1	Yes - 4 No - 1	Yes - 8 No - 2	Yes - 8 No - 2

Source: Own processing, 2017.

From the discussion with participants, we have concluded that most of the young people prefer cheese, yogurt, butter, Bryndza – sheep cheese and milk. Our Focus Group discussion (Group 1) revealed that two participants do not consume milk at all, because they dislike it and they have an aversion to milk (Table 2). In terms of the Bryndza – sheep cheese consumption, the main aspects for its consumption were health reasons. Young people prefer 3.5 % fat milk, and they consider the low-fat dairy products as a marketing trick of producers. According to other result, we can see that young consumers mostly appreciate the taste and milk fat content in the range 2.8 – 3.2 % [16]. Based on the results of research on the

factors influencing the decisions of customers in buying milk and dairy products [13] carried out in 1998, we can refer to differences between the results of the 1998 research and the results of our Focus Group discussions. The respondents in the 1998 research preferred low - fat dairy products. However, our Focus Group discussions have not proved the same. Therefore, we can say that the preferences of young consumers have changed in recent years, consumers are more educated and put more emphasis on the quality and nutritional value of the product.

All participants replied that they prefer Slovak dairy products to foreign manufacturers, or brands. The most preferable Slovak brands are: Liptov, Sabi, Rajo, Milsy and Zvolenský.

One of the main objectives of the Focus Group discussions was to find which factors have the greatest influence on young people making purchase decisions on the market with dairy products. We found that the average weekly spend on dairy products by young people is 7 - 10 Eur, and young people are cost sensitive due to their low income and student status. In terms of the quality of dairy products, we can say that most young people consider this factor as important in their purchasing decisions. Young people would welcome the sale of milk and dairy products "from the yard", directly from farmers, and a larger selection of Slovak dairy products on the market. The above mentioned findings show that young people are the country of origin-aware consumers who consider the country of origin of the product as an important factor influencing their purchase decisions. In general, we can say that advertising influences the consumer behaviour of each of us, which was also confirmed in the Focus Group discussions.

#### **4 Discussion**

Following the results of our research conducted on a sample of 252 young generation respondents in the questionnaire survey, and 30 participants in the Focus Group discussions in Slovakia, we can conclude that 53.97 % of young people consume dairy products more than once a week. The most preferred dairy products are cheeses, yogurt, butter, milk and Bryndza - sheep cheese. We found that the above mentioned products are consumed for their taste properties by 88.1 % of young people, and 41.3 % of respondents eat them on a habit basis. We have also supported these results by the Focus Group discussions. The most significant factor at purchase for young generation is taste and quality of dairy products. In the questionnaire survey, we found that only 3.2 % of the young generation respondents are interested in the cost of dairy products. In general, we can say that young consumers are cost sensitive and the cost is an important factor influencing their purchase decisions. Therefore, the result of the questionnaire survey in terms of the price factor may be false, as the respondents have prejudices to indicate the cost as the most important decision-making factor. In the Focus Group discussions, we found that most young people are price sensitive, so we did not confirm the results of the questionnaire survey.

Prior to the implementation of our own research, we developed four scientific assumptions and confirmed the correctness of two of them. We found that there was a correlation between the preference for dairy products and the gender of respondents. Our statistical tests also confirmed the existing correlation between the frequency of the consumption of dairy products and the gender of respondents.

Based on the Focus Group discussions, in addition to the above stated results, we also found that respondents, when buying dairy products, acted as patriots and in their purchase decisions preferred the Slovak brands.

In conclusion, we can say that the answers of the young generation respondents showed in our research differences. We have found small differences between the questionnaire survey and the Focus Group discussions responses, which allowed us to compare the obtained results with selected methods for collecting the primary information.

A number of literature sources and professional publications claim that young consumers are often influenced by reference groups (family, etc.), and thus their decisions in buying dairy products depend on the habit they have acquired. However, based on our primary results, we can conclude that habit is not the most important factor in making purchase decisions by young generation.

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# CORPORATE SOCIAL RESPONSIBILITY AS A TOOL OF LIFELONG LEARNING IN THE REGION

**Jelena Kubicová**

*Moravian University College Olomouc, Czech Republic  
jelena.kubicova@mvso.cz*

**Dana Bernardová**

*Moravian University College Olomouc, Czech Republic  
dana.bernardova@mvso.cz*

**Kateřina Ivanová**

*Palacký University Olomouc, Moravian University College Olomouc, Czech Republic  
katerina.ivanova@mvso.cz*

## **Abstract:**

Corporate Social Responsibility is internationally known by the abbreviation CSR. From the perspective of lifelong learning, the CSR can be an objective (the development of the moral profile of an individual), but also a tool (the development of the moral level of a business and hence the society). The National Action Plan for CSR in the Czech Republic but also the European Strategy emphasize the educational dimension of the CSR as one of its primary tasks. Moravian University College Olomouc innovated education in the field of CSR according to the Lisbon Declaration and linked the formal education at the university college with lifelong learning at regional level within the project by the Visegrad Four. The authors of the project aimed to identify: a) the level of awareness of CSR in companies in the Olomouc region; b) whether it is possible to raise awareness of CSR by means of this innovative teaching; c) whether there is a potential to improve business and management environment of the region in such a teaching method. A questionnaire survey was conducted which shows that the chosen methodological approach fulfils the educational mission of the CSR in the Olomouc region, since more than 61 % of corporate partners who did not know CSR prior to the innovative teaching, nor the idea of the responsible business, are interested in continuing in the CSR activities. The project results have proven the hypothesis that CSR can be an effective andragogical tool as well as an objective of lifelong learning.

## **Key words:**

CSR, lifelong learning, innovative teaching, andragogy, Olomouc region

**JEL Classification:** M14

## **1 Conceptualization of the initial terms**

Corporate Social Responsibility is internationally known by the abbreviation CSR. The original name of Corporate Social Responsibility (hereinafter CSR) can be translated in detail by individual words, however its meaning is given by the expression 'corporate' which refers to social responsibility in relation to companies and businesses (Pokorná, 2012). Although CSR is most commonly associated with the financial profit, market, competitive environment, it can be applied to all types of organizations, i.e. non-profit organizations as well as state institutions and public administration (Veber, 2005). The CSR concept was getting to Europe in the 80s, as an already elaborate and imported concept (Pokorná, 2012). The initial idea was that an organization is not an isolated unit but a part of a broader system of relations in

society and its prosperity consequently depends on the health of the surrounding society as well as on the way of its perception by the surrounding society (Dytrt, 2006). Social ethics sets the basic concepts of CSR. There are three basic principles which direct and coordinate social behaviour. These principles cannot be seen in isolation as they relate to each other internally. These are the principles of solidarity, subsidiarity and general welfare (Olecká, Zielina, Ivanová, 2009). Horizontally, the CSR topic is interpreted in the form of three main areas of responsibility, i.e. pillars. CSR can be conceived as a business that has its economic area of activities and manifestations, such as transparency of business, anti-corruption programmes, preferences for suppliers from the community and the region, etc. The second pillar of CSR is conceived as a social area of activities and manifestations, such as respect for equality between the genders, reducing criminality, involvement of excluded social groups specific to a particular region, etc. The final pillar is the area of environmental responsibility, such as waste sorting, air quality in certain endangered areas, protection of natural resources in the region (Dalíková, 2015, Werther, Chandler, 2011, Steinerová, Václavíková, Mervart, 2008 and others).

From the perspective of lifelong learning, CSR can be an objective (the development of the moral profile of an individual), but also a tool (the development of the moral level of a business and hence the society). The National Action Plan for CSR in the Czech Republic, which was approved by the Government on 2<sup>nd</sup> April 2014, resolution no. 199, emphasizes the educational dimension of CSR as one of its primary tasks. The intention of the various activities that are included in this strategic document and which respect the principle of voluntariness is especially to motivate commercial businesses, non-profit organizations and government bodies to implement CSR which is defined as 'the responsibility of organizations for impacts of their activities on society' (MPO, 2015).

According to the document, the integration of CSR should be automatically an integral part of the educational system of the Czech Republic so that it is conveyed gradually to pupils and students at primary and secondary schools, colleges and universities, regardless of their specialization (humanities, technical...). The integration of CSR in other educational institutions, including business education should be automatic as well. Strategic priorities for this field are:

1. increase of awareness and competencies in the field of CSR, especially among the younger generation, and improvement of Czech entrepreneurial and managerial environment;
2. increase of public awareness on the issue of CSR as a whole.

These objectives can be achieved primarily through quality education at all levels and a more systemic approach in the field of CSR. The European Strategy (COM, 2011) aims to educate and motivate companies in the field of CSR and disseminate among them the idea of the responsible business.

Following the meeting in Lisbon (the effort to transform Europe into the most dynamic and competitive economy in the world based on knowledge), the European Commission issued the Memorandum on Lifelong Learning in 2000 (SEC, 2000). The aim of the Memorandum was to provoke a debate about an effective strategy for the implementation of lifelong learning. The Memorandum postulates six issues for public discussion on which it is possible to build the principles and the system of lifelong learning in the field of CSR. They are:

1. New basic skills for all;
2. More investment in human resources;
3. Innovate teaching and learning;
4. Reward learning;
5. Rethink counselling;
6. Enable learning closer to home.

Especially the last point supports the regional learning system which is the suitable variant for small and medium businesses. Experts at the Moravian University College Olomouc (hereinafter MUCO) accepted these challenges and linked the teaching of CSR at the university college with lifelong learning in real life and innovated this teaching based on the project Corporate Social Responsibility in the Context of the Visegrad Countries. In the project, their goal was to find out the awareness of CSR in companies

in the Olomouc region, whether it is possible to raise awareness of CSR by means of this innovative teaching and also whether there is the potential to improve business and management environment of the region in such a teaching method.

## 2 Methodology

The project survey is focused on the knowledge of the CSR concept, barriers in CSR activities, benefits of implementing CSR activities and it is based on the research question: Is an innovative teaching of CSR an effective tool for the development of CSR in the Olomouc region? The question is further specified in the following sub-questions: 1) What is the degree of knowledge of CSR in companies in the Olomouc region? 2) Are the companies of the Olomouc region interested to continue in CSR activities after their participation in the innovative teaching? 3) What do the companies which want to continue in CSR activities expect from these activities? 4) Under what conditions would the companies which are hesitant continue? 5) What are the reasons of companies which do not want to continue in CSR activities?

Based on the operationalization of the CSR concept described in the paper by Pokorná (2012), the standard ISO 26000 and the MUCO strategy focused on the development of small and medium enterprises (hereinafter SMEs) in the Olomouc Region, MUCO launched teaching of CSR with 2<sup>nd</sup> year students of the field Economics and Management in 2012. The aim of the innovative teaching programme was to educate students on the topic of CSR by means of activation methods and thus simultaneously affect the knowledge and attitude aspects of the student personality (and later the one of managers and employees in the SMEs). Students started to prepare written project intentions which they began to implement in cooperation with business partners (approximately 156 implemented projects, 835 students and 150 companies). Projects implemented with SMEs, educated students and data obtained from students in the form of an electronic questionnaire were the outcomes of the teaching. In the questionnaires, students expressed the degree of knowledge of CSR among corporate partners, the impressions of teaching executed by means of the active methods. The outcome of one of the student projects was a shared electronic environment for storing information about all implemented projects which has been used in an updated form so far. Based on a two-year survey in SMEs which focused also on the degree of knowledge of CSR, an investigation was conducted in the form of a survey among SMEs of the Olomouc Region<sup>1</sup> in 2014 which showed that although the knowledge of the CSR concept was reported by only 23.7 % of respondents, the vast majority (92.1 %) of them naturally fulfils it through its activities. However, the activity of SMEs while communicating about CSR is minimal - 351 companies out of 2542 surveyed in the two rounds responded. The unavailability of information on CSR in SMEs and unfamiliarity with the CSR topic in SMEs became the basis for modification of the teaching concept. Teaching has been extended by a survey in the form of electronic questionnaires for partner organizations implementing CSR projects with students. Since 2015, the CSR teaching has been conducted within the framework of the International Visegrad Fund<sup>2</sup>. The basis of the teaching is the updated form of the shared environment 'CSR Exchange'<sup>3</sup> modified in a way that other external users can operate with it (assessors, teachers, possibly also business partners) and that the selected stored information is quantifiable.

Two electronic questionnaires are a part of the teaching, one of which is intended for students as a target group and the second one for corporate partners. The questionnaire intended for students is more complex, it contains information about the classification of the project according to the standard ISO 26000, the questionnaire intended for corporate partners includes five questions: information about the name of the project, the benefits of cooperation on the CSR project with students and satisfaction with the students in terms of communication, meeting deadlines, agreements, their activity; partners have also the opportunity to identify other areas and evaluate them. The questionnaire also investigates partners'

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<sup>1</sup> The results are available at: <http://www.mvso.cz/situace-v-olomouckem-kraji-c346.html>.

<sup>2</sup> The project: Corporate Social Responsibility in the Context of the Visegrad Countries, no: 61300004, <http://www.mvso.cz/spolecenska-odpovednost-firem-v-kontextu-visegradskych-zemi-p19.html>).

<sup>3</sup> The web CSR Exchange is available at: [www.csr-exchange.eu](http://www.csr-exchange.eu).

knowledge of the CSR concept before the implementation and their interest to continue in further CSR activities.

The data collection interpreted in this paper was conducted in 2015 and 2016, after the completion of student projects at the end of the summer semester. The web links for the completion of both electronic questionnaires were handed collectively to all students of the 2<sup>nd</sup> year (part-time and full-time study) by e-mail. Students completed the questionnaire intended for students and handed the second questionnaire to their corporate partners for completion. The data was stored in the Survey Monkey<sup>4</sup> and evaluated during the summer season. The data collection from corporate partners was conducted in the period May - June 2015 and May - August 2016, a questionnaire was handed to students who ensured the completion of the questionnaire by a minimum of one business partner of the project. In total, 62 questionnaires were obtained.

The total number of corporate partners addressed with the request to complete the questionnaire could not be quantified since the essential requirement on students was to get at least one completed questionnaire from each of the implemented student project. 39 student projects were implemented in the Olomouc region. However, an accurate record of the number of corporate partners involved in each project was not made. The willingness of corporate partners to complete the questionnaire was positively affected by the direct addressing of the corporate partners by students. 7 questionnaires were excluded because of the involvement of large companies, not SMEs, 1 questionnaire was completed by a company outside the Olomouc Region, 54 questionnaires were processed. The results obtained in both years were counted and evaluated. The descriptive characteristics of data processing using MS Excel was the applied method. Data was statistically analysed and evaluated in the form of the absolute and relative data frequency. Data was mutually compared and processed into tables.

The questionnaire contained only one compulsory question concerning the name of the project, other questions were answered only by some partners. The questionnaire contained also open-ended questions. All responses to these questions were analysed and classified to ensure clarity into the created categories (Tables 3-5).

### 3 Results

The following section presents the selected results of questionnaires (n=54) intended for business partners who participated in the implementation of the student CSR projects in the region.

**Table 2: Did you know the CSR concept prior to the implementation of the project?**

Response options	Number of responses	Percentage
We knew the CSR concept.	21	38,89 %
We did not know the concept nor the idea prior to the implementation, we acquainted with CSR during the project.	18	33,33 %
We were aware of the idea of the responsible approach, we did not know the very concept of CSR.	15	27,78 %
Total	54	100,00 %

<sup>4</sup> The environment Survey Monkey ([www.surveymonkey.com](http://www.surveymonkey.com)) is used under the license purchased from 12. 12. 2013, the license is purchased annually for 12 months. This environment allows to create an own electronic questionnaire with different ways of answer choice (it offers predefined responses, own answer of the respondent, a numeric answer, scales etc.) The environment ensures the distribution of questionnaires for completion via the web link, e-mail, spreading through social media (e.g. Facebook), inserting the questionnaire to own website or manual completion of the questionnaire. The environment allows also the evaluation of the obtained overall data or individual respondents' answers. Data can be also evaluated by using a filter (e.g. only the evaluation of chosen questions). Results can be obtained in the form of tables and graphs in Excel document (xsl), PDF, SPSS, or Google Drive.

Corporate partners should have evaluated their own knowledge of the CSR concept prior to the project implementation. There are no significant differences in the percentage of individual responses. However, the results indicate that in most cases partners knew the CSR concept or they were at least aware of the idea of the responsible approach to business. Approximately one third of partners reported that prior to the project implementation they were not familiar with the concept neither the idea of the responsible business.

The results presented in Table 1 are the basis for the distribution of the interests of corporate partners to continue in CSR activities presented in Table 2.

**Table 3: Are you interested to continue in CSR activities?**

<b>Response options</b>	<b>Overall results (n=50)</b>	<b>Knowledge of the CSR concept (n=20)</b>	<b>Unfamiliar with the CSR concept or the idea (n=18)</b>	<b>Awareness of the idea of the responsible business (n=12)</b>
Yes – expected benefits:	62, 00 %	65,00 %	61,11 %	58,33 %
Perhaps – I would continue in case that:	28, 00 %	20,00 %	33,33 %	33,33 %
No – why?	10, 00 %	15,00 %	5,56 %	8,33 %
Total:	100, 00 %	100 %	100,00 %	100,00 %

The table above presents the interest of corporate partners to continue in CSR activities based on their experience from the already implemented project. In total, 4 corporate partners did not respond to this question. The overall results show that 62 % of business partners would like to continue in CSR activities. 28 % of corporate partners would consider participation in other CSR activities if the conditions they placed were fulfilled. The least of the interviewed partners (10 %) stated that they are not interested to participate in other CSR activities.

With respect to the knowledge of the CSR concept, the results show that the corporate partners who knew the CSR concept prior to the project implementation are in the most cases (65 %) interested to continue in other CSR activities. 20 % of respondents would consider the continuation in other activities if certain conditions were fulfilled. Only 15 % of corporate partners are not interested to continue in CSR activities, although they knew the concept CSR at the beginning.

In case that the corporate partners did not know the concept or the idea of the responsible approach to business, corporate partners who are interested to continue in CSR activities were the mostly represented (61.11 %). Corporate partners who knew only the idea of the responsible approach to business are also interested to continue in CSR activities (58.33 %).

The specific benefits expected from the implementation of other activities, conditions for participation in other activities and also reasons why the partners are not interested to participate in other CSR activities are presented further in Tables 3 – 5. Table 3 presents only the responses ‘yes’ and the expected benefits, Table 4 shows only answers ‘no’ and the reasons why partners are not interested to continue in other CSR activities. The last Table 5 presents answers ‘perhaps’ when partners hesitated and stated conditions for further continuation in CSR activities. The total number of responses is 54 out of 50 analysed questionnaires since some corporate partners stated more reasons related to their interest to continue in CSR activities in their answer.

**Table 4: Expected benefits when continuing in CSR activities**

<b>Response category</b>	<b>Number of responses</b>	<b>Percentage</b>
Building the relationship with the surroundings	18	48,65 %
Part of the business	5	13,51 %
Interesting supplementary activity	4	10,81 %
Benefits for employees	3	8,11 %
Long-term/permanent activity of the company	3	8,11 %
Cooperation with students	3	8,11 %
Benefits for the region	1	2,70 %
Total	37	100,00 %

In the questionnaire, corporate partners had the possibility to specify benefits of the implementation of other CSR activities, 4 corporate partners did not specify them. From the obtained responses, it is obvious that according to the corporate partners, the most common benefit of CSR activities is, in particular, building the relationship with the surroundings, e.g. have a possibility to be visible, gain a good reputation, establish cooperation. Such responses comprise nearly half of all responses. The second most common benefit was categorized as 'the part of the business' (13.51 %), there were listed specific benefits such as e.g. profit, better results. Corporate partners further expect the implementation of interesting supplementary activities (10.81 %). CSR activities should be particularly beneficial for employees (8.11 %), e.g. the development of teamwork. The partners also expect that the project will be held regularly and it will become the enduring tradition in the company (8.11%). Partners consider also the cooperation with students (8.11 %) important, e.g. by means of acquiring work experience in an entertaining way. Finally, partners expect the CSR activities to be beneficial for the region.

**Table 5: The reasons why partners are not interested to continue in the CSR activities**

<b>Response category</b>	<b>Number of responses</b>	<b>Percentage</b>
Their own projects	3	60,00 %
One-time event	1	20,00 %
Do not look for the end customers	1	20,00 %
Total	5	100,00 %

If corporate partners were not interested to continue in CSR activities, they reported the implementation of their own projects (60 %) as the most common reason. Other reasons were that the project was considered a one-time event or partners did not need to look for further end customers.

**Table 6: Conditions for further continuation in the CSR activities**

Response category	Number of responses	Percentage
Implementation of a similar activity	3	25,00 %
Lower organizational demands	2	16,67 %
Good idea	2	16,67 %
Broader promotion	1	8,33 %
Free selection of team members	1	8,33 %
Positive marketing benefits	1	8,33 %
Family member asks for it	1	8,33 %
Warm cooperation	1	8,33 %
Total	12	100,00 %

The most companies (25 %) would continue in further activities if it was a similar activity, an activity with lower organizational demands or in case of a good idea for a project.

#### 4 Discussion and conclusion

Overall results suggest that participation in the project could positively influence the attitude of corporate partners to CSR activities. The incorporation of CSR activities is especially significant in cases when the corporate partners were not familiar with the CSR concept or the idea of the responsible approach to business or when they knew only the idea of the responsible approach to business. Interesting results were obtained from partners who would consider continuing in the CSR under certain conditions. Among the most commonly reported conditions, there was a continuation in case of the realization of a similar activity aimed particularly at children, reduction of organizational demands of the project was also required and it depends on the good idea of the project which should be implemented. Among other conditions the broader publicity of the project, free selection of team members, positive marketing benefits of the implemented project were mentioned. Partners would be willing to continue in case they were asked for it by a family member or if warm cooperation was established. These findings can facilitate the adaptation of dispositions of the projects to the needs of corporate partners in the region in the following years.

According to Dalíková (2015), three-quarters of SMEs from her research group are actively engaged in the CSR, either consciously or secondarily. Based on the analysis of relation levels of CSR to their financial situation, she investigated whether CSR in current business environment is for these businesses beneficial. She proved that socially responsible businesses are financially more efficient and healthier than other companies investigated. The presented research also clearly characterized the relationship between the subjective and objective perception of the company as socially responsible. Businesses applied CSR mainly in order to strengthen the staff morale and the related increase of the overall business efficiency, enhancing the image and relationship not only with business partners.

Pajerská (2016) investigated in her research what motivates small and medium enterprises in their activity in philanthropy or possibly what would motivate them to deepen their charity activities. According to the results of the questionnaire survey, the majority of companies are active in philanthropy because of their desire to help others and support a good cause. 25 out of 28 companies stated that the motivation to philanthropy is their desire to help. The second most frequent motive was the effort to improve the perception of the company in its surroundings, which was stated by 10 companies. 7 companies stated as motivation the tax depreciation of a gift from the income tax and 2 companies are trying to keep up with the competitors through charity.

Ratajczak (2015) investigated the knowledge of CSR in SMEs in Agribusiness in Poland. The purpose of this paper was to present the issues related to the knowledge and defining the CSR concept. The research on business opinions on the CSR was carried out in the second half of 2013 and included

174 micro (0-9 employees), small (10-49 employees) and medium (50-249 employees) companies from the agribusiness sector engaged in business activities in the rural areas of the Warmia and Mazury. The results showed that more than half of the surveyed entrepreneurs do not know CSR at all. Entrepreneurs with a higher level of education had the most information about CSR – and were more engaged in CSR activities. Due to the fact that entrepreneurs lack the knowledge of CSR, there is a need to supplement these shortcomings by providing knowledge and information, in particular, on examples of good practice in the field of agribusiness.

The knowledge of the CSR concept and its main principles is usually directly affected by the size of the company. Although SMEs in the Czech Republic implement a number of activities that can be considered as CSR activities, they do not always have the necessary knowledge of the CSR issue (Kašparová, Kunz, 2013). The research of the Business Leaders Forum 'Corporate Social Responsibility New Factor of Corporate Competitiveness', carried out in 2008, showed that the knowledge of the CSR concept is higher in large enterprises than in SMEs. The results showed that small businesses met with the concept in 37 %, medium in 61 % and large even in 97 % (BLF, 2008 in Kašparová, Kunz, 2013).

The success of CSR strategies depends on the quality of employees' performance in this area, which is largely related to the high quality of education in the CSR. Due to the fact that there is a lack of know-how and experience to support the systematic integration of CSR practices in SMEs management process, new specific educational materials and tools that are adapted to meet the needs and expectations of SMEs are needed (Jonkutė, Staniškis, Dukauskaitė, 2011).

The results of the research by Tseng et al. (2010) reveal that large enterprises place more emphasis on the importance of CSR education than SMEs, based on the number of employees, the amount of capital and business volume. Interestingly, it was found out that there is a positive significant influence on concern for CSR issues, teaching approaches and courses, if a company sets up a CSR department, has annual CSR reporting, implements CSR and evaluates its performance. Despite the crucial role of SMEs in national economies, the existing literature on CSR is traditionally focused on large companies. This study provides an empirical, valuable step towards an investigation into CSR education for SMEs on three dimensions: CSR issues, CSR teaching approaches and CSR courses.

The Corporate Social Responsibility (irrespective of size and industry) remains for the impacts of activities of companies in the plane of voluntariness, its development is dependent on spreading the idea of the responsible business. The tool for the realization of this idea is andragogy, the science that deals with lifelong learning. CSR partially overlaps with the andragogic scientific content and extent which proves its validity in lifelong learning of adults (Pokorná, 2012). Within the meaning of the mentioned documents on CSR strategies and the Lisbon Declaration, the CSR in the concept of andragogy becomes the objective of lifelong learning but also its educational tool.

Andragogic understanding and grasping the CSR concept has the potential not only to increase the awareness of CSR but also the potential to improve the quality of the business and management environment. The results implemented by the described innovative teaching are a proof that the interconnection of theory and practice in a particular region raises awareness of CSR and motivates for the implementation of activities. In the longer term, it logically leads to changes in the quality of business in the region. Therefore, there is a challenge for the scientific field of the andragogy in what arises from the document (MPO, 2015): 'If we want to make all the attributes included in CSR or CSV (Creating Shared Values), affecting the economic success of the CR (e.g. fair and ethical conduct of managers and entrepreneurs, corruption perception index - an indicator evaluated annually by the WEF, sustainable development, environmental behaviour, respecting work discipline related to the prevention of waste, etc.) changed considerably, it is necessary, among other things, to have far more effective forms of education in this field than there are now.' Based on the above, for the near future, a close cooperation of expert sections of the Quality Council of the Czech Republic is clearly proposed. These could include the creation of a comprehensive national strategy for the education in the field of CSR, including the preparation of quality professionals/teachers for this field, as one of their pivotal priority activities for the near future.

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# COOPERATION AS A WAY TO ENHANCE THE COMPETITIVENESS OF RURAL AREAS OF UKRAINE

**Inna Kulish**

*State institution "Institute of Regional Research n.a. M. I. Dolishniy of the National Academy of Sciences of Ukraine", Ukraine  
reksi@email.ua*

## **Abstract:**

The aim of the research in this paper – is selection of reasons for the low cooperative activity of residents Ukrainian village in terms of creating competitive advantages of rural areas. It is shown that in recent years the number of rural cooperatives has been steadily declining. Based on research of current legislation of Ukraine in the field of cooperation and agricultural cooperation was shown that it imperfections and legal vacuum are the main factors that hamper the development of cooperatives in rural areas. Analysis of economic activities of cooperatives, the example of agricultural service cooperatives, showed that even in cases where individual indicators of economic activity have positive dynamics in general activities of these cooperatives can be considered unprofitable, as increasing amounts of taxes and increase the number of employees is due to the decrease in the core business. Determined that it is necessary to study the positive experience in the area of cooperation, which is owned by leading countries for its use in rural areas of Ukraine.

## **Key words:**

Rural areas, agricultural cooperatives, agricultural service cooperative, competitive, Ukraine

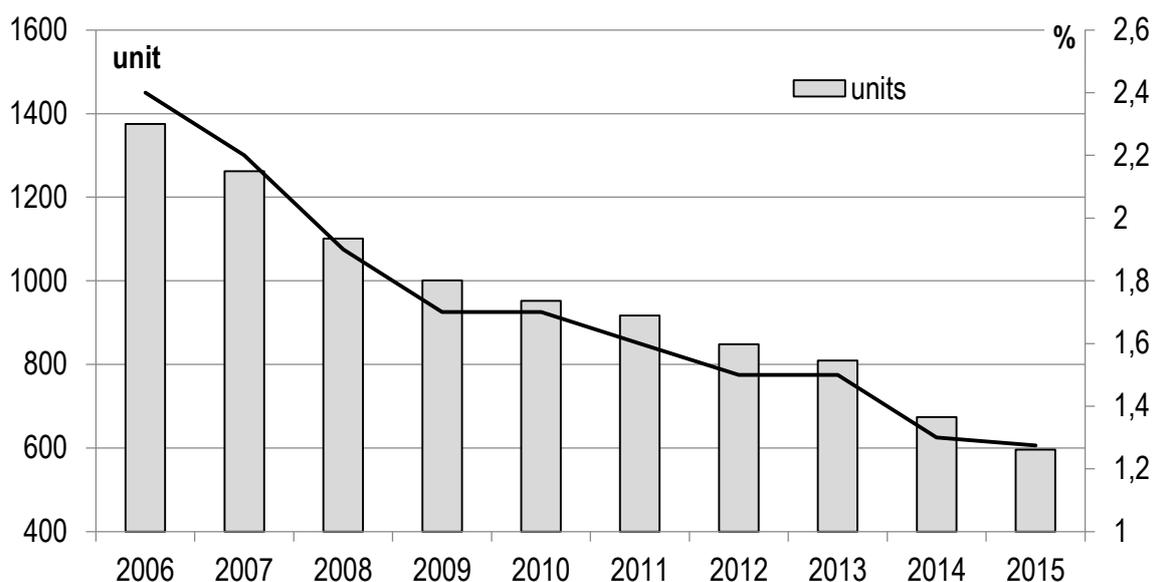
**JEL Classification:** Q130, Q180

## **1 Introduction**

Numerous facts of the positive influence of cooperation on the improvement of rural areas competitiveness are observed throughout the world, yet nowadays in Ukraine this movement is not developing, but declining. This is evident from the dynamics of the number of agricultural cooperatives, shown on the chart (figure 1), which illustrates the decrease in number of agricultural productive and service cooperatives during the years 2006-2015 [16]. It should be noted that the statistical number of agricultural cooperatives does not mean their active functioning. Thus, although among all agricultural enterprises 1017 cooperatives were recorded in 2011, to reach 596 cooperatives in 2015 [32], [33], [34], there were considerably lesser cooperatives which were actively functioning. It is therefore necessary to study the reasons of the existing problems and find the ways to tackle them.

From the graph in the figure can be seen a gradual reduction of production cooperatives and cooperatives agricultural services. Formed a paradoxical situation in which increased activity aimed at improving the regulatory and legislative support cooperatives in rural areas leading to fewer rural cooperatives. That is very negative impact on the socio-economic condition and competitiveness of rural areas. It is therefore necessary to investigate the causes of low efficiency of agricultural cooperation in Ukraine and try to find solutions to the problems existing in this area.

Figure 1: Cooperatives as economic agents in agriculture of Ukraine



Source: Sil's'ke gospodarstvo Ukrainy za 2008 rik (2009); Sil's'ke gospodarstvo Ukrainy za 2015 rik (2016)

## 2 Methods

Co-operation is a very important problem of development of agriculture, that is why constantly researchers pay attention the different aspects of her functioning. Scientists examine the problem of agricultural co-operation in Ukraine from many points of view, that conditionally can be divided into common and specialized.

Among the common problems are distinguished:

- historical – [6], [15];
- informative support – [9], [11], [14];
- legal – [2];
- management – [1].

Specialized or sectoral problems relating to these cooperatives:

- milk – [5], [17];
- grain-growing – [13];
- sheep-breeding – [18];
- poultry farming – [31];
- veterinary – [20], etc.

It should be noted, at the same time, in most scientific papers on agricultural cooperation is no research on the causes of unsatisfactory activity in this area. Unfortunately, the volume of the article does not allow for a more in-depth analysis of publications on the topic of agricultural cooperation in Ukraine.

For research was used a set of modern scientific methods, including: systems analysis – to study the conceptual approaches to the functioning of agricultural cooperatives in Ukraine; historical and logical method – for the analysis of monographic and documentary sources in a historical retrospective view; statistical and economic – for the analysis of the current state and tendencies; comparative analysis – for identify of problems and search of ways to solve them; content-analysis – for the explore of normative-legal base in the field of agricultural cooperation; analogies – for the exposure of prospects of development.

Empirical research base were statistical collections State Statistics Committee of Ukraine, existing laws of Ukraine, as well as the actual material that the author personally collected after processing different sources.

### **3 Research the causes of cooperation in market conditions**

Cooperation as a market phenomenon that arose from the coincidence of economic interests of individuals who are under the influence of competition begin to organize themselves, including through the creation of cooperatives dedicated work of many scientists and economists, representatives of different scientific schools.

Supporters institutionalism believe that the cooperatives in market economy develops because that provides the participants of this opportunity to reduce transaction costs, especially in times of scarce economic resources. Otherwise, the individual subjects will not associate in cooperatives, and will focus on individual business [8].

This approach allows to explain the development of cooperatives in rural areas desire to agricultural producers and other businesses improve their own competitiveness by reducing transaction costs.

Central to the doctrine F. A. von Hayek has the idea of association "scattered knowledge" of individual market participants under the influence of competition. In particular, it explains their motivation for creating various kinds of cooperatives. In particular, F. Hayek emphasized that the moral norms and traditions that provide individuals opportunities for the development of bilateral trade and cooperation, helped build strong networks of commercial relationships in the community, giving them a competitive advantage to participants in the economic struggle [10].

Representatives of neoclassicism explain phenomenon the market cooperation as attempts of individual economic agents combine their specific talents and skills to obtain goods and services of higher quality because alone none of the market players cannot ensure such quality. That cooperation is a means of improving the competitiveness of their members on the basis of achieving the highest level of efficiency in the implementation of the division of labor between them [4].

Considering the issues of cooperation between people, and more specifically - cooperation that allows economic systems to benefit from trade, should carefully examine the development of institutions that create an enabling environment to jointly address complex sharing problems, providing economic growth. Not every co-operation between people is productive in terms of society [19].

Thus, the basis for spread of cooperatives in the market economy on the one hand is the individual interest of economic agents, particularly agricultural producers, especially farmers and private households, on the other - the current system of formal and informal institutions that make it possible to realize this interest in the market competition [3].

### **4 The legal framework of functioning cooperatives in rural areas**

Rural cooperation is an important and versatile form of economic activity in Ukraine and a number of laws were adopted to regulate it, including the Law "On Cooperation" [22], and the special Law "On Agricultural Cooperation" [24]. Both of the above mentioned laws, as far as subordinate regulations based on them, have gone through many revisions in order to eliminate the possibility of ambiguous interpretation. However, unfortunately, the regulatory framework concerning cooperation in rural areas still remains flawed and requires further correcting, as evidenced by the low activity of the cooperative movement.

The legislation provides that the cooperative is a legal form of a public association. Public Association – a voluntary association of private law for the implementation and protection of rights and freedoms, social satisfaction, in the interests of economic, social, cultural, environmental and other (Article 1 of the Law of Ukraine "On the social union" in the editorial 03.08.2014 [21]).

Cooperatives, as a voluntary unification of citizens to jointly resolve their questions of economic, social and living conditions, and others, can be created in different sectors (manufacturing, food, housing, etc.). The activities of different types of cooperatives is regulated by law (Article 94 Economic Code of Ukraine in the editorial of 07/24/2014 [7]).

Cooperative – a unit formed by people who voluntarily joined together on the basis of membership to pursue a common economic and other activities in order to meet their economic, social and other needs on the principles of self-government (Article 2 of the Law of Ukraine "On cooperation," the editors of 04.08.2013). The aim of the cooperation is to meet the economic, social and other needs of members of cooperative organizations on the basis of reconciliation of the interests of personal and collective, divided between them the risks, costs and revenues, the development of self-governance and self-control. The main tasks of cooperation are:

- Increase the standard of living of cooperative members, defending their property interests and social rights;
- Create a system of economic and social self-population and subjects of managing;
- To join in the production of goods and services, additional labor, employment and social activity of the population;
- The creation and development of the infrastructure needed to conduct economic and other co-operatives in order to increase the wealth of its members and meet the needs in goods and services;
- Promoting sustainable development and creating the foundations of a democratic society (Article 3 of the Law of Ukraine "On cooperation") [22].

The Law of Ukraine "On public associations" does not apply to co-operative organizations, social organizations, which have legal personality or without such status. NGO status of a legal person is a non-profit association whose main purpose is not profit (Article 1 of the Law of Ukraine "On public associations").

The legal principles and organizational right to freedom of association guaranteed by the Constitution of Ukraine, the Law of Ukraine "On public associations" and the international treaties of Ukraine ratified by the Verkhovna Rada of Ukraine. The procedure for the creation, registration, operation and termination of NGOs determined by the said law (Preamble to the Law of Ukraine "On public associations") [21].

In Ukraine are valid next international documents on the rights to freedom of association: Article 20 of the Universal Declaration of Human Rights, article 22 of the International Covenant on Civil and Political Rights, article 11 of the Convention for the Protection of Human Rights and Fundamental Freedoms.

Principles of legal, economic and social consumer cooperatives in Ukraine are defined Law of Ukraine "On consumer cooperatives" (Preamble to the Law of Ukraine "On consumer cooperatives" the editors of 12.09.2012) [26].

Consumer cooperatives in Ukraine – a voluntary association of citizens for joint business activities in order to improve their economic and social situation. They perform trade, supply, production, and other activities not prohibited by the applicable laws of Ukraine, are promote the development of social and cultural villages, folk arts and crafts, participate in international co-operative movement (Article 1 of the Law of Ukraine "On consumer cooperatives").

The basic element of the consumer cooperatives is consumer association – an independent, democratic organization of citizens (...), from the date of registration of the consumer association is considered to be created, granted a legal entity and may conduct business and others activity (Article 5 of the Law of Ukraine "On cooperatives consumer").

Therefore, getting legal person status upon registration (Law of Ukraine "On consumer cooperatives"), means that the an organization of citizens (consumer cooperative) has no right to deal with entrepreneurial activity and make profits (Law of Ukraine "On public associations").

Legal, organizational, economic and financial characteristics of the establishment and operation of agricultural cooperatives defines the Law of Ukraine "About agricultural cooperation" [24]. According to Article 1 of this document:

- Agricultural cooperative production – agricultural cooperative formed by the business combination, which are producers of agricultural products to conduct joint production and other economic activities on the basis of their compulsory share of work in order to obtain profits;
- Agricultural service cooperative (hereinafter – ASC) – agricultural cooperative formed by the combination of individuals and / or entities – producers of agricultural products to the organization of services designed to reduce costs and / or increase the income of cooperative members in the course of their farming activities and to protect them economic interests.

State support of agricultural service cooperatives are melded in the art. 15 Law of Ukraine "On Agricultural Cooperation". This support is dependent on the state and regional programs, fulfills at the expense of state and local budgets in the manner prescribed by law. For this purpose it was developed and approved "Concept of the State target program to support the development of agricultural service cooperatives for the period up to 2015" [25]. In addition, a number of other acts, including:

- Ukase of the President of Ukraine "About measures for reforming the cooperative development and strengthen its role in reforming the Ukrainian economy on market principles" [27];
- National and regional programs to promote and support the village ( "Native village", "State target economic program to support the development of agricultural service cooperatives for the period up to 2015" [29] regional target programs aimed at to promote the development of agricultural service cooperatives 2016 etc).

Apart from the legal acts that directly adopted in order to promote cooperation, there are many that focused on its revitalization indirectly, for example, ukase of the President of Ukraine "On measures to ensure the establishment and functioning of the agricultural market" [28] ukase of the President of Ukraine "On urgent measures to accelerate the reform of the agricultural sector" [23] and ets.

## 5 Discussion

Analysis of the current legislation revealed a number of discrepancies, which became the reason that the great potential of rural areas of Ukraine, which could be unleashed through the development of cooperation, is not fully realized.

In addition to the mentioned laws Ukraine has a large number of regulations in the field of rural cooperation and new legal acts are adopted every year. Periodically a part of regulatory acts are revoked, and new regulations are adopted to replace them or many times amendments are made to the existing legal rules. This entails large transaction costs and confusion, because as soon as the adaptation to the changes in standards is completed (and sometimes there is even no time to complete it), new amendments are made and they need to be properly legalized.

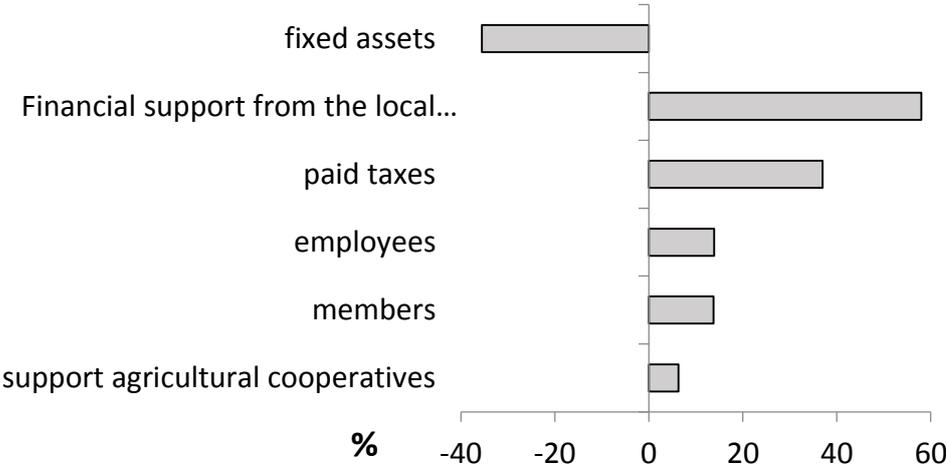
Such a continuous legislative activity demonstrates the topicality of creating a viable agricultural cooperation system and, at the same time, indicates the inadequacy of legislation. This is proved by the low activity of creating cooperatives. A paradoxical situation has come into being: the more measures are undertaken to improve the legislation related to cooperative activity in the rural areas, the more drastic is the reduce in number of cooperatives.

Researchers express different opinions regarding the reasons of this situation: some of them attribute this to the fact that creation of a legal framework for the development of cooperation cannot accelerate the objective tendencies of enhancing integration processes in the cooperative movement, since practical integration and coordination of cooperative activity is a complex task and it takes a certain time [35]; the others believe that a large number of regulations is a criteria of promoting the development of agricultural cooperatives and the role of the state in this process is to provide psychological support [12].

In our opinion, the increase in number of legislative acts indicates the extent of bureaucracy and inefficiency of management, but not the development of cooperative movement. Every possibility of ambiguous interpretation of legislation leads either to the emergence of bureaucratic barriers or to official corruption activity.

Unlike the agricultural production cooperatives, the number of agricultural service cooperatives increases: during the period 2006-2013 the number of agricultural production cooperatives decreased from 1324 to 1224 units, and the number of service cooperatives increased from 372 to 1017 units [30]. However, only 596 among 1017 of registered cooperatives were operating in fact in 2015 [34]. The number of actively functioning cooperatives was not separately recorded in 2006, but there are grounds to believe that it was lesser than the number of registered units.

**Figure 2: The activities of agricultural service cooperatives in Ukraine (2012-2013), %**

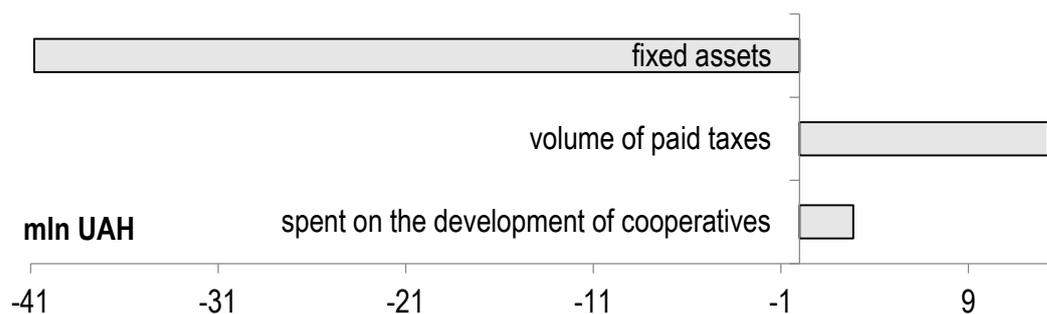


Source: Ministerstvo ahrarnoyi polityky ta prodovol'stva Ukrainy (2016)

However, the growth dynamics due to some reasons cannot be considered positive. Analysis of activity during the period 2012-2013 shows that the number of agricultural service cooperatives increased by 6.3%; ASC membership – by 13.8%; number of ASC employees – by 13.9%; share capital increased by 43.6%; the volume of taxes paid increased by 37%; financial support from the local budget increased by 58%; fixed assets decreased by 35.5% (figure 2).

In monetary terms the above mentioned means that for 2 years 2 865 thousand UAH was spent to support the development of ASC, 13.3 million UAH of taxes were paid, and fixed assets decreased by 40.8 million UAH (figure 3). Thus, the increase in tax payments and the number of ASC employees actually took place due to cooperatives' fixed assets diminution. In comparison with the leading countries of the world we must admit that such approaches to cooperation are not practiced in any of them.

Figure 3: The activities of agricultural service cooperatives in Ukraine (2012-2013), UAH



Source: Ministerstvo ahrarnoyi polityky ta prodovol'stva Ukrayiny (2016)

It should be noted that the result of activity ASC is not always the production and sale of agricultural products (for example, if a cooperative procurement, designed to organize bulk purchases for wholesale prices, or cooperative with the common use of machines for land cultivation, harvesting harvest if she gives its members with appropriate services for prices equal to the cost of, in this case, about income tax revenues are not talking). As for the harvesting/marketing ASC or multipurpose cooperatives statute which provides services to members of the pre-processing and marketing their products here and really there is revenue, but again - income not cooperative and its members (in proportion to the amount provided for sales), because under Article 9 .. Law "On agricultural cooperation cooperative does not own the products provided by members for sale. In this case we have the following discrepancy: if cooperators are farmers (legal persons, payers of income tax), then during the income tax at the stage of product sales, there may be a situation of double taxation of profits of the cooperative members.

Therefore, the existence of agricultural service cooperatives encloses several aspects: on the one hand, they have proven themselves from the best side as a tool to increase the efficiency of using potential of rural areas and for this reason the state is interested in their viability; on the other hand, there is still an element of attitude to ASCs the way cooperatives were treated during the period of political and economic transformation in the former USSR, when various legal restrictions were intentionally created in order to have levers of influence on cooperators, whose incomes in the opinion of state authorities were considered to be excessive.

It is also necessary to regulate taxation of ASC by establishing their status of a for profit organization. Yet, given the need to support agriculture as a prerequisite for food security – an integral part of national security, this feature should be considered when fixing the tax rates. In addition, it is necessary to amend the Regulations (standards) and other regulations governing cooperatives activities.

Ukraine's current system of credits for development of farms (for the purchase of agricultural machinery, seeds and breeding young stock, etc.), for which a collateral is required, also obstructs the efficient functioning of ASC. A rural resident can use as collateral only his property, which is his dwelling house and land plot. It makes a problem for the residents of remote villages, because the above mentioned property has quite low collateral value, and thus the loan cannot cover the needs of production.

So, despite of the fact that individual farmers produce the bulk of agricultural production in Ukraine they do not have access to the privileges, which are used by agricultural enterprises, and they are unable to get the necessary credits for the development of farming. Therefore, integration into cooperatives at present is unprofitable. Actually, ASC has got into a pitfall of a legislative vacuum and is forced to operate in very ambiguous conditions, and this fact distorts the essence of cooperation and undermines the objective of its establishing: having no economic privileges and suffering from working capital shortage, a cooperative carries a considerable financial burden and has to cope with a complicated and confusing paperwork document control system, which requires writing out tax invoices, declarations and so on, and thus there is a need to create additional jobs for highly paid specialists in this field – those who will carry on financial and tax accounting.

The above mentioned discrepancy between the number of registered and actively operating cooperatives can be explained by the complicated procedure of liquidation of ASC, which is regulated by the Law of Ukraine "On Cooperation" and contains a number of difficulties for application.

According to article 20 of the Law of Ukraine "On Cooperation" agricultural cooperative's property consists of share capital fund, reserve fund, indivisible fund and special fund. Indivisible fund is created on mandatory basis and formed of admission fees and contributions from the income of the cooperative. This fund cannot be distributed between members of cooperative excluding cases determined by the law. The order of paying in contributions from income to the indivisible fund has to be determined by the statute of cooperative.

In case of liquidation of the cooperative (article 29 of the Law "On Cooperation"), its assets remaining after satisfaction of creditors of the cooperative, giving back the shares to the members and paying off their share payments and cooperative payments, settlement of wages, mutual settlements with the cooperative association (in case if the cooperative is a member of any association), are finally distributed between members of the cooperative in the manner specified by statute. However, the indivisible fund cannot be divided between the members and according to the resolution of liquidation committee should be transferred to another cooperative organization or included to the budget income. The resolution should clearly determine the purposes of using this fund.

In this manner according to the Law of Ukraine "On Cooperation" a part of funds earned by the cooperative in fact have to be "voluntarily" passed to the third parties without any reimbursement.

Sometimes the described difficulties do not hinder the creation of cooperatives. This is about when it takes place within a program of development (state, regional, sectoral, etc.) or the cooperative becomes a subject to the requirements of a foreign grant program.

It should be noted that the emergence of cooperatives in the current difficult circumstances is not always caused by mercenary goals, because joining together in a cooperative farmers usually count on fast (promised) positive changes in the current legislation. The positive experience of actively operating cooperatives, which receive support from the state, give grounds to the other cooperatives also expect for such support.

Integration into cooperatives for the small agricultural producers is a vital necessity, because the processing enterprises using the current situation usually purchase agricultural production from the individual farmers by prices that are in average by 20% lower than those, paid to agricultural enterprises. Trading intermediaries also offer lower purchase prices.

## **6 Conclusion**

Creation of a viable system of rural cooperation can increase the competitiveness of rural areas and solve many problems not only of individual agricultural producers, but all the inhabitants of rural areas.

Cooperation could establish strong relationships in the marketing of agricultural products. In the lack of opportunities to get paid for production according to its market value individual farmers tend to produce only those agricultural products which they will be able to profitably sell by themselves. This fact substantially confines agricultural production and leads to the emergence of grey market mechanisms, this reduces the degree of use of agricultural potential of rural areas.

The level of development of agricultural production and service cooperation still remains very low, therefore the number of cooperatives in the rural areas is gradually decreasing and a part of them are officially existing only due to the complicated procedure of liquidation of cooperative. Agricultural cooperation must be profitable and convenient for its members, but it is not.

When planning actions to create favorable conditions for the development of cooperation in Ukraine it is necessary to apply one of main criteria of providing support for spatial development which is well-known in the European Union: assistance and support should be provided to those, who are able to use it with a maximum efficiency, but not to the one, who is in the worst situation. However, as of 2016 due to a hard socio-economic and political situation in Ukraine, material and technical support from the government has almost been terminated.

Therefore, the most important and the only available (at the current situation in the country) way to possible to solve the problems of development and improving the efficiency of agricultural cooperation is the settlement of legislative support in this field.

Otherwise, continue a situation in which agricultural cooperatives will be created only for certain government programs and only on the period of action of these programs.

## 7 Limitation of the study

First, as already mentioned, the legislative process is in constant dynamics, so research must continue in view of new changes. Second, the main attention was paid to agricultural service cooperatives. In further researches should closely examine other types of cooperatives in rural areas, including those not related to agricultural production.

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# ALTERNATIVE INVESTMENTS REVSHARE

**Jan Lavrinčík**

*Moravian University College Olomouc, Czech Republic  
jan.lavrincik@mvso.cz*

**Zdeňka Krišová**

*Moravian University College Olomouc, Czech Republic  
zdenka.krisova@mvso.cz*

**Jiří Pavelka**

*Moravian University College Olomouc, Czech Republic  
pavelka.investments@gmail.com*

## **Abstract:**

The paper deals with the revshare. It provides examples of strategy revshare advertising, buy adpacks, gaming, and affiliate management program. The next part describes the way how to make sense in a specific interface and specific terminology. Attention will be also dedicated to wallet payment and the payment system, selection, purchase, and change into Czech crown, dollars, and euros. The final part of the paper deals with the possibilities of variable revshare strategy.

## **Key words:**

Revenue sharing, revshare, adpacks, coin payment, cryptocurrency, Bitcoin, advertisement

**JEL Classification:** E42, G35, J33

## **1 Introduction**

Currently, ordinary people suffer a lot of economic problems, reflected in family life and low interest rates, low mortgage which already do not cover 100% of the property value, increasing debt, and many other factors. Beautiful example of big game players and market manipulation arbitrariness of politicians is our Czech crown. Czech National Bank only prints money. On the weakening of the Czech crown against the euro 27 CZK already made over 900 billion Czech crowns. Until you will want to keep, so the crown will be where it is since you started with. Once they decide to end this weakening, the Czech crown should go to a steep drop from 24.30 to CZK 24.80 per euro. Before that, however, again come into play Czech National Bank and the currency will simply be manipulated for so long until the market calms down and the price will stabilize at levels where it will be politicians and groups behind them need. This has nothing to do with a free market and supply demand (1), (2).

Chart 1: S&P 500 (2015 – 2017), (2)



In the past year is also noteworthy **OPEC agreement on the reduction of oil production in November 2016**. It was the first reduction in mining since 2008 and after this report, oil prices rose for a few days by more than 10%. However, a strong dollar, the decline in oil revenues in Libya, Nigeria, Russia and new technologies in the long term depresses oil prices back below (1), (3).

Chart 2: Petroleum (2015 – 2017), (4)



Also interesting is the rocket in Bitcoin last year from 400 USD to 1 000 USD. Reason? Digital currency is very appealing as an alternative to the Chinese Yuan, as well as increased demand in the second most populous country, India. More than 7% of all global transactions in the digital currency comes from China. Another reason are the speculators who bet that bitcoin "too volatile" and that it is an escape into a decentralized world where you cannot nobody in it capital to socialize, entertain, question or falsify (5), (6).

Chart 3: Bitcoin (2016 – 2017), (7)



The above described economic indicators lead to frequent use of Bitcoin, an alternative combination, the question is how it goes further with Bitcoin work and achieve a regular income. One of the alternatives are revenue share projects on which we will focus in this study.

Now we, as an example to current events in the markets using standard business tools (stocks, commodities, Bitcoin). Among them, there are alternative investments - cryptocurrency or revshare (earnings on advertising on the Internet). Even so alternative that about them, there is no book, expert study or article in a journal. Therefore, we decided to create this scholarly article with a substandard structure, because it is the first swallow in this area and sets a new standard. The main objective of this paper is to describe revshare as an alternative investment to focus on specific elements shown on the terminology that will be practically demonstrated at the conference. In another part of the work conducted by the four revshare demonstrated on the optimal strategy, based on practical and theoretical knowledge of the authors of the study.

## 2 Revenue sharing

Revenue sharing is the distribution of profits and losses between stakeholders, who could be general partners (and limited partners in a limited partnership), a company's employees, or between companies in a business alliance (8).

Projects such as the Revenue Sharing offering yields above 3% per day represent in most cases Ponzi scheme. A high-yield investment program (HYIP) is a type of Ponzi scheme, an investment scam that promises unsustainably high return on investment by paying previous investors with the money invested by new investors. Most of these scams work from anonymous offshore bases which make them hard to track down (9).

Revenue sharing uses for its operation a number of new controls and specific terminology, of which the most interesting concepts below (8), (10), (11), (12), (13):

- **Admin;** Administrator platforms, often is the owner;
- **Adpacks;** Advertising package from English Ad (advertising) and pack (package) refers to a product which is the only revenue to sharing platform offers returns. Can be easily used and Czech form of expression;
- **Advertiser;** entity that advertises via Revenue Sharing Platform. Member himself Advertiser;
- **Affiliate;** referral, recommended;
- **Alexa Ranking;** Ranking which assigns rank websites according to their traffic, higher traffic to the lower rank, the goal of every platform, every day is a rank lower, since it is one of the indicators of the credibility of the project;

- **BackOffice**; a term which is a combination of English words (back or rear) and (office = bureau), a collective term for the main user menu revshare program, showing the date of registration, last login, user accounts, the number of purchased advertising packages and so on;
- **Banners**; internet advertising, it looks like "image". It can even blink differently. This is one of the promotional products revshare projects;
- **Cash links**; it is a PTC advertising for the watch is a tiny commission;
- **Clicks**; in many projects, it is necessary to set up a banner and use it to buy Adpacks buys Adpacks achieve not only the possibility of return, but even so. Clicks or credits, or click one credit usually corresponds to one viewing;
- **Commission balance**; indicates the account to which are attributed to profits from referral. It is also only the English expression;
- **Corporate Advertiser**; often external advertiser who advertises for a little money and a post-paid customer advertising program revshare;
- **Credits**; clicks, credit;
- **Daily cap**; daily returns, denotes the percentage of the maximum amount which is credited to Earning daily balance. It is used frequently and Czech translation;
- **Earning balance**; the account to which is attributed to profit from Adpacks. From the Earning balance and balance (account). Given that the translation is a long and relatively poorly melodious translatable, uses only the English version;
- **Expiration**; refers to the period during which Adpacks "expires", that runs its effectiveness. Maturing of such a package is complete;
- **FAQ**; abbreviation of the words Frequently Asked Questions (= frequently asked questions) page containing a list of frequently asked questions for the issue;
- **Fee**; Fee is used slang Fick, or Czech fee;
- **Hangout**; livestream webinar, which are connected to the Platform members and ask questions admin, admin informs about news and success of the platform and is in touch with members;
- **Hosting**; complaining of the project on other projects in order to obtain membership;
- **Login Ad**; advertising sign is displayed when you log on to each member and it is necessary to watch that man got into the back office;
- **Maturing**; Maturing Adpack indicates the amount of the return of the Advertising Package. Maturing is therefore synonymous with the return;
- **Maxout**; the English Maim and out (of, in this sense choice). Maxout refers to the maximum amount you can withdraw once every 24 hours;
- **Member Overview**; multi-word terminological connection (= list of members);
- **Membership**; Membership is used primarily Czech text;
- **My Referrals**; a person who has been recommended to you and therefore you profit from it follows a commission;
- **My Sponsor**; if your referral, then the man who brought you to your project, your sponsor;
- **Overview**; button that directs us to back office;
- **PPC ad**; Ads for whose views are not commission;
- **Processor**; Processor is hidden under a collective name for the currency and bitcoin wallets;
- **Profit**; refers to profit Adpacks, that such a profit, which is already exceeding the amount of the purchase (Like interest);
- **Purchase**; designates the amount for which we bought Adpacks. (Something like Denomination);
- **Return**; refers to the total profit of the advertising package if the return on the purchase of 120 %, 100 %, then the return value for which we originally bought the remaining 20 % is our profit. (Something like a nominal + interest). Daily returns are called daily cap;

- **Revenue Sharing Sites**; the English revenue (revenue, profit), sharing and site (page), it is a general indication Revenue Sharing projects could be freely this association translates to revenue sharing sites. This translation, however, has an ambiguous and somewhat stupidly, because you hear anyone use the Czech translation and you will meet only with the wording of the English version. Revenue sharing refers advertising platforms, which make money by selling advertising products and part of the revenue is shared with its members;
- **Revenue sharing**; cannot be seen as an investment, it is a marketing tool; in terms of selling advertising - not an advertising investment, so instead of conventional investment terminology you will encounter an entirely unique and typical projects revshare terminology. For a better understanding, I decided to assign investment concepts equivalent "term revshare terminology.;
- **Script**; part of the source code, it is a security and organizational chart of the page;
- **Stats expression for (= statistic)**; which includes date of origin server, total payroll numbers last registered users and so on;
- **Support**; the term (= aid, assistance, support) designation for a man or a team of people who are able to after inserting a query into the system to solve it, or send instructions professional advice, assistance or link;
- **Surf free units**; this is an opportunity to purchase "clickable holidays" If you go on holiday. Buying this product on non-advertising revshare project is exempt from the obligation of daily surfing ads in traffic Exchange;
- **Surfing**; every day you revshare the project will be obliged to see, or "surfing" a certain number of advertisements in traffic exchange. If the member had not surf, it does not, on any given day gain;
- **Text Ads**; text ads, used Czech translations;
- **Ticket**; label the message you have written to support;
- **Traffic Exchange**; term that indicates the relative movement of the ad, clicks and ad view the Revenue Sharing platform;
- **Upgrade**; upgrades, often under the upgrade meant a higher purchase membership to revenue sharing project.

The table below presents four stable revenue sharing projects 2016 - 2017 from the perspective of expiration packages daily profit and referral bonus.

**Table 1: Comparison of selected revenue sharing programs**

Revenue Sharing:	MyPayingAds	MyPayingCryptoAds	TheAdsTeam	10AdsPay
Expires [days]:	60	60	60	60
Profits/ peer day [%]	1,8 – 2,0 %	2,0 – 2,2 %	1,8 – 2,1 %	1,9 – 2,1 %
Referral bonus [%]	10 %	6 %	8 %	10 %

Below are 3 examples of working strategies for revenue sharing MyPayingAds:

**Strategy 1 – MyPayingAds (MPA):**

Investing money: 200 USD

Adpacks: 40

Profit after 4 months: about 200 USD + 40 Adpacks (reinvesting)

### **Strategy 2 – MyPayingAds (MPA):**

Investing money: 100 USD + 100 USD (after 1 month)

Adpacks: 40

Profit after 4 month: about 170 USD + 40 Adpacks (reinvesting)

### **Strategy 3 – MyPayingAds (MPA):**

Investing money: 100 USD + 100 USD (after 1 month)

Adpacks: 40

Referral: 10 (average deposit: 200 USD)

Profit after 4 month: about 200 USD + 200-500 Adpacks (reinvesting)

Revenue Sharing projects offer a range of variable strategies that may be a return on the invested amount in 4 months thanks to the folded investing. Further shortening is using affiliate programs (deposits recommended). Completely new is the matter of choosing the volatile cryptocurrency here is because of course I can get more than 10% per month (data for Bitcoin from 2016), (15).

## **3 Discussion**

Revshare are interesting young alternative investment vehicle and in compliance with the above mentioned and described strategies may offer significant appreciation of 10% per month. Yes, it is a young and relatively risky investment, because many platforms bankrupt. One of the tools can be diversification, where in investments in four projects can ruin even at three projects after more than 8 months to be even with one of the positive values of investment. Another tool is the strategy of the monthly investment when the return of about 97.5% with the use of compound interest. Another tool may be a combination of selection into multiple types cryptocurrency - Bitcoin, Ethereum, DashCoin, litecoin, etc.

## **4 Result**

Passive income is income resulting from cash flow received on a regular basis, requiring minimal to no effort by the recipient to maintain it. The U.S. Internal Revenue Service categorizes income into three broad types, active income, passive income, and portfolio income (14). Passive income is usually taxable (Czech Republic 15 %, income tax on individuals \$8).

Some examples of passive income are (14, 15):

- Any type of cash flowing property income;
- Profits, cash flow, and earnings from a business that does not require direct involvement from the owner or merchant;
- Rental income and incoming cash flow from property or any piece of real estate;
- Interest income derived from a bank account or pension;
- Royalties paid for intellectual property such as music, books, manuscripts, computer software, or a patent;
- Earnings from internet advertisements on websites;
- Dividend and interest income in the form of cash flow or capital gains from owning securities and commodities, such as stocks, currencies, gold, silver, ETFs, and bonds;
- Alternative investments Revenue Sharing program (MyPayingAds, MyPayingCryptoAds, TheAdsTeam, 10AdsPay), Recyclix etc.;

Revenue Sharing projects can offer stable profit shared by around 2% a day and can be an alternative to standard banking products, rents from real estate, investment in physical metal (gold, silver, platinum, palladium, iridium). Alternative investments, however, due to higher profit represent a higher risk and should create only a proportion of the investor's portfolio, which should not exceed 30%.

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# STRATEGIC PLANNING AS A CONDITION FOR SUCCESSFUL MANAGEMENT SCHOOL

**Anton Lisnik**

*Catholic University in Ruzomberok, Slovakia,  
anton.lisnik@ku.sk*

**Katarína Greňová**

*Pavol Jozef Šafárik University in Košice, Faculty of Arts, Slovakia  
grenovak1@gmail.com*

## **Abstract:**

This paper focuses on issues of strategic planning, which is among one of the most important management processes of each organization. Long-term planning, which will allow the school to fulfill the vision in the context of its values and internal potential is irreplaceable in terms of future prosperity and schools. The school, whose leadership has no idea of their direction, they are hardly able to operate seamlessly. The paper is studied in practical terms the meaning and function of management on specific high school. Based on the questions used in the questionnaire and subsequent analysis were revealed strengths and weaknesses of the schools, knowledge of which is a prerequisite for successful strategic planning and formulating goals and direction of the school.

## **Key words:**

Strategic planning, management, school, SWOT analysis

**JEL Classification:** I25

## **1 Introduction**

In recent years, we have placed ever-greater demands on pupils' level of knowledge of all types of schools so that graduates know how to do to successfully integrate the companies met all the demands of the knowledge and knowledge-based society. For schools to precious means the need for preparing pupils for their future profession, as well as incorporating a company to do. The school must give pupils the knowledge they will need their education, so as to apply future inclusion in society Education in the Slovakia undergoing a transformation, which aim to upgrade this system, to modernize and offer new alternatives in the Learning educative process. After this transformation, however, the actual teachers do not participate. On the other hand, it is true that teachers can significantly change the quality of the school, on which they operate. The terms of quality teachers, quality schools most often we mean a good teacher, a good school.

If it wants to be a school quality, you must regularly evaluate its work plan activities while future. Only it will allow the school has a clear vision and way.

## **2 Strategic plan as a tool for management school**

For optimal well-functioning school is a necessary strategic planning, which is starting from the systematic analysis of the school and its inner external surroundings (Dravecký2010). Strategic planning involves defining the mission of the school, the value of schools, creating a vision for the school, formulating strategies of goals that get the most school vision in the context of its value inner potential.

A school's strategic plan is the physical document that embodies the guiding orientation regarding how to manage the school within a larger national and local development perspective. ( Wyk, 2014), The prerequisite for an effective strategy is to generate knowledge strengths weaknesses of the organization, we detect SWOT analysis. The object of the research issue is Gymnasium St. Francis from Assis in Levoča.

## **2.1 Characteristics of the organization**

Gymnasium is a private school that educates students in four-and eight-year program, and provides full secondary general education. Gymnasium was founded within the meaning of Act no. 542/1990 Coll. Ministry of Education and has been included in the network of secondary schools in the Slovak Republic on 20 June 1991. The founder of the school's Roman Catholic Church, Bishopric Spišské Podhradie, Spišská Kapitula. School opened its operations as a four in the academic year 1991/1992 and 1997/1998 school year, education was broadened to include eight-year study focusing on foreign languages.

School is part of the device school is School dining area with a multi-purpose playground gym. Founder guarantees inspects the school, and if flaws are discovered adopt the necessary measures. Gymnasium is a nonprofit organization. Managed separately according to the approved budget, on its behalf to acquire rights and obligations. At its activity can accept financial donations in kind.

School educational program based on the National Education Program for Secondary School in the Slovak Republic: ISCED 3A – Upper secondary education, which is a public document accessible for teaching and non-teaching public. The aim of education is the pupil who has all the necessary knowledge, skills and competences to a level sufficient to meet the demands of education and knowledge society. These competencies are formulated in the graduate profile, which together with the educational plan is in line with the curriculum, educational standards and catalog the target requirements for knowledge and skills of graduates. School education program reflects the mission and goals of the school, the specific conditions and resources of schools, teacher requirements and students' interests. Formal curriculum includes not only the content of the curriculum and selecting the most optimal training methods, quality and access for teachers, informing parents of continuously achieved results.

Additional services – informal curriculum includes school trips and excursions. In addition to swimming training, ski courses and course protection of man and nature, which are part of the formal curriculum, the school also organizes dance classes and social education. Interest education is provided by means of ring action. Pupils are successful in subject Olympiads (Slovak competitions in different school subjects), singing and recitation competitions in sports competitions and projects in vocational activities.

## **3 SWOT analysis as a means of planning**

To thoroughly map the conditions in which the school operates and the school partners, serve marketing audit of the school. Examine the conditions of demographic, economic, natural, technological, political and cultural. They evaluate opportunities (opportunities) and threats (risks) for school - SWOT analysis. The acronym SWOT is made up of the initials of English words strengths (strengths), weaknesses (weaknesses), opportunities (opportunities) and threats (threats). SWOT analysis can be considered as self-open schools as organizations (Kachaňáková 2001). The purpose of SWOT analysis is to assess the school's internal assumptions for execution of a specific plan and analysis of the external opportunities and constraints that are determined by the external environment. SWOT analysis begins by defining the end goal. If the target is clearly defined, the analysis can be used as management support to achieve this goal. SWOT analysis is not without relation to the objectives. The mistake is when the analysis is carried out before the defined objectives. If the final target state is not clearly and openly defined and approved, the parties to the decision may mean different final states and the results of the analysis will be inefficient (Blaško 2009).

However, there has never been a single and definite definition of strategy. The term has had several meanings, different in scale and complexity (Gillespie 2009).

Focus on students is considered as the prerequisite to changes in school management. The overall benefits of focus on students are increasing students' satisfaction and fostering effective and deep learning rather than surface learning in the classroom (Toorani 2012).

**Strengths** - description of the intrinsic properties of schools, positive activities and unique resources that can help to achieve the goal (what the schools are what makes better than other schools, what stands out in what it knows what resources at its disposal - people, traditions, culture, environment, technology).

**Weaknesses** - description of the intrinsic properties of the schools, the negative activities and resources that make it difficult to achieve the objective (what is done badly at school, which is failing, what needs to be improved, which would be needed to avoid what is missing school, what do not know).

**Opportunities** - forecast opportunities, potential benefits, opportunities, environmental conditions, which may help the school to achieve the goal, positive trends in environmental factors (what options exist independently from the school that the school can use, what can the school use from near and afar - experience of others, finance, people, advice).

**Threats** - the prognosis of external threats, potential problems, risks, environmental conditions, which can make it difficult to achieve the objective of the school, the negative trends in environmental factors (what obstacles stand in the way of school, making it threatens what has competition).

After results of SWOT analysis school should choose the appropriate strategy for developing other strengths, or finding new opportunities. It also must not underestimate the elimination of weaknesses and threats, of course, defend. SWOT analysis is complete the alignment as well as the strengths and weaknesses of our school, also opportunities and threats that may affect the fulfillment of the objectives set. It's a useful tool for processing an overview of the strategic situation of the school. We can say that is the basis for formulating strategies that would arise as coherence between the internal capacity of the school and its external environment. Highlighting the strengths and weaknesses of the school creates space to address these issues (Kvalita školy 2012).

The school's mission is a clear expression of the reasons why the school exists and functions that wants to perform. It's school's document that characterizes the school and determine its values and objectives. It's a description of what the school should achieve for its stakeholders (for groups of persons having an interest in the performance or success of school - pupils, parents, teachers, employers, school founder, school authorities, society, media). Mission statement is of a permanent nature, which provides insight into the current and future activities of the school, its values, providing educational services, which school and where he wants peace, what sets it apart from other competitors. This mission should be in accordance with the vision of school is to provide an understanding of the direction and objectives of the school. **Mission is an expression of the philosophy of the school and is formally captured in a written statement** (mission statement). The mission determines the objectives and defining the most important tasks of school, so it can also serve to control the quality of schools. Formulating the mission should be unique to each school, as each works in a different environment, a different teaching staff, business activity, and other objectives. It should be geared more to students than schools to offer an educational program. **Based on the school's mission defines its long-term objectives.** School values, on which it built its business, are also part of strategic planning. It is a declaration containing core beliefs, value system and character of the school (Kvalita školy 2012, Turek 2008).

**Vision school** - have an internal character and talks about what should be, how it should look like in the future. For example: 5, 10, 20 etc. years. According to Maxwell's vision it is the greatest treasure of the head, because it leads. Although the definition of vision is the prerogative of the school management, but you should know her and take her for both teachers and school staff (Albert 2008). The vision is clearly defined, realistic and credible picture of what he wants school in the specific conditions in the future to achieve. It is a concept that describes how the school wants to be in the future, where he wants to get. They are bold ideas that surpass the current status, school philosophy, vision of the future school. The

basis for the development of a vision is credit - ideas that express beliefs, faith and values recognized school. It formulated in general without specifying the amount, terms or determining liability.

For school staff formulated a vision should be inspirational and motivational means in everyday work also-correcting element and a criterion for evaluation. That is why it is so important to formulate a vision for the school to accept the results of the SWOT analysis of the current state of the school and its surroundings to school staff were the same thing with her knew her well and participate in its implementation. Formulated vision is to build on the conclusions of the SWOT analysis of the state schools - should lead to maximizing the identified strengths of the school and minimize its weaknesses. While it is also necessary to respect the values professed by teachers, other school staff, and also the values that professes school as an organization. For the vision it is also clear development strategy of the school, its conception. Teaching staff should not be confused with the general objectives of the school, its mission, objectives and other subsystems school. When designing school development vision is a unifying (Kvalita školy 2012).

#### **4 SWOT analysis – paper results**

In the SWOT analysis we monitored personal conditions (teachers' qualifications, communication at all levels, methods and forms of work, ...), spatial and material conditions (equipment professional and language teaching, equipment, physical and chemical laboratory equipment, costs of heat, technical condition of the building, canteen equipment, ...), health and safety conditions (school organization, cleanliness and aesthetic interior and exterior modifications schools, ...) and the conditions for the educational process (the internal rules of the school, the criteria for the assessment of pupils the quality of the teaching process, the control system of the school, ring work, ...).

#### **SWOT analysis of teachers and pupils**

The primary task was to collect input information from the experiences, attitudes and opinions on the current state of schools from teaching staff and pupils from the school in the form of a questionnaire. The questionnaire was distributed to all 33 school teachers. The same questions we asked the 70 students of the fourth year of a four-year high school and eighth year of an eight-year high school. In the first part of the questionnaire we focused on the detection we value teachers. Respondents were asked to choose one value, which is most important from their perspective.

The results show that the most important values include high school teachers: education in the spirit of the Gospel, education for respect and tolerance towards others and education for life in a democratic society. Similar results were also in answering students: the most important value was 29 pupils education in the spirit of the Gospel, followed by education for tolerance and respect for others and the capacity to learn.

We examined the views of teachers on spiritual activities at school. As seen from the table, up 30 teachers are consider to be spiritual activities for the benefit of what I consider a very important indicator to the future direction of the school. Replies students were not as clear - for the benefit of their students was 59 (84.30%), but compared with the teachers was higher number of negative responses - 11 pupils t. j. 15.70%.

The perception of relations between teachers are not so clear. How good relations said 19 teachers, 9 teachers considered their relations as purely collegial and 5 teachers think they outweigh the negative relationships. A positive finding is that 70% of pupils perceived relationships between teachers as well. 18.60% rate them as a purely collegiate and 11.40% think that the predominantly negative relationships. This shows that although the teachers are disagreements, it does not make it clear before the students what they see as a positive finding.

Cooperation between teachers and pupils perceived as a helpful 14 teachers, 15 teachers considered cooperation based on mutual dialogue and 4 teachers understand cooperation as a relationship of superiority teacher. When this issue was significant differences between the responses

of teachers and students - as a helpful co-operation said 88.60% of the students as cooperation based on mutual dialogue only 2.90% (here we see the biggest difference in the perception of teachers and pupils) and 8,50% perceive cooperation as a relationship of superiority.

Mutual cooperation between schools and pupils' parents and 28 teachers deemed as good and 5 teachers answered in the negative. That cooperation between schools and parents to be good results also show students where to 84.30% of the students considered cooperation between schools and parents sufficient and the opposite holds 15.70% of the students.

The problem seems to be informed about events taking place at school. Although the teachers are satisfied 60,60% and 39,40% are dissatisfied with the level of information among students, it is the other way around. Only 34.30% of the students have enough information and to 65,70% think the opposite.

As sufficient is perceived and communication between teachers and pupils, when up to 27 teachers (81.80%) answered in the affirmative and only 6 teachers (18.20%) it is deemed insufficient. This opinion has students when 84.30% answered yes and 15.70% in the negative.

In the educational process is an important part of securing the interest activities of students. It involves the school considered sufficient 18 teachers, t. j. 54.50% think the opposite and 15 teachers (45.50%). Most pupils - 54.30% interest activities deemed insufficient and 45.70% of the students think the opposite.

An important factor is the feeling of satisfaction students that are respected his ability and individuality. The fact that it is convinced 26 teachers, the opposite holds 7 teachers. The students answered as follows: 61.40% is satisfied, 7.10% answered negatively and did not know 31.50% of students assessed.

The students took part in our research. Final year of four-year and eight-year high school, interested in us their views and opinion of teachers and the work of educational adviser in choosing their professions and other studies students. 57.60% of the teachers considered the work of educational adviser to be sufficient, the opposite holds 42.40% of teachers. For students, the situation was different when only 62.90% of the students were not satisfied with the work of educational adviser. In contrast, 37.10% of students answered the question in the affirmative.

In education it is very important and material equipment of school. Up to 32 teachers consider it sufficient and only one teacher it would be insufficient. Equally satisfied are the students, if answered positively 90% and only 10% of pupils were not satisfied.

The quality of education is also active classroom environment or school. Appropriate to consider the environment school's 31 teachers and only two teachers expressed dissatisfaction with the school environment. Satisfaction with the school environment and expressed the 82,90% of the students answered in the negative and 17.10% of students.

## **5 Discussion – Conclusions and recommendations**

The aim of this analysis was gathering the views of teachers and pupils in some selected areas. Based on the research, 33 teachers and 70 students have come to the strengths and weaknesses of our school that are listed in the table. Numbers in brackets indicate the number of respondents by their responses.

The results show that the strength in terms of teacher education in the Christian spirit, education for respect and tolerance, spiritual exercise in schools, collaboration between teachers and students, cooperation between schools and parents of pupils, as well as materials and school equipment space. Weaknesses are: in terms of teachers collaboration between teachers and difficulties in securing interest activities. Another weakness is the work of educational adviser through which the school participates in the further direction of graduates. The results of a SWOT analysis of teachers are thus in line with their value orientation and are practically useful for improving the quality of schools and the quality of the educational process. From the perspective of students are among the strengths also education in the Christian spirit, education for respect and tolerance, as well as education for life in a democratic society,

spiritual exercise in schools, collaboration between teachers and students, cooperation between schools and parents of pupils, as well as physical and spatial school equipment. An interesting finding is that students perceive the relationships between teachers as positive, suggesting that the problems between teachers is not transferred to pupils. Weakness is the lack of information on upcoming events at the school, as well as the lack of leisure time activities and respect for the individuality of students. Significant dissatisfaction with the work of students is educational adviser when dissatisfied was almost 63% of pupils.

The results of the SWOT analysis is a prerequisite for enhancing the quality of our schools, especially in developing and upgrading the school curriculum, in communication schools to the outside world (especially with partners - students, parents, founder), as well as for the needs of the school management and the feedback from those entities.

## **Recommendations**

Based on responses from teachers, pupils are positive evaluation built into the following priorities:

1. Education and training

Pupils must be shaped by the principles of Christian education so that they are developed Christian virtues, for example. charity, justice, reverence, generosity, devotion ... spiritual activities at school are very positive way perceived by teachers as well as pupils, so they should be further development. As weakness is job (service) educational counselor to advise students when choosing a college. Since this is a serious decision in the lives of students, which in many ways will affect their future, it is necessary to ensure adequate communication and cooperation between pupils with educational advisors, educational counselor expertise and greater responsiveness to students.

2. The teaching team

All teachers are qualified; the school operates an educational consultant, coordinator of drug prevention education for matrimony and parenthood. All united by a common task - to nurture and educate students in the Christian spirit to the best of my knowledge and belief. Teachers can enhance their expertise and skills through projects, training, implementation of qualification tests, and participation in the retreat. Positive relationships between teachers are a prerequisite of satisfaction in teaching. It is very difficult to make relationships between teachers were good, friendly and accommodating. However, it is essential to trying to do so in the future, because pupils very sensitive to the relationship between teachers.

3. Relations between teachers and pupils

An important factor affecting the educational process is the relationship between teachers and pupils. Results of the analysis showed that students perceive teachers' relationship to them as a courtesy, based on mutual dialogue. Some students, however, marked the relationship of teachers as a relationship of superiority towards them. Therefore, it is necessary to constantly work on improving communication between teachers and students as the means of achieving mutually beneficial relationships. This applies especially to information about upcoming events that students identified as insufficient. To increase awareness and improve their bilateral relations is also possible to use the school website, or school magazine. Another area is to improve mutual communication and, consequently, the relations while organizing extracurricular activities. Build mutual trust requires efforts as part of pupils, as well as from teachers and must be supported by the school management.

#### 4. Cooperation with parents

Cooperation between schools and pupils' parents were both teachers and pupils assessed as very positive, suggesting a correctly chosen communication with the public and priorities with parents. Impact on mutual satisfaction and we have organized events for pupils and their parents who have several years of tradition, but also the personal approach of school management and individual teachers to pupils' parents. This cooperation should be further developed and developing other joint events.

#### 5. School surroundings

The school is located in renovated spaces, as reflected on their satisfaction of students and teachers who have largely expressed satisfaction with the material and spatial equipment of schools, as well as the overall environment in school. Only a small percentage of students were dissatisfied with the environment. Despite the current lack of funds for material and technical provision of schools it needs to be continuously updated material equipment to meet the highest quality standards. This requires communication and cooperation with the school management, as well as with the Council of Schools and Parents' Council.

## 6 Conclusion

Each school aims to quality education and training of students. Therefore, it is necessary to know its strengths and weaknesses in order to strengthen the school's priorities and eliminate its negative aspects. On an analysis of strengths and weaknesses and focused this work. At its authorship it was used the SWOT analysis of the teachers and students who have the greatest influence on who they are graduates of our school and applied in the next life. The analysis of teachers and students shows that the strength of our school is education in the Christian spirit as well as education for respect and tolerance towards other people. The fact that this value was reviewed by students and teachers as the most important suggests that existing schools routing is correct.

Another positive fact is that the teaching staff considered be a professional with a good relationship with pupils and parents of students. Some negative is that students perceive, although relationships between teachers and good teachers already do not perceive this situation as follows. School is very positive that was renovated a few years ago and meets all the requirements for the provision of quality education, using the latest information technology and teaching aids. Performed reconstruction also had an impact on the overall environment of the school, the pupils and teachers judged very positively. The facts indicate that both teachers and pupils have the same priorities and there shares the objective and focus of the school. This trend needs to continue and improve it. Weaknesses that we know, among other things from the questionnaire indicate on what is needed in the future work. True knowledge of the strengths and weaknesses in the functioning of schools is important for long-term planning that our school was still attractive and meet the conditions they expect pupils, parents and the general public.

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# EVALUATION OF QUALITY OF LIFE – MORE THAN AN ECONOMIC ISSUE

**Karel Macků**

*Palacký University Olomouc, Department of Geoinformatics, Czech Republic  
karel.macku01@upol.cz*

## **Abstract:**

The questions regarding quality of life have been already dealt by ancient scholars and philosophers. In Aristotle's concept of *eudaimonia*, individuals were urged to take every opportunity to achieve a good life. In early stages of research of the quality of life (middle of 20<sup>th</sup> century) was this topic associated mainly with an economic development. However, economic indicators themselves are for evaluation of quality of life insufficient, because they are not able to cover many important aspects of quality of life. The context of sustainable development extends this economic view on other dimensions – social and environmental. This article describes the main ideas and problems related to the quality of life, with an emphasis on objective, qualitative and spatial approach to this issue. The research aims to explore possibilities of creating a universal methodology for the quality of life evaluation in member countries of European Union.

## **Key words:**

Quality of life, sustainable development, evaluation, municipalities, spatial

## **JEL Classification:** O11

## **1 Introduction**

The quality of life is a very complex topic, which can be approached from many points of view – medicine, psychology, economics or environmentalism. This presence of many attitudes caused absence of clear consensus on the definition of quality of life in long-term perspective (Andrews, 1986). According to Wallace (1971) quality of life involves a psychological and sociological dimension of living, experiencing cultural, sport and leisure activities, satisfying interpersonal relationships, functioning family relationships and ability to adapt (or affect) to changes occurring in real life. Liu (1976) bases quality of life on economic, political, environmental, health, educational and social factors, which may be represented by e.g. income, housing quality or level of education. According to Bérenger and Vardier-Chouchane (2007) is the quality of life focused primarily on intangible things, activities and opportunities to engage with a social life. In the World Health Organization concept, quality of life is a broad term influenced by the physical health of man, mental status, social relations, set of personal beliefs and opinions, and the environment in which he lives.

It is obvious that the topic of quality of life has a broad interpretation. In last decades, scientific research tried to define the quality of life better and especially propose methods how to measure it. Assessment of quality life can be a useful tool for government and organisations in the direction of planning, decision making, determination of problem areas and the distribution of funds for local development.

This research aims primarily at objective indicators of quality of life without any subjective influence of the individual nature of each individual's life. The use of objective information cannot assess real quality of life as individuals subjectively perceive it, but rather determinate the potential for good life based on conditions in which man lives. Processing of this kind of objective data requires suitable quantitative methods. Based on this fundamental principles, this paper suggests a procedure for

a comprehensive evaluation of the quality of life at the lowest possible administrative unit with emphasis on its spatial aspect.

## **2 More than an economic issue**

In the early stages of research of quality of life (middle of 20th century), this topic was associated mainly with an economic development. For this reason, since its origin in the 1930s, Gross Domestic Product (GDP) has been used as the main measure of development and well-being (Martín and Mendoza, 2013). However, economic indicators themselves are for evaluation of the quality of life insufficient, because they are not able to cover many important aspects of life (for example health, security, environment, etc.). In many cases, economic indicators might even have a negative correlation with other aspects of life (e.g. state of the environment, personal health). For this reasons, economic indicators should be considered only as one of the parts for evaluation of the quality of life.

In 1982, The Organisation for Economic Co-operation and Development (OECD) conducted a study focusing on common concerns of its member countries and set the general issues affecting the quality of life (Martín and Mendoza, 2013). Issues are following:

- health
- education and skills
- employment and quality of working life
- leisure
- purchasing power of goods and services
- physical environment
- social environment
- personal security

Interest in the quality of life outside the academic research is also demonstrated by European Commission initiative “Beyond GDP”. It was launched in 2007 with the aim of exploring how to improve or create new ways of measurements of quality of life in its member states (Quality of life: facts and views, 2015). In this context, a special Commission on the Measurement of Economic Performance and Social Progress (CMEPSP) has been formed. It established topics closely related and affecting the quality of life (including health, education, personal activities, social relations, political situation, environment, economic and personal uncertainty).

Most of the topics mentioned by OECD and CMEPSP agree and provide guidance on how such indicators should be addressed in the study and measuring of quality of life. Environmental, social and economic aspects of sustainable development are included in quality of life principles (Haslauer, 2015). The context of the sustainable development is also followed in this study – for the quality of life assessment, tries to select topics and indicators falling into three main pillars of the sustainable development. This idea is particularly important in rapidly expanding urban areas. During the 20th century, the urban population has increased tenfold, in absolute value this represents an increase of approximately 2.8 billion inhabitants. The United Nation predicts that by the year 2050, the population of urban areas rises to 6 billion (Marans, 2015). In connection with this phenomenon, evaluation of the quality of life in the context of sustainable development could be an important tool for urban policy and planning.

## **3 Subjective vs. objective perception**

Over the past decades of the quality of life research, two main principles of its evaluation were defined – objective and subjective approach. Despite the different perception of the essence of the whole theme, quality of life can be assessed by both subjective and objective (their combination eventually) attitudes (Lo and Farber, 1997).

Subjective assessment is based on the premise that to understand an individual's personal well-being is directly necessary to examine the individual's feelings about various parts of his life, within its

normal standards of living. These findings should be directly applied to the fundamental interests of society to improve the living conditions. Subjective indicators are determined by questionnaire survey; they are often assessed by scale describing the degree of agreement or satisfaction with the issue or problem (e.g. the Likert scale). Subjective indicators are often criticised for being incomparable and incomprehensible (Santos et al. 2007). Research of subjective indicators is very complicated because every person has different perceptions and preferences.

Objective indicators are based on objective, quantitative values determined e.g. during the census, economic analyses or derived from aerial images. In the early times of socio-economic research, these indicators were used for general characterization of the society such as unemployment, mortality, morbidity, and crime (Marans, 2015). The greatest strength of a group of objective indicators lies right in their objectivity. They can be easily identified and defined, without any examination of the personal feelings. Measured values can be easily compared with each other. Objective indicators reflect the general opinions of society – low criminality or low air pollution are positively accepted values.

Of course, there are many weaknesses regarding the objective approach. Firstly, obtained values can be fallible. Deiner and Suh (1997) give as an example number of reported rapes as a crime measure – the number of reported cases is far short of the number of actual cases, as well as the number of reported cases also differ in different cultures where this kind of personal injury means social discrimination. The second problem is the correct interpretation of obtained data. Many of the measured data must be interpreted to determine whether they represent positive or negative impact. As an example of this problem describe Diener and Suh (1997) logging – it is a positive action with economic benefits, but after crossing certain level, it turns into deforestation with an adverse effect on the environment. Interpretation is thus often based on socially accepted views on what is required and what is dismissed as undesirable. Especially in complex and opinion-fragmented societies can occur conflicts regarding the interpretation. Another issue is fragmented nature of the phenomena studied by a particular indicator – e.g. various criminal offenses are evaluated with varying severity depending on local jurisdiction. When indicators are being selected, it is important to distinguish whether a given phenomenon cause or consequence of another phenomenon. Objectives and means of achieving these objectives are evaluated simultaneously and is thus could be difficult to determine the cause and the effect. Is a large number of policeman per capita consequence or cause of given level of criminality?

The last of the complaints against objective indicators is that they do not reflect the human experience of well-being. They only describe the conditions in which the individual is located.

#### **4 Methods of evaluation**

As many other phenomena, also the quality of life needs to be measured, quantified, for the purpose of comparing different administrative units, finding weaknesses in the particular dimensions of life and also to identify the less developed areas from the spatial point of view. To find a suitable quantification method in such a complex phenomenon is not a trivial task. In much previous research, the complex numerical indexes have been used as a measuring tool. An index is a dimensionless indicator readily perceivable or comparable, it is, therefore a convenient tool to present the results to the general public. It carries in itself very complex synthetic information consist of a series of input data, so the way how it is created it is very important. If the index is improperly constructed, it leads to wrong interpretations and undesirable plans and strategies, which are based on the index (Martín and Mendoza, 2013). Also, its simplification prevents understanding of the broader context and nature of the problem; therefore it is necessary to deliver not only the value of the index, but also a theoretical background about its creation. Then the problem of the observed phenomenon, its internal structure and relationships between partial building blocks can be understood.

## 4.1 Existing indexes

As already mentioned, the first method of measuring the quality of life was the gross domestic product. Over the century, as the research of quality of life was developing, there were further comprehensive indexes primarily focused on an international comparison of the development of the country.

Another tool for evaluation of economic development is Index of economic wellbeing, which was designed by Lars Osberg in 1985. It had to compete with the Gross Domestic Product by more detailed analysis of four main dimensions: consumption flows, accumulation of stocks of productive resources, income distribution and economic security (Osberg and Sharpe, 2001). Its calculation does not have fixed weight of indicators, which is often used to demonstrate changes caused by different priority of individual indicators. The main disadvantage is the lack of standardised data across the world states, as it is in the case of GDP or HDI described below.

The Index of economic wellbeing, however, does not cover another non-economic aspect of life. Therefore, in 1990 the United Nations defined Human development index. The wider concept highlights differences between countries with approximately same economic strength. The overall index consists of three main dimensions: a healthy life, access to education and material standard of living. The resulting value is calculated as a geometric mean of standardised factors.

An interesting alternative to HDI is the Regional index of quality of life and sustainable development. It was created at Charles University in the Czech Republic. Its concept combines the idea of human development according to UNDP (United Nations Development Program) and context of sustainable development. With 101 indicators, it covers four main areas of development and quality of life: socio-political, social, economic and environmental area (Mederly et al., 2003).

An example of another most known indexes for measurement of quality of life from different points of view is Happy Planet Index, Deprivation index, Active ageing index, Health-related quality of life index or Better Life index. The above-described existing indexes are very general, and they are particularly suitable for international comparisons. Most of them examine the quality of life only from a narrow perspective. Use of these indexes is not always convenient or possible, which is why many authors come to create their own indexes.

## 4.2 Composite indexes

For the specific purpose, it is often necessary to create a new own index, which is a common method often used in the social sciences. Many researchers are dealing with this topic, for example, Greyling and Tregena (2014), Martín and Mendoza (2013), Bérenger and Verdier-Chouchane (2007), Mederly et al. (2004) and many others. Since the index represents a highly complex phenomenon composed of many indicators, it is necessary to use the appropriate procedure that aggregates these individual aspects into resulting synthetic indicator. According to Sharpe and Smith (2005), particular indicators are aggregated into the index by weighting scheme.

Many methods are dealing with the determination of the weight of the individual components in the composite indicator. Same weight all the partial indicators can be used. In a real situation, where different parts have a different scattering and also a different significance, this method is the least meaningful. Adjusting the weights should be consistent with the theoretical background of the topic, or according to the nature of the data used. Knowledge of the theoretical background is represented by expert adjusting weights, based on detailed knowledge of the reference topic. An alternative is to use objective methods from the field of multivariate statistics. The most commonly used methods for determining weights of the composite index is the principal component analysis and factor analysis (Greyling and Tregena, 2014). The principal component analysis reduces the dimension of the dataset and creates new, synthetic components. They are expected to reveal hidden relationships between the input variables. A new principal component represents the synthetic index of quality of life and weights of particular indicators are then derived from the loadings on the new components.

Other examples of the quantitative method for creating of indexes are available in Balamoune-Lutz and McGillivray (2006) research, who use fuzzy sets; Martín and Mendoza (2013) using economic data envelopment analysis (DEA); Šanda and Křupka (2016) creating a quality of life index with a rule-based system or index based on calculation of multidimensional distance (Pérez et al., 2015).

### 4.3 Spatial aspects

The existing approaches rarely think about the quality of life as a spatial phenomenon. The aim of this article is to evaluate the quality of life at the lowest possible administrative level (optimally municipalities) and enrich the theme of its geographic aspect. Through the use of geospatial technologies, the result will be not only in the declaration "how" quality of life, but also "where" these values are. Spatial analysis can explore hidden patterns in the behaviour of the phenomenon and its spatial differentiation, identify spatial clusters of problematic areas or vice versa successful regions, or perform aggregation to higher administrative units. The great strength also lies in visualisation tools (e.g. epidemiological data visualisation, Marek et al., 2013), which allow to display information much faster and more efficiently than, for example, using tables or word assessment.

When the quality of life is evaluated, is necessary to distinguish spatial extend, which is monitored - evaluation of individual housing, quality of life at the level of city/municipality, region or country. This level significantly influences the selection of indicators for the creation of the overall index – some phenomena will be suitable for assessment at international level, and others for comparing the different communities within the state.

## 5 Paper results

The preceding paragraphs provide an introduction to the whole broad topic and try to define a narrower path of research of spatial evaluation of the quality of life. The main steps of the process can be defined:

### 5.1 Selection of indicators

The good data base is essential for performing any type of analysis. The data part affects the success and result of the research. The availability of different dataset influences selection of indicators, because all intended optimal data cannot always be gathered. In recent years, the European Commission tries to open up many datasets suitable for evaluation of the quality of life. Currently (the year 2017), database EurLIFE is available, but its information is based on the national level, and therefore cannot be used for purposes of this research evaluation. A more detailed source of statistical data are the national statistical offices; a lot of information can be derived from spatial data, such as Corine Land Cover or aerial images.

Every indicator should be covered by one of the pillars of sustainable development. Ideally, in each of them should be a similar number of indicators. The following table shows the proposal for selection of indicators based on previous studies.

**Table 1: Example of indicators**

Economic pillar	GDP, unemployment, commuting, median household income, intensity of tourism, economic burden index, index of economic activity, fiscal balance
Social pillar	population density, life expectancy at birth, mortality, level of education, crime rate, health and social facilities, suicide rate
Environmental pillar	greenness, coefficient of ecological stability, emission rate, water surfaces

## 5.2 Creation of composite index

The second step in the evaluation of the quality of life is the creation of the composite index, based on methods of selection of indicators, described in chapter 4.3. This research tends to use quantitative numerical methods, which are free of subjective perception of individuals and allow to determine the potential for quality of life, based on the environment in which the individual lives. Nevertheless, it would be interesting to compare the purely objective methods with methods extended by subjective perceptions and opinions. Such a variant is the process of creating an index by consultations with experts when the weights of individual indicators are set right by professional assessment. The last alternative for comparison with an objective procedure may be an evaluation of indicators using a questionnaire survey. Subjective level of agreement (appropriateness) may subsequently be converted back to weights of indicators using fuzzy set theory.

## 5.3 Evaluation

Once the index of quality of life is calculated for the entire area of interest, the final evaluation can be performed. This can be done by standard statistical methods, but also by spatial analyses. Especially the spatial aspect of quality of life has so far been overlooked. As with other phenomena, it is also good to have information where and which values phenomenon has, not only in the local view of one unit but also in a broader context and connection to the neighbourhood.

## 6 Discussion

This paper has so far moved only at a theoretical level, describes the basic knowledge, actions and targets for further research. It defines a specific direction focused on the spatial evaluation of the examination of the topic, especially in the context of the sustainable development, using objective quantitative methods. There are several deficiencies in existing approaches and therefore possibilities for improvement. They can be divided into following issues:

**Complexity of the topic:** The topic of quality of life is very broad and offers a variety of concepts and procedures for processing. In the past, many works have been focused mainly on its social and psychological essence. Another approach is focused only on economic strength, which is also insufficient. The quality of life is an issue that must be assessed comprehensively. In this context, ideas of sustainable development which cover main important aspect of life, are good guide in the selection of interesting indicators of quality of life.

**Spatial aspect:** from the geographical point of view, the topic is missing greater focus on the spatial variability of the phenomenon. Most of the above-described indexes are primarily focused on international comparisons and their use at the local level is not possible because of the theme of selected indicators and also unavailability of the suitable data for lower administrative units. However, it is necessary to examine the phenomenon in maximal spatial detail and thus identify problematic locality and scope for improvement. In spatial terms, the evaluation of the quality of life is a quite untouched topic. There is great opportunity for usage of geoinformatics technologies, not only as a tool for graphical presentation of information but also as an analytical tool, which allows performing a variety of spatial analyses, revealing patterns and deeper relationship in the behaviour of observed phenomena, which cannot be find in non-spatial outputs. Basic visualisation cannot also always provide this complex information at first glance. In most of the previous studies, this potential of spatial information has been looked over, and insufficient attention has been given to the spatial aspect of quality of life.

**Limited methodology and lack of data:** The main deficiency of quality of life research is the lack of a unified approach. The previous research defined an approximate area, which should be dealt, however, still leaves a large scope. Existing methods are not universally applicable – either they are designed for use at the national level (and then they are too general), or they are created only for a limited area, following the availability of suitable data. Also an initiative by the European Union aiming at a unified

methodology is a great step ahead, however, it is still focused only on the national level. Since each state has within its territory considerable variability in socioeconomic and physical geographic phenomena, it is necessary to keep exploring in greater detail and ideally at the level of individual municipalities. In relation to EU initiative would be appropriate to propose a methodology that would be universally applicable in all EU states, anytime and anywhere, based on readily available data. It should avoid complicated surveys with questionnaires and assess potential for good life using objective statistical and spatial data. Unfortunately, this is still limited by the lack of detailed data. As chapter 5.1 describes, there is no central database, which would be suitable for detailed evaluation. One of the next research objectives is to verify the availability of sufficient data sources in all European Union member states at the lowest possible administrative units. Once a set of data common to all member states and following ideas of sustainable development is defined, spatial variability of quality of life can be investigated.

The aim of the further research is to propose a procedure for the quality of life assessment. Compared to existing methodologies, this should have following key ideas:

- It is based on easily available data and therefore applicable in any country of European Union.
- It evaluates objective conditions for quality of life.
- It calculates composite index by quantitative methods.
- It puts emphasis on detailed spatial evaluation.

The topic of quality of life has been scientifically studied for many years, but still is in the scope for further development and improvement.

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# RISK MANAGEMENT PROCESS AND SOFTWARE SUPPORT

**Anikó Molnárová**

*Brno University of Technology, Faculty of Business and Management,  
Department of Informatics, Czech Republic  
molnarova@fbm.vutbr.cz*

## **Abstract:**

Risks are a characteristic phenomenon related to business operation in the current turbulent environment. Risk management is an area that focuses on the analysis of potential risk and their reduction through various prevention methods. Risk management enables substantial damage to be eliminated in advance and helps maximize the benefits. By implementing a systematic approach to identification, measurement, controlling, monitoring and reporting all significant risks in a systematic, unified and integrated manner using efficient IT support, these risks can be minimized and foreseen in time. The main objective of the paper is to point out the importance of risk management in companies, the formation of a basic risk management process outline and the description of the most commonly used software solutions in this area.

## **Key words:**

Risk management, risk, risk analysis methods, CRAMM, GRC, ERM

## **JEL Classification:** G32

## **1 Introduction**

The present time is characterized by increasingly rapid changes and the occurrence of many risks affecting prosperity and sometimes even survival of companies in a number of fields. The key factors increasing the frequency and intensity of risk occurrence undoubtedly include globalization as well as technical and technological changes. With regard to the above, the importance of adequate risk and uncertainty integration in business decisions of strategic nature. However, practical business experience shows that the manner of risk management are often insufficient and have considerably negative effects on business operation in general. The issue of cybersecurity is also closely related to risk management in companies. Cybersecurity is a topic of today and in the future its significance will increase. With increasing illegal activities of various groups, the fear of the impact of potential cyber attacks is growing; therefore risk management needs to be considered thoroughly.

The paper aims to point out the importance of risk management in companies, the formation of a basic risk management process outline and the description of the most commonly used software solutions in this area.

## **2 The Concept of Risk – Theoretical Background**

Risk is a historical term, purportedly originating in the 17th century when it appeared in connection with water transportation. The word “risico” comes from Italian and it originally meant danger the sailors needed to avoid. In contemporary understanding, risk in general means a threat of damage, harm, loss or destruction or failure in business. (Smejkal, Rais, 2013)

The notion of risk is thus related to the philosophical categories of necessity and accidentality. In economics, the notion of “risk” is used in the context of inexplicitness of development of certain real

economic processes and the uncertainty of their results. In general, of course, it can be stated that the risk may be of other than economic nature.

Thus risk is often understood as the danger of a certain loss. Financial theory usually defines risk as financial value volatility around the expected value as a result of changes of in a number of parameters. Risk must be assessed in two ways (Smejkal, Rais, 2013):

- Positive aspects – the hope of higher profit, hope of greater success
- Negative aspects – the danger of worse results. Losses can occur through a combination of these factors – the volatility of financial variables affecting the level of risk and the total engagement in these sources.

## 2.2 Risk Management

Risk management is a process in which the subject of management strives to eliminate the effects of both existing and future factors and proposes solutions that facilitate the elimination of undesired effects and, on the other hand, aims to make use of a potential positive impact. Smejkal, Rais (2013) Risk management is thus a formal process enabling their identification, assessment, measurement and management. However, the choice of the correct risk management process and its application is a very complicated task.

According to Tichý (2006), **risk identification** involves mostly engineering and economic approaches, experience and a certain level of generosity in understanding the relevant connections. We generally look into the future, either distant or immediate. Any risk identification methodology is based on the identification of assets, determination of asset value and the sources of risk. (Smejkal, Rais 2013, Tichý 2006) Therefore it must be completely clear what is threatened and where the danger comes from. Risk identification needs to be systematic and for that reason predefined table or verbal processes are applied. Korecký (2011) discusses the methods of risk identification, stating that it is advisable to combine various methods and not rely on a single one. He also lists the most efficient methods in this area: brainstorming, checklists, discussion, structured interviews, questionnaires and the Delphi method. In their extensive publication, Williams et al. (1995) describe suitable use of checklists and flow charts. Pritchard (2015) and Kendrick (2015) are among other foreign authors who focus on risk identification.

**Brainstorming** is a method within which a certain group tries to “create” ideas or find a solution to a certain problem by the individual group members coming up with ideas spontaneously without immediate critical evaluation. A discussion in the form of brainstorming should be led by an experienced moderator who should also present new categories of potential risks and thus continuously boost the flow of ideas. After collecting ideas, the moderator can group the results and divide them into more manageable categories. However, the brainstorming method must be used carefully and definitely should not be used too much or in an incorrect way. The emergence of new ideas might sometimes be hindered by group effects, such as fear of social embarrassment. (Pritchard, 2015)

**The Delphi method:** The basic principle of this method is reaching agreement within a group of experts who try to forecast future development. The Delphi method has the form of repeated rounds of questions and written answers that can also include comments on answers from previous rounds. In this way information can be gathered from the whole group and at the same time bias is eliminated. However, when applying the Delphi method, a suitable group of experts in the given field must be selected. (Kendrick, 2015)

**SWOT analysis** is an analysis of strengths, weaknesses, opportunities and threats that is often used in strategic planning. However, SWOT analysis can also be used in risk identification where the project team focuses on broader risk contexts in particular projects. (Kednrick, 2015)

## 2.3 Risk Analysis

Merna et al. (2007) note that the stage of risk identification is followed by the next phase of risk management process, i.e. risk **analysis** and assessment. The objective of this stage is to assess and determine the effect and probability of risk situation occurrence and risk prioritization based on their gravity. The selection of the method depends on many factors, in particular the availability of financial and time resources.

Smejkal a Rais (2013) state there are two approaches to risk analysis, namely quantitative and qualitative. Quantitative methods are based on mathematical calculation of probability of emergence and impact of a risk incident. In qualitative methods, the gravity of the impact and probability of a new risk incident emergence is determined on a set verbal scale or with the use of a point scale.

Kaplán et al. (1981) discuss quantitative risk definition. As mentioned above, risk quantification employs analytical estimates based on mathematical and statistical probability analysis, based usually on models of the examined phenomena and on the application of the Monte Carlo method. Fabian, Klüber (1998), Říha (2005) define the Monte Carlo method as a simulation method based on the use of a sequence of random or pseudorandom numbers. There is a number of different applications of this method with various result accuracy and calculation speed. General methodologies of quantitative risk analysis include @RISK, RiskPAC, Risk Watch.

## 2.4 Risk Treatment

Drdla, Rais (2001), Koller (2005), Smejkal, Rais (2013), Hopkin (2013) describe in their publications that after the analysis and assessment of risk gravity, the next stage is planning the responses to risks in order to **reduce** risks. If possible, it is more advisable to prevent risks through relevant measures before the risk turns into a problem whose negative consequences need to be eliminated. In general, one can differentiate two approaches to reduce risks, namely offensive, focused on reducing the causes of risk emergence, and defensive, focused on reducing any adverse consequences. Risk retention is probably the most common method of dealing with risks. Since entrepreneurs face a large number of risks, in most cases, either knowingly or unknowingly, they fail to act against them. However, it is crucial to create reserves to cover adverse development. Risk reduction is divided into two groups: methods removing the causes of risk emergence and methods reducing adverse consequences of risk. The first group includes methods focused on preventive activities within the company in order to eliminate the occurrence of risk situations, such as risk transfer, vertical integration, etc. These methods are described in detail in the publications by Hopkin (2013), Kendrick (2015). The second group includes mostly diversification and insurance. The relation between insurance and risk management are discussed in publications by the group of authors Williams, Smith, Young (1995), Janata (2008). Risk avoidance is applied to the most significant risks and is based on eliminating the risk emergence cause in order for the risk not to occur. A risk can be avoided, among other things, by finding an alternative solution, reformulating targets or changing technology. (Hopkin, 2013)

## 3 Methodology

The applied methods included in particular the methods of analysis and synthesis, i.e. decomposition of the whole to smaller parts followed by their connection in order to get a new view and induction method (progress from the particular to the general) and deduction (progress from the general to the particular). (Hendl, 2005)

Description and Explanation A scientific description is a precise record of the observed phenomena. The description is based on material notions describing the issues in their quantitative and qualitative determinations. Well selected or defined terms are important because the description provides evidence of the observed phenomena on which repetition may be based. Description differs substantially from explanation. Where description depicts the observed state, explanation expresses reasoning of the

given phenomena. Explanation puts facts in context. It may be the basis for hypotheses but its key role lies in drawing theoretical conclusions. The paper presents the description method in several places. It is used in particular in the theoretical part of the paper. (Hendl, 2005)

## 4 Risk Management Software Solutions

Rais (2001) states that reaching the desired level of practical problem solving, risk analysis is practically restricted by the limited ability of people to process information, their ability to formulate and solve complex problems. Human judgement is often irreplaceable in risk analysis and management; however, in some cases also tools to support operation tasks can be used, based on the application of mathematical models and computer technology. According to Vondrák (2002), the highest form of computer support are artificial intelligence instruments, expert systems in particular. Expert systems can be defined as computer programmes simulating the decision-making activity of a human expert in solving complex tasks, using suitable coded special knowledge taken over from the expert. The aim is to reach an expert level of decision-making within the selected problematic field (Berka 1994, 1998; Mařík a kol., 1997).

In the context of the above, the issue of cybersecurity should be mentioned. In the last two decades, the development of information and communication technologies has had a remarkable impact both on the individual and the society. The issue of cybercrime has been of increasing importance in recent years. The society is dependent on well-functioning information services. Extensive attacks in the cyberspace have forced the representatives of states and businesses to become more active in the area of prevention and safety. Securing safe cyberspace is a pressing topic not only at the level of theory and law. The issues of cybercrime are discussed in the extensive publication by Smejkal (2015).

The process of risk management never ends, it is very costly and requires high-quality knowledge and experience. A possible solution is available in the form of specialized computer programmes aimed at risk management support. According to Svatá (2011), these instruments are divided into three groups:

- **The first group** includes instruments for risk management through safe information: these are tools supporting risk analysis on a one-off basis, yet with longstanding results. CRAMM is one of the instruments in this category.
- **The second group** includes instruments for risk management within the whole company, applied in the so-called Enterprise Risk Management (ERM). With the use of such tools the company reduces risks threatening its business processes.
- **The third group** is represented by complex software platforms – Governance, Risk and Compliance (GRC).

### 4.1 CRAMM

CRAMM is a methodology for ISMS implementation. It is used in IS and network risk analysis, for designing safety measures and solutions to emergency situations as well as in determination of IS emergency requirements. The use of CRAMM methodology enables the performance of IS risk analysis for the period of one day (using CRAMM Express), the determination of IS data value in detail, discovery of the IS parts most susceptible to risk, forming proposals of countermeasures to reduce the established risks, keeping the safety documentation updated and IS analysis in all stages of its life cycle.

CRAMM fully supports the process of ISMS implementation in accordance with the ISO / IEC 27001: 2005 standard and prepares the system for certification in accordance with ISO / IEC 27001. The user can select the analysis type with regard to the style of work, analysis length and the volume of inputs / outputs.

The CRAMM Expert analysis is the basic module of CRAMM, which enables to perform detailed IS analyses and propose countermeasures. This analysis consists of 3 stages:

1. Identification and creation of asset models based on interviews with respondents. The objective is to determine possible effects on the company operation in the event of a threat.
2. Identification and determination of the level of system vulnerability. The objective is to calculate the degree of risk.
3. Proposal of countermeasures, identification of the established risk status. The objective is to process materials for implementation of the countermeasures recommended for execution.

The analysis can be performed in a few hours, therefore it is more suitable for initial area mapping rather than for obtaining certification. (Mullerová, 2016)

## 4.2 Enterprise Risk Management (ERM)

The value of a company is usually quantified at the level of the company as a whole; therefore it seems logical that any risks related to the activities creating the value of the company should also be managed at the corporate level. This approach is provided by Enterprise Risk Management (ERM) aimed at identification and assessment of all risks in an organization as well as the implementation of a whole risk management structure at the corporate level. It is the only solution covering the needs of risk resolution from project management to strategic planning. (Monahan, 2008)

**Enterprise Risk Management (ERM)** can be defined as risk management penetration into corporate philosophy where the management process is systematic and connected to the most significant activities. As such, it is a process that affects workers at all management levels. (Monahan, 2008)

The ERM process consists of setting up the risk management policy and formation of its implementation structure, while the process does not change in time, only the group of identified and analyzed risks is extended. Apart from setting the degree of risk tolerance, another important step in ERM is defining the procedures and methodology to identify, measure, assess, analyse, application and reporting of risks, monitoring and reporting being the last stage of the process. These steps are continuously repeated and new solutions are added. (Olson, Dsheng, 2010)

The **Enterprise Risk Manager** tool is based on a number of standards, such as ISO 31000, AS / NZS 4360, ISO 27001, COSO and others. It facilitates compliance with the above standards for companies. Thanks to the fact that the tool supports quality risk analysis, the data on risks are stored according to categories: assets, divisions, localization, risk actors, responsible parties, affected activities, departments. Among other things, it also enables preliminary event screening and monitoring of measures adopted as a reaction to the event.

The tool is available in different versions based on the number of users (one user - RiskEasy, group application – Risk Register for Workgrounds) and the type of risks (project risk management Risk Register for Projects, company risk management – Enterprise Risk Register). (Fraser, Simkins; 2016)

**Table 1: ERM solution functions and benefits. Source: own processing by Khan et. al. (2016)**

<b>Benefits for executive management and internal auditors</b>	<b>Benefits for managers and risk management</b>	<b>Benefits for project managers</b>
Automatic notifications and panels increase the security in reaching key company targets, such as profit, volatility and cash flow. Support of internal auditors in audit planning and internal audit management.	Centralized risk registers eliminate inconsistent table processors and other isolated risk information storage.	Quality and quantity risk assessment and evaluation takes into account both instinctive and objective risks.
Management of direct and indirect losses through targeted reduction increases profit. Planning and Administrative Management of Internal Audits and Risks	The available libraries, templates and tests ensure that the current risk management processes are efficient.	Resource management according to risks facilitates timely prevention of drawing on reserves and observation of allocated project costs.
Advanced display of risk assessment and analysis in "heat" maps facilitates the prioritization of activities aimed at reducing the effect of risks at the level of projects, programmes, individual departments as well as the organization as a whole.	Centralized risk coding and classification contribute to process consistency and fast acquisition and implementation within the whole organization.	The views / screens and applications based on the user task simplify the inputs and displays of information on risks, plus they accelerate the application process

#### **4.3 GRC – Governance, Risk and Compliance (GRC)**

GRC, i.e. **Governance, Risk, Compliance** has three basic layers, helping the management mutually to get an overview of how the particular company meets its specific targets. Governance represents a general approach to organization management that facilitates the management and control of the whole company by managers and responsible persons. The introduced Risk concept presents a complex system of risk management within an organization. Compliance is a way of checking that the organization fulfils all the respective requirements. (Bamberger, 2010)

The aim of GRC is to achieve effective information sharing, efficient activity implementation and reduction of uneconomical waste of resources. Although the scope and purpose of GRC may vary in different organizations, it generally includes activities such as management processes (IT processes, security processes, business processes), enterprise risk management (safety risks, supplier risks) and compliance with applicable laws and regulations. (Bamberger, 2010)

GRC integrates various related data. It is possible to determine at any point which asset affects which risk. If there is a safety event, the responsible manager is able to determine the impact of the potential incident and the level of risk increase very fast and he/she is able to actively monitor the risk progress in corrective or preventive measures execution. The risk analysis can be performed without the need to attend the respective sites in person. The data are stored and processed in a centralized manner, based on asset records. GRC can be connected to other sources of information (LDAP, record database, etc.). Continuity plans can be made and tested for the assets. Safety incidents can be recorded, classified and resolved. (Schermann, 2012)

The particular GRC solutions differ from each other, offering various functions, but the internal idea is the same. The joint feature is the main GRC benefit – integrated data and information. (Jokonya, Lubbe; 2009)

## 5 Discussion

Organizations currently conduct business in an environment characterized by increasing and more complex risk. Companies gradually embrace an increasingly lower tolerance to failure. In this dynamic world it is necessary to have such a management system that withstands significant threats. The previous chapter presents the basic description of the three systems used in risk management: ERM, GRC and CRAMM. Each of these solutions has its advantages.

**ERM** has to be understood as an independent capability, a process with a defined set of technologies, experts, programmes that are generally supported within the company, have the requested effect and are a part of each decision-making process.

**ERM solution advantages:** global view of risks; strategic orientation; focus on gaining competitive advantage; ERM activities are performed through individuals, business units to the management; focus on organization as a whole; responsibility for results shared by all stakeholders; retrospective view and reduction of cost duplicity in risk management; regular reporting, free access to data.

Companies are continuously subject to ever increasing pressure of various regulations (cyber laws, GDPR) and a suitable **GRC tool** can help organizations to deal with the above effectively in the future. Its implementation is usually not simple; however, if a company invests its time and resources in it, these are recovered in particular in the form of overall more efficient processes.

**GRC solution advantages:** Integrated company management significantly reduces the number of people and the amount of time required to ensure and manage compliance as well as risk management; thanks to the solutions that involve automation, analysts and notices, businesses are able to mitigate risks arising from the range of laws and regulations more effectively; thanks to increased transparency and more complex knowledge the companies are able to select or reject projects based on the assessment of the relation between the impacts and potential risk occurrence and potential return on investment; the organizations are able to simply identify and assess alternative scenarios.

The principal advantages of **CRAMM** include: A complex set of tools for risk assessment and analysis; a number of support and additional tools and guides to form safety policies; predefined risk analysts for different types of IS; extensive library of countermeasures; tools for creating safety documentation; graphical output of analysts and statistics.

## 6 Conclusion

Risk management should be an integral part of strategic management, regardless of the business focus. Risks affect each organization from various angles. They can be legal risks following from contractual issues as well as legislative risks, commercial risks, economic, cyber risks and many others. The most suitable way of their prevention is setting a standard of risk management in the organization in such a way that it is consistently applied on the execution of all business processes. Within risk management, IT support is necessary to ensure its correct and quality operation.

Today companies are not able to do without a risk management system, in other words, without an effective risk management they would not be able to assert themselves in the competitive market environment. Moreover, the system of risks the companies have to face is very complex and without an organized risk management structure such a complex of risks could not be managed at all. This structure must include the process of risk identification, analysis and quantification as well as decisions on risks followed by a review.

The paper briefly described the risk management process based on domestic and foreign literature and it aimed to point out the importance of IT support utilization in risk management.

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# BEHAVIORAL MODELS IN THE SOCIAL ENTREPRENEURSHIP

**Zuzana Palová**

*Silesian University in Opava, School of Business Administration in Karvina,  
Czech Republic  
zuzana.palova@centrum.cz*

**Jarmila Šebestová**

*Silesian University in Opava, School of Business Administration in Karvina,  
Czech Republic  
sebestova@opf.slu.cz*

## **Abstract:**

Social innovations are challenge of this century. The social enterprises are very important kind of social innovations. Their importance lies primarily on employment people with disadvantages. Every organization is helping to employ a different group of people with disabilities. The most often group is people with disabilities in the Czech Republic. One of the basic principles of the social enterprises is that their primary objective is not profit. In modern economic theory of the firm we meet with the so-called alternative or alternative models. The goal of this paper is to show that the theory which was originally applied to the company, from a certain perspective on the profit sector, are also important in the nonprofit sector. The application was done on two behavioral models, namely Doyle's model and behavioral model of firm according to Cyert and Marche.

## **Key words:**

Alternative models, behavioural models, social enterprises, social innovation

**JEL Classification:** A13, L31, O35

## **1 Introduction**

Social innovations are challenge of this century. The social enterprises are very important kind of social innovations. These enterprises are formed based on triple benefit, and so social, environmental and economic. Their importance lies primarily on employment people with disadvantages. The most often group is people with disabilities in the Czech Republic. One of the basic principles of the social enterprises is that their primary objective is not profit. Profit is of course important for the operation of the company, but only as a tool for achieving others goals. Because the objective of these kind businesses is not maximizing profits or turnover, we can classify these kind enterprises into alternative models.

In modern economic theory of the firm we meet with the so-called alternative or alternative models. It is an approach stemming from a critique of neoclassical economics, which disregards to psychological or sociological factors. It ignores the separation of owners and managers, a complex organizational structure, variability of internal and external factors, uncertainties and other. There are two different large groups of alternative models namely managerial and behavioral.

The aim of this paper is to show that the theory which was originally applied to the large company from profit sector is also important for the nonprofit sector. At the end there was also discussed the Corporate Social Responsibility (CSR) in context with social enterprises.

## 2 Theoretic background

This part is devoted into theoretic background of this paper. It consists of two parts, and so Social innovations and social entrepreneurship and Alternative theory of the firm.

### 2.1 Social innovations and social entrepreneurship

#### Social innovations

Murray, Caulier-Grice et al. (2010) in the Open Book of Social Innovation defined social innovation: „...as new ideas (products, services, and models) that simultaneously meet social needs and create new social relationships or collaborations. In other words, they are innovations that are both good for society and enhance society’s capacity to act“.

Social innovations can be seen as innovations contributing society and also have an activated element for a local company or community "do something or change something" (Lauritzen, 2012). The social enterprise is an important kind of the social innovations.

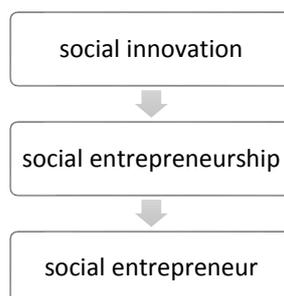
Šebestová and Palová (2016) devoted their research into the creation social innovation with support from the ESF in the Czech Republic. They proposed also the definition of social innovation. “The social innovations is understood as a new approach that seeks to improve the living situation, whether an individual or a whole community through new methods or approaches. Social innovation is closely tied with the local economy. Its impact is actively monitored and supported by institutions and their creators, who are trying to develop the concept further.” (Šebestová and Palová, 2016, p. 106).

Caulier-Grice et al. (2012) created classification of social innovation:

- new products,
- new services,
- new processes,
- new platforms,
- new organizational forms,
- and new business models (social entrepreneurship or social businesses etc.)

Social innovations cross the borders of one field and it is no possible to separate them from entrepreneurship, social entrepreneurship and socially oriented entrepreneurs (Fig. 1).

Figure 1: The status of social innovation



Source: (Howaldt et al., 2014)

The behavior of social innovations is similar to technical innovations. Social innovations are not connected to any kind of organization or kind of business. Social innovations could be created anywhere. The social innovations are most often in the public by provided services, such as education, social and health care. Social innovations are created especially on local level due to voluntary organizations, NGOs, societies and social entrepreneurs. The social innovations are in all four sectors of national economy (TEPSIE, 2014). The social entrepreneurship makes up certain intersection between individual sectors (Fig. 2).

**Figure 2: The status of individual creators of social innovation across sectors**



Source: (TEPSIE, 2014)

### **Social entrepreneurship**

Definitions of social entrepreneurship range are large. In the former, social entrepreneurship refers to innovative activity with a social objective in either the for-profit sector, such as in social-purpose commercial ventures (e.g., Dees and Anderson, 2003; Emerson and Twersky, 1996) or in corporate social entrepreneurship (e.g., Austin, Leonard, Reficco and Wei-Skillern, 2004); or in the nonprofit sector, or across sectors, such as hybrid structural forms which mix for-profit and nonprofit approaches (Dees, 1998). Social entrepreneurship usually refers to the phenomenon of applying business expertise and market-based skills in the non-profit sector such as when non-profit organizations develop innovative approaches to increase their income (Reis, 1999; Thompson, 2002). Common across all definitions of social entrepreneurship is the fact that the underlying drive for social entrepreneurship is to create social value, rather than personal and shareholder wealth (e.g., Zadek and Thake, 1997), and that the activity is characterized by innovation, or the creation of something new rather than simply the replication of existing enterprises or practices. Austin, Howard and Wei-Skillern (2006) defined the central driver for social entrepreneurship which is the social problem being addressed, and the particular organizational form a social enterprise takes should be a decision based on which format would most effectively mobilize the resources needed to address that problem.

Basic principles of social entrepreneurship were globally defined by the Nobel Peace Prize winner, Muhammad Yunus, in his book *Building Social Business* (2010). He defined the basic principles of social entrepreneurship on global level and subsequently used them in practice. The social entrepreneurs according to him help to eliminate poverty and promote economic growth. The nongovernmental organizations (NGO) such as the organizations in the “third sector” have important role in the creation of social enterprises. NGOs know the actual needs of society.

The social economy began to be formed in 1980’s in France. Then it started to spread into other European countries. In 1980 the Social Economic Charter was accepted by the National Council for

relations between mutual societies, cooperatives, and associations. Charter considered the social economy as a group of organizations which do not belong into public sector, are democratic and have special scheme for redistribution their profit for further development and improvement for its members and for society (Monzon and Chaves, 2008).

In the last decade, the social economy has managed much stronger position on the European level. The social economy has been admitted by European Commission in 1989. According DG Enterprise the social economy contains cooperatives, mutual societies, associations, foundations and social enterprises (Dohnalová et al., 2009).

The platform TESSEA proposed the most widely used definition of social enterprises in the Czech Republic. TESSEA defined social enterprise as follows: "*Social enterprise means "a subject of social entrepreneurship", i.e. a legal entity established under private law or any part thereof or natural person which fulfills principles of the social enterprise. Social enterprise fulfills the public benefit objective, which is formulated in the founding documents. Social enterprise arises and develops on the concept so-called threefold benefit - economic, social and environmental"* (TESSEA, 2011).

## **2.2 Alternative theory of the firm**

Alternative goal or set of goals of the firms are based on the interaction of internal and external interest groups within their power or status of implementation of business strategies. Into file of alternative goals the company includes both tangible goals and intangible character, or satisfaction optimization goals, objectives measurable in monetary or other units or targets difficult to measure. Vimrová (2015) distinguishes five basic alternative theories:

- Management theory,
- Behavioral theory,
- Institutional theory,
- Postkeynesian theory,
- and Employee theory.

The behavioral theory has the most closed to the social enterprises from all the alternative theories. Although the behavioral theories are more suitable for larger company and social enterprises we could classified as small or medium company<sup>1</sup> the role of the interest groups are higher than by usual small or medium enterprises.

### **Behavioral models**

Neoclassical and managerial theories have in common that their concept the companies seek to maximize certain variables. In behavioral models we do not meet a similar approach. These theories take into account the organizational structure of the company and examine how the structure of the company acting on their goals. The goal there is basically understood as the result of the clash of interests of several interest groups and may change with changes in the objectives of each group and also the change of power within the company.

Behavioral theories are based on the assumption that the complex structure of large companies leads to the existence of various interest groups. For basic groups are considered owners of the company, management and ordinary workers. Interest groups can be further subdivided. Majority owners and small shareholders could have different objectives. In each model, we can see different classification of interest groups. All models however predict that the complicated structure of the company did not allow a company to watch as a goal to maximize some quantity. The company always tries to achieve compromise between the various objectives of the interests groups.

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<sup>1</sup> The median number of employees in the social enterprises which was created with financial support from the ESF in operational period 2007-2013 was 8. (Oddělení evaluací, 2016)

In next part we will deal with three kind of behavioral models: Simons model, Behavior theory of the firm according Cyert and March and Doyle's model.

### **Simons model**

The American economic and theoretic of management Herbert Alexander Simon, the Nobel Economy Prize winner, is the author of this model from the 1959. Buchta and Kovárník (2006) state the aim of the company according to Simon's is to survey on the market. This goal, in practice, is transformed into finding solutions that satisfy all interest groups in the company. The model is thus rather focuses on the processes through which the company takes its decisions, rather than the results of these processes. Objective survive in the market characterizes the majority of social enterprises. At first a social enterprise must survive in a competitive environment, so that it can fill different objectives of various interest groups.

### **Behavior Theory of the firm according Cyert and Marche**

Cyert and March (1992) for them work used the idea H. A. Simon. They dealt with the analysis of decision-making processes inside large company in imperfectly competitive market with conditions of uncertainty. In their concept, the company is made up of a wide range of interest groups, and therefore does not attempt to achieve a single target or group of targets. Targets are determined as elaborately reach compromises that are the result of social games between different interest groups.

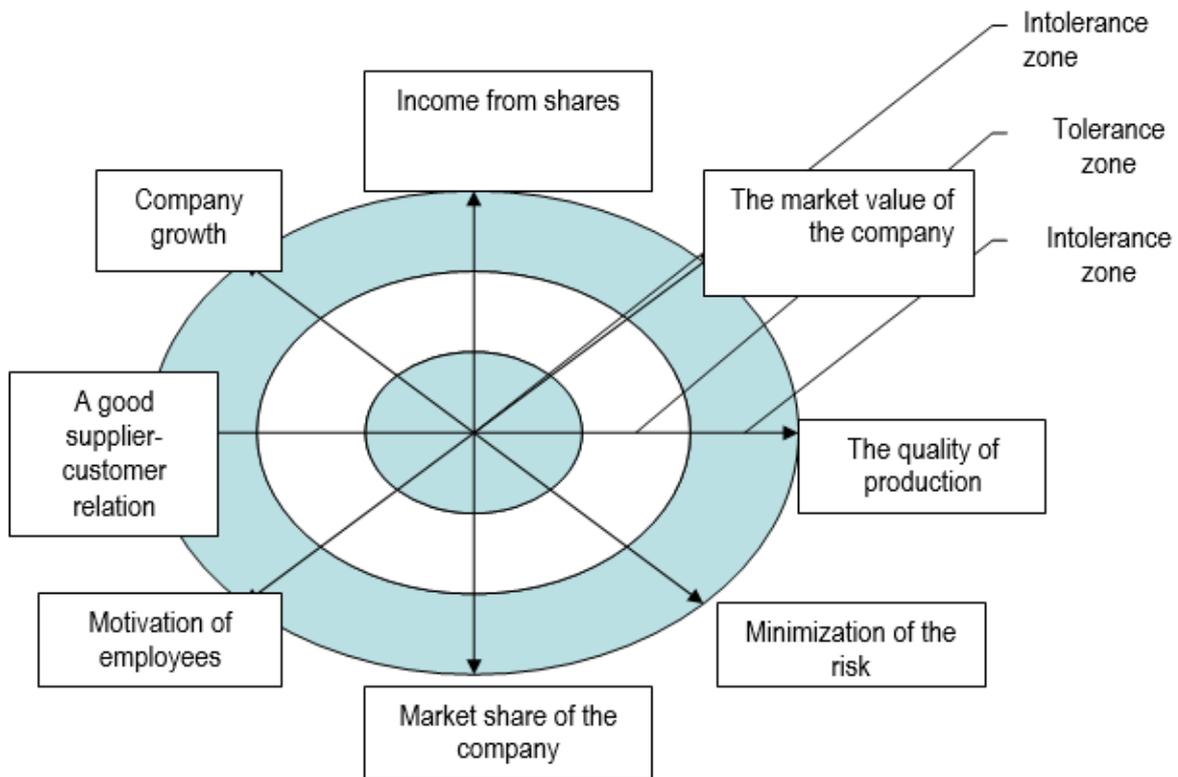
According to the authors there could be distinguished internal and external interests groups. Among the internal group there are included senior management, lower management and administration, union leaders, high skilled workers and ordinary workers. External interest groups are formed e.g. shareholders, creditors, suppliers and customers. Each of these groups has own set of goals. For the achieving of them there are done the short and long term targeted coalitions with other groups against other groups. These social games are the core of decision-making processes. Decision-making process within the company is not focused on maximizing of any chosen target, but focuses only on satisfying its amount.

### **Doyle's model of zones**

*Peter Doyle* introduces the notion of a tolerance zone whereby the firm matches the minimum expectations of all its key stakeholders (Soukup, 2001). In this behavioral model simultaneously pursues a number of objectives. Doyle chose eight of them. Various interest groups in the firm identify with different objectives. When we move from the center to outwards the chart focuses on meeting the relevant targets. Disequilibrium situations correspond to the external and internal zone.

External zone of intolerance shows that too strong emphasis on one of the eight goals is not appropriate because it brings an excessive alternative costs. These costs result from the inability to achieve other goals. This situation may destabilize company or even threaten its existence. Internal zone indicates that the company does not fulfill the minimum expectations of any interest groups that operate within it. Tolerance zone expresses bargaining space available to managers to reconcile different (and sometimes conflicting) goals of interest groups (fig. 3).

Figure 3: Doyle's model



Source: Soukup (2001)

The task of management is to expand the room for negotiation in the interest of stable existence of the company in the market, e.g. finding common interests groups, improving communication between groups, strengthening informal links etc.

### 3 Applications of models on social enterprises

This part is devoted to application of behavioural methods on social enterprises. The most of the social enterprises do not fill condition of the size of company. But in the social enterprises we could find a lot of different interests groups and the objective of the profit is only for fulfilling other objectives. The application is devoted into two models, and so Behavior theory of the firm according Cyert and Marche and Doyle's model of zones.

#### 3.1 Behavior Theory of the firm according Cyert and Marche

Different authors of applications of this method introduce different interest groups. Buchta (2004) worked with interests groups in Industry Company. He classified interest groups according to subdivision, level of administration, and according to the task (owners, top management, other employees and company union. Buchta and Kovárník (2006) their interest groups were finding for the university. The main interests group were consist of teachers, employees and students.

For social enterprises in the Czech environment we can be characterized above these interest groups:

- owners / founders of the social enterprise,
- employees,
- customers of services or products.

Other interest groups:

- Ministry of Labour and Social Affairs,
- municipalities and regions,
- providers of social services
- and more.

### **What are the goals of these groups?**

- Owners / founders of the social enterprise
  - The founders and owners of the social enterprise may be in the Czech Republic due to the lack legislation whoever. Subsequently, depending on whether of the main motive of the owner or founder we could divided the target from the maximization of the profit too achievement of predetermined socially responsible targets.
- Employees
  - Employees can be divided into employees from the target group (with disadvantages) for which it was founded a social enterprise, and other employees. All employees have a common goal to maximize their salaries. Furthermore, there could be formed other targets. Employees with disadvantages are wondering whether they receive for the same work same salary as workers without disadvantages. A similar situation can then also arise for employees with no disadvantages. For employees from target groups there can be one of the goals at maintaining a job in social enterprise. This goal can be very competitive with the aim of maximize salaries.
- Customers of services or products
  - The customer's behavior can be specific because the social enterprise is a specific kind of company. On the one side there may figure customers whose aim is to minimize costs. On the other hand, there can figure customers who have subscribed to services or products, not because of price, but because of the social producer. This is objective of social responsibility, not only by the companies but also individuals who are included in the market.

Other interest groups also have their goals in relation to social enterprise. The aim of the Ministry of Labor and Social Affairs is that social enterprises employee as many as possible people with disadvantage. Municipalities and regions like to participate in the creation or supporting of social enterprises. Their support may also consist of the role of customers. At present Czech legislation addresses how these companies offer preferential conditions procurement (Socially responsible public procurement, 2017). Social service providers are often a source of employees in these enterprises. Sometimes, these social service providers are creators of these companies. It is depending on the necessity for their clients.

### **3.2 Doyle's model of zones**

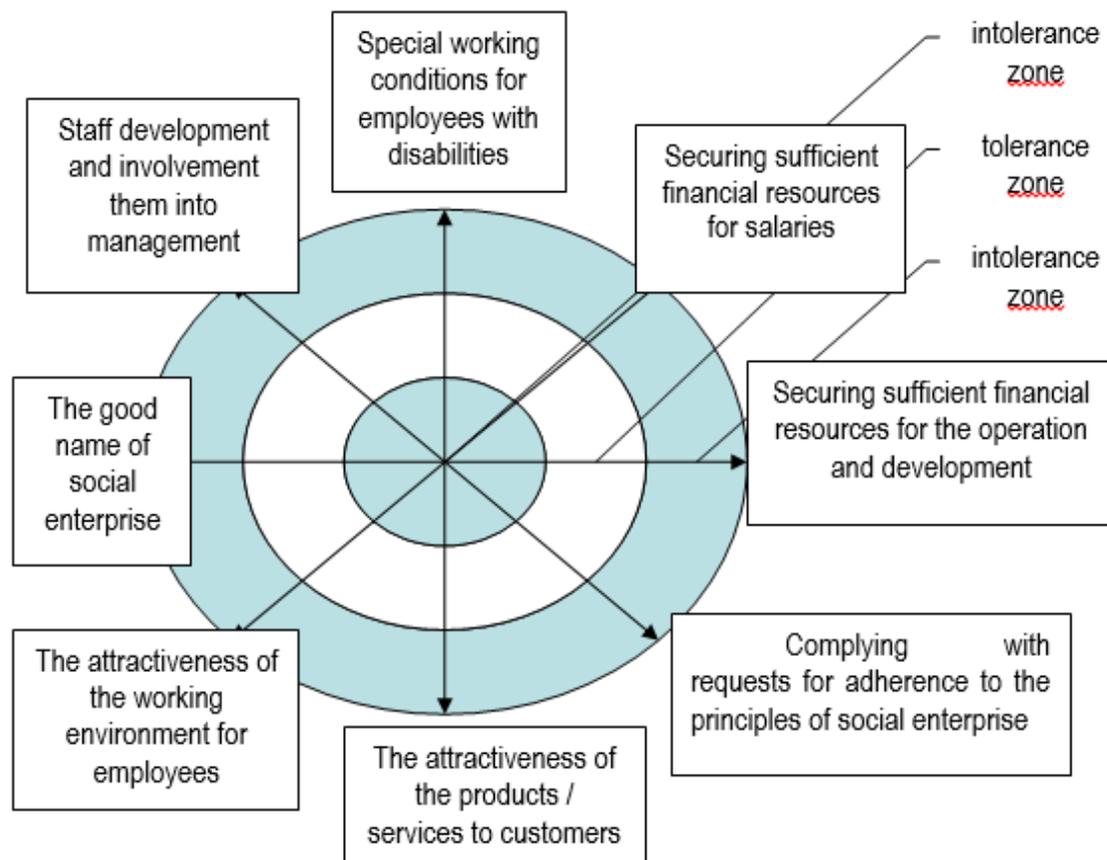
This model applies mainly to the corporate goals, not the goals of special interest groups. In reality one of the aims of interest groups may be identical to the company's goals.

In application to social enterprises we have tried to formulate the objectives of social enterprise as follows (fig. 4):

- special working conditions for employees with disabilities,
- securing sufficient financial resources for salaries,
- securing sufficient financial resources for the operation and development,
- the good name of social enterprise,
- the attractiveness of the products / services to customers,
- the attractiveness of the working environment for employees,
- staff development and involvement them into management,
- complying with requests for adherence to the principles of social enterprise.

These goals are not identical with the objectives of interest groups referred to in 3.1 and in addition are much more societal goals, or objectives of the institution.

Figure 4: Doyle's model for social enterprises



Source: Own.

It can be said that the management of social enterprises must for achieving the objectives take into account the interest groups, respectively must acquire for its policy allies.

### 3.3 Corporate Social Responsibility in context with social enterprises

Corporate Social Responsibility concept is much older than the stakeholder theory. CSR since the beginning has been addressing whether the company liable to the society. The CSR has triple bottom line. This 3BL concept consist of threes spheres (Werther and Chandler, 2006)...

- economic,
- social,
- and environment.

Crane et al. (2008), Blowfield and Murray (2008) state that the economic sphere is referred to as profit ("profit"), the social sphere represents the notion of people ("people") and the environmental sphere represents the planet ("planet"). That the same concept as the concept of social entrepreneurship which is creation on the basic of three elements: economy, social and environment.

Business expectations are different according the stakeholders. Different expectations according stakeholders the social enterprises have against the business companies (tab. 1). In the table there are designed differences by authors of this paper. The individual differences could change according specialization of social enterprise. The social enterprises have of course the expectations according Bateman (2003). The different expectations are extra.

**Table 1: Business expectation and expectations for social enterprises**

<b>Stakeholders</b>	<b>Business expectations (according Bateman 2003)</b>	<b>Different expectations for social enterprises</b>
Owners and Investors	profit, growth in enterprise value and transparency	to achieve social objectives
Customers	quality products and services, reasonable price and after-sales service	social responsibility of buyers
Business Partners	quality contracts and negotiations, the timely fulfillment of commitments	social responsibility of partners, the social and finance advantages for business partners
Employees	reasonable salary and non-financial benefits for work, professional development and educational opportunity, reconciling professional and personal life	specific approach employers to employees with disabilities
Local community	financial and material support, obtaining the know-how from corporate volunteers	---
Environmental NGOs	organic production, products and services, minimal burden on the environment	environmental approach and its implementation are mentioned in the founding document social enterprise

Source: Own proceedings.

## 4 Discussion

The social enterprises are very important kind of social innovation. These enterprises are formed based on triple benefit, and so social, environmental and economic. Their importance lies primarily in

employing disadvantage people. The most of the social enterprises employ people with disabilities. One of the basic principles of the social enterprises is that their primary objective is not profit.

In modern economic theory of the firm we meet with the so-called alternative or alternative models. The goal's contribution is to show that the theory which was originally applied to the large company, are also important for small the nonprofit sector. The application of alternative models was done on two behavioural models, and so Behavior theory of the firm according Cyert and March and Doyle's model of zones. The most of the social enterprises do not fill condition of the size of company. But in the social enterprises we could find a lot of different interests groups and the objective of the profits is only for fulfilling another objectives.

In the behaviour model according to Cyert and March was proposed main interest groups (owners / founders of the social enterprise, employees, customers of services or product) and other interest groups (Ministry of Labour and Social Affairs, municipalities and regions, providers of social services and more). In Doyle's model of zone we tried to formulate the objectives of social enterprise as follows special working conditions for employees with disabilities, securing sufficient financial resources for salaries, securing sufficient financial resources for the operation and development, the good name of social enterprise, the attractiveness of the products / services to customers, the attractiveness of the working environment for employees, staff development and involvement them into management, complying with requests for adherence to the principles of social enterprise. The results of the all goals are different because it depends on the interest groups.

This paper is theoretical design of applications of behavioral models on social enterprises. It will be very interesting to continue in this research with questionnaire research among social enterprises. This research could confirm or refuted our proposed targets for the two methods. After this we will able to create accurate behavioral models for social enterprises which could be useful for propose a uniform legal form of social enterprises.

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# FUZZY REGRESSION ANALYSIS APPLICATION ON DATA TIME SERIES IN ECONOMICS

**Miroslav Pokorný**

*Moravian University College Olomouc, Czech Republic*

*miroslav.pokorny@mvso.cz*

## **Abstract:**

Complex economics systems are difficult to define and difficult to measure. In engineering practice there is a need to reflect the effects of disturbances and other influences. The suitable theoretical background for abstract formalization and utilization of vague phenomenon of uncertainty of such systems is fuzzy set theory. The basic principles of fuzzy linear modelling and identification of time series systems are presented. The real time-trend and seasonal cycles including their possibility areas are calculated and expressed.

## **Key words:**

Complex systems, fuzzy number, fuzzy linear model, genetic algorithms, time series, time-trend, seasonal cycle, possibility area

## **JEL Classification:** C45

## **1 Introduction**

Complex economics systems are difficult to define, difficult to measure and the human element is incorporated. In mathematical statistical modelling, we assume that the relationship between dependent variables and independent variables of a model is well-defined and sharp. Uncertainty of data is caused not only by random stochastic disturbances. Although statistical methods has many applications, problems can occur in the situations in which number of observation is inadequate (small data set), difficulties verifying distribution assumptions exists, vagueness in the relationship between input and output variables exist, the ambiguity of events or degree to which they occur or inaccuracy and distortion introduced by linearization is possible.

Such relationship is more or less non-specific and vague. The suitable theoretical background for abstract formalization of vague phenomenon of such systems is fuzzy set theory. The vagueness of fuzzy model is defined in uncertainty of its parameters and finally in uncertainty its output variable. Fuzzy model parameters and output variable are formalized as the specialized fuzzy sets - fuzzy numbers. The basic principles of fuzzy linear modelling and identification is also presented.

The submitted paper presents fuzzy analysis of the selected variables under these specifically defined conditions [1]. The time-trend and seasonal cycles including their possibility areas are calculated and expressed. The analysed time period was selected on the basis of the beginning and the proceedings of the crisis. In the measured period, every year 12 values were analysed, which in the coherent time series already enable a complex, general and valuable analysis

## 2 Vague Phenomenon Fuzzy Modelling

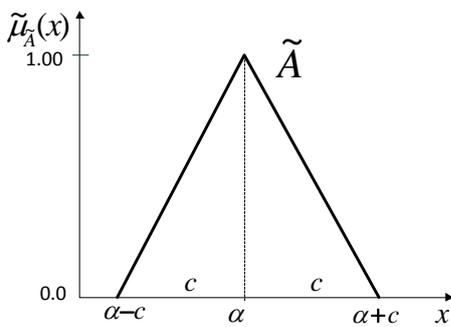
Suitable models reflecting the vagueness of the systems are fuzzy models [2], based on principles of scientific field Artificial intelligence [3]. Model uncertainty is represented by the uncertainty of its parameters and finally of its output variables.

The vagueness of the linear fuzzy model is represented by the fuzzy output values  $\tilde{Y}$  and the fuzzy coefficients  $\tilde{A}$  in the form of special form fuzzy sets - fuzzy numbers [2]. The shape of one-dimensional fuzzy linear model is given by

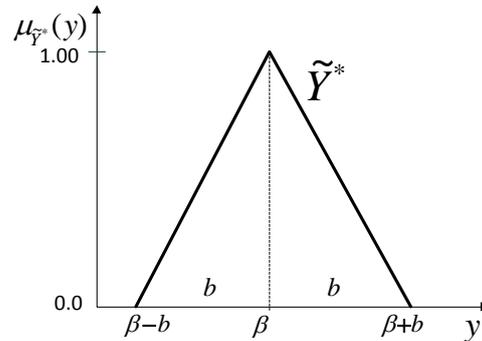
$$\tilde{Y} = \tilde{A}_0 x_0 + \tilde{A}_1 x_1 \quad (1)$$

where  $\tilde{A}_0, \tilde{A}_1$  are fuzzy coefficients in the form of fuzzy numbers. The fuzzy number  $\tilde{A}$  is defined using its triangular shape membership function  $\mu_{\tilde{A}}(x)$  of fuzz set – Fig.1a.

**Figure 1a: Triangular membership function of fuzzy number  $\tilde{A}(\alpha, c)$**



**Figure 1b: Triangular membership function of fuzzy number  $\tilde{Y}^*\{\beta, b\}$**



where  $\alpha$  is the mean value of fuzzy number  $\tilde{A}$  and  $c$  is a half of the width of the carrier bearing  $\tilde{A}\{\alpha, c\}$ . The degree of uncertainty of fuzzy number  $\tilde{A}$  (linguistically expressed as “approximately  $\alpha$ ”) is determined by the size of the crisp interval  $[(\alpha - c), (\alpha + c)]$ .

The output variable  $\tilde{Y}$  of fuzzy model (1) is also fuzzy number defined using the triangular membership function (Fig.1b). The estimated value – fuzzy number  $\tilde{Y}^*$  – is defined in the form  $\tilde{Y}^*\{\beta, b\}$ , the fuzzy form of observed value  $\tilde{Y}^0$  is defined in the form  $\tilde{Y}^0\{y^0, d\}$ .

Value  $\beta$  is the mean value of estimated output fuzzy number  $\tilde{Y}^*$  and  $b$  is a half of the width of the carrier bearing  $\tilde{Y}^*\{\beta, b\}$ .

To calculate the parameters  $\beta, d$  the principles of fuzzy arithmetic is used [4]. The mean value  $\beta$  is done in the crisp form

$$\beta = \alpha_0 x_0 + \alpha_1 x_1 \tag{2}$$

and the fuzziness  $b$  is done in the form

$$b = c_0 |x_0| + c_1 |x_1| \tag{3}$$

Fuzzification of the examined values  $y^0$  is done with the use of fuzzy interval  $d$ . Its calculation is described in the follow.

### 3 Linear Fuzzy Model Identification

To define the type of the fuzzy model we use the version in which the input variables  $x_j$  are mentioned as crisp numbers and the observed values  $\tilde{Y}_j^0$  as triangular fuzzy numbers, respectively. The fuzziness  $d_j$  of the observed fuzzy value  $\tilde{Y}_j^0 \{y_j^0, d_j\}$  at the step observation  $j$ - can be determined using the observed values at the step  $(j+1)$  and  $(j-1)$ , respectively. It means, fuzzy number  $\tilde{Y}_j^0$  is mentioned of an equal triangular type. The values  $d_j$  we can calculate by the formula

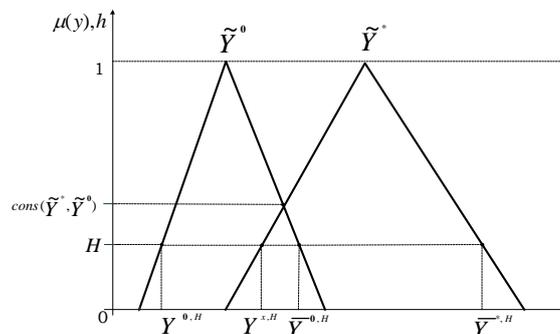
$$d_j = \frac{1}{2} |y_{j+1}^0 - y_{j-1}^0| \tag{4}$$

Finding values  $\alpha_i$  and  $c_i$  as searched parameters of fuzzy coefficients  $\tilde{A}_i$  (Fig. 1a) is defined as an optimization issue.

Fitness of the linear fuzzy model to the given data is measured through the Bass-Kwakernaaks's index  $H$  – see Fig. 2 [5]. Adequacy of the observed and estimated values is conditioned by the relation (5) – the maximum intersection of two fuzzy sets – the estimated  $\tilde{Y}^*$  and the examined  $\tilde{Y}^0$  - must be higher than the set value  $H$  (see Fig. 2).

$$\max_y \{ \mu_{\tilde{Y}^0}(y) \wedge \mu_{\tilde{Y}^*}(y) \} \geq H \tag{5}$$

Figure 2: Adequacy of fuzzy model



Only if the condition (5) is fulfilled we assume good estimation  $\tilde{Y}^*$  of the observed output value  $\tilde{Y}^0$ .

In addition, the requirement on adequacy of the estimated and observed values (5) will be complemented by the requirement on minimum possible total uncertainty of the identified fuzzy model

$$\sum_{i=0}^1 \sum_{j=1}^m c_{i,j} \rightarrow \min, \quad j = 1, 2, \dots, m \quad (6)$$

where  $j = 1, 2, \dots, m$  is the number of observations. Then, we can set the optimization problem minimization of fuzzy model vagueness (6) under the condition (5).

To solve the minimization problems (6) we use the genetic algorithm method [6]. The identification of fuzzy coefficients – fuzzy numbers  $\tilde{A}_0, \tilde{A}_1$  - was divided into two tasks: the identification of the mean value (core)  $\alpha_i$  of fuzzy number  $\tilde{A}_i$  and the identification of  $c_i$  as a half of the width of the carrier bearing  $\tilde{A}_i = \{\alpha_i, c_i\}$ .

The tasks are solved by using two genetic algorithms A1 and A2 in series. For the identification of the mean value (core)  $\alpha_i$  of fuzzy number  $\tilde{A}_i$  the minimization of the fitness function JA1 is defined in the form (consider m- observations)

$$\min J_{A1} = \min \frac{1}{m} \sum_{j=1}^m (y_j^0 - \beta_j)^2 \quad (7)$$

and the genetic algorithm GA1 is used. For the identification of  $c_i$  as a half of the width of the carrier bearing  $\tilde{A}_i$  the minimization of the fitness function JA2 is defined in the form

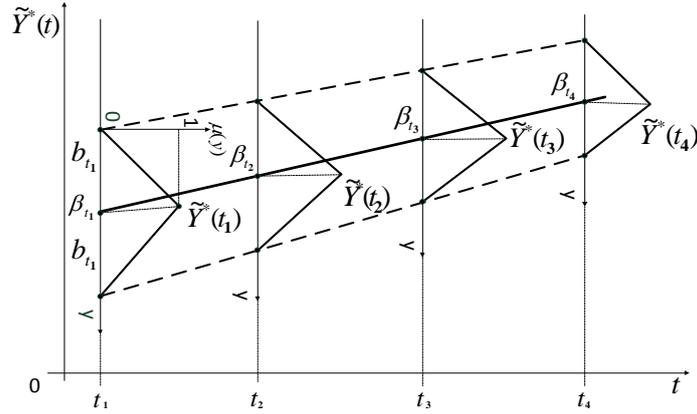
$$\min J_{A2} = \min \sum_{j=1}^m \sum_{i=0}^1 |c_{j,i}| \quad (8)$$

and the genetic algorithm GA2 is used. The value of  $H = 0.5$  is expertly determined.

#### 4 Fuzzy analysis of time series

The fuzzy linear model (1) has the opportunity to express not only the analytical linear approximation of functions, but also the size of its uncertainty in the form of an indeterminate possibility area. The graph of a one-dimensional linear fuzzy function we can see in Fig. 3 together with the appropriate linear approximation and the possibility area of the estimated fuzzy output  $\tilde{Y}^*$ .

**Figure 3: One-dimensional fuzzy linear function**



The one-dimensional fuzzy time series model has the ability to express its trend and seasonal cycles, respectively. Both of these features are enhanced by the possibility area that defines the size of the vagueness of the model and defines the range in which may be the value of the trend and seasonal cycles.

The one-dimensional fuzzy linear model of a time series trend is given by the formula

$$\tilde{Y} = \tilde{A}_0 + \tilde{A}_1 t \quad t = 1, 2, \dots \quad (9)$$

The value of a seasonal deviation in every month MSD (Month Seasonal Deviation - as fuzzy number) is calculated for each year  $r = 1, 2, \dots, L$  and for each month  $k = 1, 2, \dots, 12$  as the difference between the trend value and the actual value to be estimated

$$MSD = (\tilde{Y}_{r,k}^0 - \tilde{Y}_{r,k}^*), \quad r = 1, 2, \dots, L, \quad k = 1, 2, \dots, 12 \quad (10)$$

The central value of fuzzy number MSD is calculated as the difference of the central values  $\tilde{Y}_{r,k}^0; \tilde{Y}_{r,k}^*$ , the fuzziness is calculated as the sum of fuzziness of fuzzy numbers  $\tilde{Y}_{r,k}^0; \tilde{Y}_{r,k}^*$ .

The seasonal cycle is then defined as the time series of 12 seasonal deviations for 12 months. A seasonal deviation for a given month  $k = 1, 2, \dots, 12$  is calculated as the average value of the month of year  $r = 1, 2, \dots, L$  of the considered time series.

$$\tilde{Y}_k^* = \frac{1}{L} \sum_{r=1}^L (\tilde{Y}_{r,k}^0 - \tilde{Y}_{r,k}^*); \quad r = 1, 2, \dots, L, \quad k = 1, 2, \dots, 12 \quad (11)$$

For example, the seasonal variation for the first month of January is calculated as the mean of the January seasonal variations of the considered  $r = 3$  years

$$\tilde{Y}_1^* = \frac{1}{3} \sum_{r=1}^3 (\tilde{Y}_{r,1}^0 - \tilde{Y}_{r,1}^*) \quad (12)$$

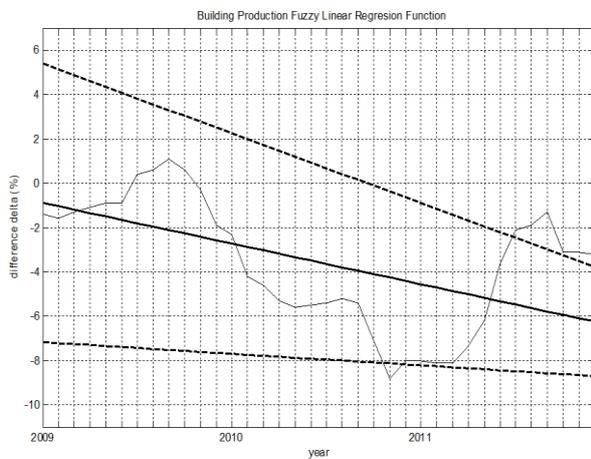
The values of monthly deviations are calculated as fuzzy numbers. The core of fuzzy number  $\tilde{Y}_k^*$  is calculated as the mean difference of the cores, the uncertainty is calculated as the mean of the sum of fuzziness. Thus, we calculate 12 fuzzy numbers, which pass into the timeline of 12 months as a curve of cores and their possibility areas.

## 5 Examples of economic variables investigation

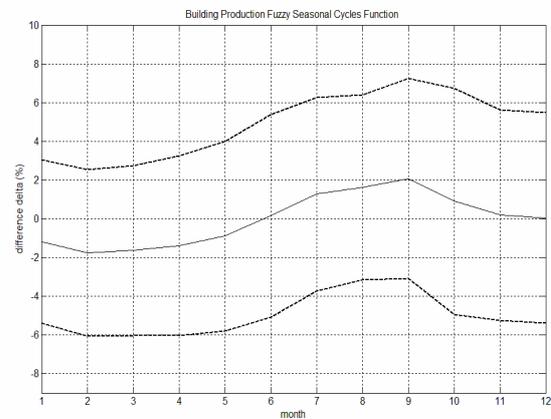
Selected economic variables (macroeconomic variables) the values of which show a seasonal character (fluctuations) were subjected to the fuzzy analysis, namely construction production, agricultural production and the rate of unemployment [1], [7]. The submitted time series development fuzzy analysis models 12 measured values of the selected variables in the years from 2009 to 2011 under these specifically defined conditions. The analysed time period was selected on the basis of the beginning and the proceedings of the crisis. In the measured period of three years, every year 12 values were analysed. The identification of the time series fuzzy models was made using the standard genetic algorithms of the Optimtoolbox MATLAB Program System [8].

**Figure 4: CPT – Fuzzy Linear Function**

$$A_0 \{-0.7268; 2.0190\}, A_1 \{-0.1533; 0.1187\}$$

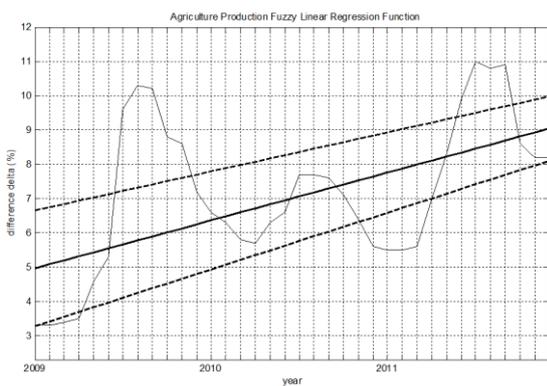


**Figure 5: CPT – Fuzzy Seasonal Cycles Function**

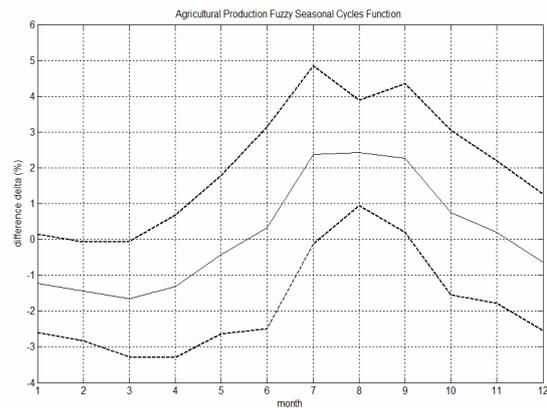


**Figure 6: APT – Fuzzy Linear Function**

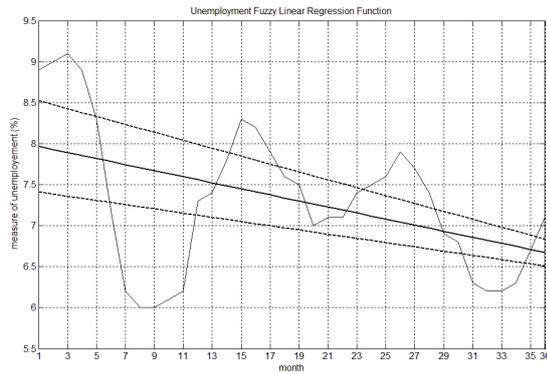
$$A_0 \{4.9646; 0.7891\}, A_1 \{0.1157; 0.0243\}$$



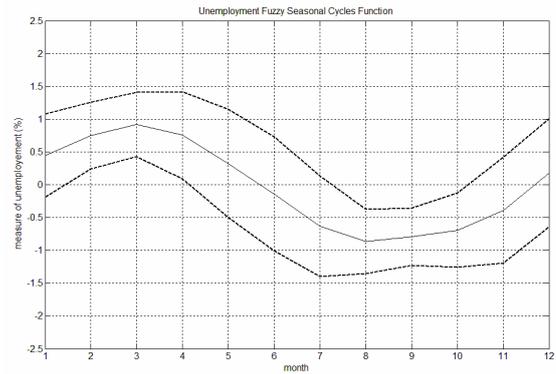
**Figure 7: APT – Fuzzy Seasonal Cycles Function**



**Figure 8: UNT – Fuzzy Linear Function**  
 $A_0 \{7.9438; 0.5790\}, A_1 \{-0.0385; 0.0057\}$



**Figure 9: UNT – Fuzzy Seasonal Cycles Function**



The results are shown in the form of the fuzzy linear models of time series of Construction production (CPT) – Fig. 4 and Fig. 5, Agricultural production (APT) – Fig. 6 and Fig. 7, and Unemployment (UNT) – Fig. 8 and Fig. 9. The figures represent their fuzzy trends and fuzzy seasonal cycles. Appropriate fuzzy coefficients of fuzzy linear functions are presented in the form  $A\{\alpha; c\}$ .

The fuzzy analysis of the time series development of CPT, APT and UNT demonstrated a non-standard behaviour of the monitored variables in 2010; from an economic point of view this is a result of a number of causes [1]. Here we talk about the third and deepest crisis year and we can see full influence of the state and a huge impact of globalization on the small and open economy of the CR. The delay, certainly, played its role here; it appeared in the economy during the second studied year (2010). This year, the system of indicators behaved fuzzily and the interdependence of CPT and APT on UNT was never proven by the model; moreover, the model behaved much vaguer, i.e. fuzzily, in relation of CPT to UNT than in relation of APT to UNT. The cause of the phenomenon we can find in low elasticity of demand for agricultural production, or, for example, in the rising price of agricultural commodities throughout the period. State intervention and transnational influences on the APT and UNT variables are so large that they can be seen as one of the causes of non-standard and fuzzy behaviour of these variables during the year.

## 6 Conclusions

In mathematical statistical modelling, we assume that the relationship between dependent variables and independent variables of a model is well-defined and sharp. Although statistical methods has many applications, problems can occur in the situations in which number of observation is inadequate (small data set), difficulties verifying distribution assumptions exists, vagueness in the relationship between input and output variables exist.

However, in the real world, the systems relationship is more or less non-specific and vague. The suitable theoretical background for abstract formalization of the vague phenomenon of such complex systems is the fuzzy set theory. In the paper vague data is defined as specialized fuzzy sets - fuzzy numbers. A fuzzy linear model as a fuzzy function with fuzzy numbers as vague parameters and fuzzy numbers as estimated output variables is calculated using fuzzy arithmetic.

To identify the fuzzy parameters of the model, the genetic algorithm is used. The linear approximation of the vague function together with its possibility area is analytically and graphically expressed. The suitable application is performed in the task of the time series fuzzy analysis. The time-trend and seasonal cycles including their possibility areas of selected economical dependences are calculated and expressed, namely time-development of unemployment, agricultural production and construction.

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# PROCESS OF DETECTION, INVESTIGATION AND PROVING OF CYBER OFFENCES

**Viktor Porada**

*University of Finance and Administration, Faculty of Law and Administrative Studies,  
Institute of Criminology, Security Sciences and Research of Negative Phenomena in  
Society, Prague, Czech Republic  
viktor.porada@mail.vsfs.cz*

**Vladimír Smejkal**

*Moravian University College Olomouc, rector, Czech Republic  
vladimir.smejkal@mvsso.cz*

## **Abstract:**

The paper contains an overview of security and forensic identification kinds through the ages. The systemization of the concepts, principles and methods of identification can be carried out according to various criteria with regard to the possibilities of the use of new information and communication technologies which enabled the application of the system access and biometric identification. Identification in terms of determining the identity and using the results of identification while proving an offence in criminal proceedings has the most general sense, however, the need for identification of various kinds of security activities cannot be overlooked either.

## **Key words:**

Identification (concept, kinds), identity, the criterion of identity, biometric identification, verification, authentication, information and communication technologies, cybercrime

**JEL Classification:** K14, K24, L63

## **1 Introduction**

Ensuring the unavoidability of criminal sanctions is the strategic objective of security authorities. In security activities, it is realized mainly through cognitive processes. From the gnoseological point of view, it is a specific process in which the cognition of information is achieved by means, methods and procedures of the security authorities. It is the cognition of the reflection of phenomena, things, processes and events in the course of security activities and within them, in particular the cognition of the reflection of the offender's behaviour and the personality in the surrounding environment, both in the material environment as well as in the consciousness of people (potential witnesses). The aim of the security activities is, based on finding and maintaining the mentioned objects — holders of evidentiary and other significant relevant information, to create conditions to ensure that offences are detected, all the serious circumstances of a particular criminal case clarified, the perpetrators and other participants in the offence detained. The penalty, however, has to always remain the only means by which the society protects itself against a further crime commitment. (Kuchta, J. & Válková, H., 2005, pp. 187-188) Yet, in the context of the criminal process, it is not appropriate to ignore the associated issue of crime prevention, the effectiveness of which is also dependent on a correct identification of objects, subjects and processes which occurred in connection with the realized attack (the security incident).

The paper deals with the application of general forensic methods used for the identification of objects, systems, and events in a specific area - cybercrime.

## 2 Identification in criminalistics

In criminalistics (forensic science), identification is the process of the identification of objects while the connection between a person or thing and the investigated event is sought based on traces and other relevant information. Forensic identification along with the trace evidence and the manner of committing an offence are the basic forensic science categories, and we can say that, to a large extent, it penetrates all methods of security activities.

The modern conception of criminalistics is based on the physical interpretation and subsequent mathematical processing of the basic forensic issue, i.e. by means of a correct interpretation of the trace evidence of the crime to reconstruct this crime and identify the perpetrator. In the traditional conception that influenced the development of the philosophical thinking, logic and the foundations of mathematics, identity is considered to be the relationship which is determined by meeting defined criteria. The criterion of identity is influenced by the nature of the conceptual framework and the background the formulation of identity is based on.

Taking into account the conceptual framework which corresponds to the predicate or functional calculus, all entities which can be attributed to the same properties, or relations or functions can be considered identical. In terms of pragmatic aspects, the choice of when we can state the match of two or more entities and in what way we can distinguish these entities is not just a matter of these entities, but also a matter of a complex of circumstances that can be defined, specified or otherwise determined to ensure the objectives of a particular decision-making procedure.

We can consider identical those entities to which the following applies - everything what is valid for one of them is also valid for the other one. The decision-making itself is then a decision-making about the possibility to match defined properties, relations or functions. However, the identification does not necessarily need to denote only the decision-making about the relationship of the entity, two, or more entities, but also about the possibility to match in the mentioned sense only of one of them. In this respect, we can consider, in addition to the identification of objects and systems elaborated especially in the theory of forensic identification, also the identification of a phenomenon or police activities. The identification in this sense is also a more accurate specification of a particular entity, the identification is also, for example, specifying a particular technical condition of a vehicle carried out in the framework of an analysis of a collision of vehicles in a traffic accident or forensic medical findings of the cause of death of a person at autopsy carried out in connection with an investigation of a murder.

In recent years, as the time goes by, more options of a wide and very effective use of information and communication technologies (computer technology) and mathematical apparatus in the processes of security identification have gradually appeared. As the technical approaches to solving problems in other technical sciences appear, new principles and system approaches penetrate the methods of security activities. One of the new directions is the introduction of the concepts *identification of objects* and *identification of systems* (Porada, V. & Požár, J., 2001) and, lately, the *biometric identification* (Rak, R., Matyáš, V. & Říha, Z., 2008 or Porada, V. & Šimšík, D., 2010).

### 2.1 Forensic identification of objects

Identification in criminalistics means the process of comparison and identification of objects in order to detect the connection between a person or thing and the investigated event according to trace evidence or other depictions. To determine the identity of the object, various comparative methods are used. If we fail to find out a specific object or process which left the trace evidence, the process of forensic identification narrows to the determination of the group membership of the objects, finding out of the group or class of the object that left the traces. (Porada, V. & Požár, J., 2001) In this sense, the identity can be defined as follows: as a relationship or a state. The conception of identity as a relationship is crucial for

the theory and process of the forensic identification. On the contrary, for the theoretical clarification of the forensic reconstruction, the definition of identity as a state, i.e. as a constancy of the qualitative determination of an object is preferable. (Musil, J., Konrád, Z. & Suchánek, J., 2004)

The current form of the standard object identification, however, is nowadays often not enough to achieve the final target, i.e. the identification of a specific object. For this purpose, a new form of forensic identification - the forensic identification of systems - has been created. The identification of objects and systems are not in opposition, do not exclude each other, but they are in compliance and complement each other. The identification of systems is currently a modern forensic specific theory which can be particularly useful in cases where the standard identification of objects does not lead to a successful goal and the problem can be solved by the creation and a subsequent identification of systems.

## **2.2 Forensic identification of systems**

The system approach to the identification of objects brought new perspectives of the conception of criminalistics which is based on the physical interpretation and subsequent mathematical processing of the basic criminal issue, i.e. by means of a correct interpretation of the evidence of a crime to reconstruct this crime and identify the perpetrators. From this modern point of view, the following was examined:

- a. identification as a process of the identification of objects,
- b. system access scheme, the state and structure of the system,
- c. criterion of the compliance of the object with the model object and
- d. influence of errors on the identification.

In the case of the system conception of the identification, it is also identification, however, of a different kind. Identification in criminalistics is different from the identification in other areas of human knowledge. By means of a detailed study of the trace evidence (identification features, the mechanism of the origin of the trace in the area, etc.) the so-called input information  $I_{vst}$ , by which we create the models (control samples), is singled out. In the decision-making block, by the mutual comparison of output information  $I_{vyst}$  from the trace evidence and particular control samples based on the application of the match criteria, we find out the identity (the sought identity relationship) between the states and expressions of one and the same object. It is therefore the object which caused the trace evidence and the control sample (identifying object of a known origin). (Porada, V., 1987)

This basic procedure of the system identification is in all of its three steps conditioned by the selected resolution level, i.e. the details of the observations and the examination of the whole system in security activities. The identification of the system is not a one-time activity but takes place in an iterative manner, i.e. there is a gradual refinement of particular versions of the system. The recognition of the identification but also the verification of the system is a process in which particular, specific entities are identified. (Požár, J., 2006b)

## **2.3 Forensic identification of events**

We understand the event as an incident in information security which occurs and causes any negative (undesirable) effect. It can be a failure of the computer system, an unauthorized access, or any other criminal offence within the category of cybercrime (Smejkal, 2015). Processes and phenomena which take place under certain conditions, in a time sequence of events, operations are called events. Event (incident) is, therefore, any change of the particular object in time. Events are composed of individual states and the states are changeless at a given time, however, events are dynamic and thus cause changes of the particular states. States are particular static conditions of the object; the sequence of particular states in time creates an event. Processes and transitions which carry out transfers are a part of the event. Transfers are of different size, strength and direction, and thus differ from one process to the next one. Security incident or event can be described as a sequence of particular states as this

event took place. (Porada, V., 2015) Forensic analysis of cyber security incidents occurring in a complex system is an important prerequisite for a successful investigation and proving of cybercrime. (Smejkal, V., 2016)

### **3 Identification and authentication in the prevention and investigation of cybercrime**

Terms such as *identification* and *authentication* are some of the most frequently used terms in the field of the information system security. This is where they represent the cornerstones for building a secure information system. However, in the same way, they play a significant role in the investigation of cybercrime where we will examine firstly, the manner in which the crime was committed, i.e. beside other things also the manner in which the perpetrator gained access to the computer system and information medium and what took place in the system. During this process, the above mentioned identification methods and approaches will be used.

Subsequently, it can help us to identify and convict the offender and, of course, these findings should serve to the improvement of the security, i.e. to prevention. (Mates, P. & Smejkal, V., 2012) For this purpose, in particular, we examine the so-called logs - record of the activities of the computer system and all persons (users, administrators, service, etc.) that can be associated with a security incident.

But in fact, the issue of identification, verification and authentication of people and processes is the key question.

#### **3.1 Identification and authentication in information systems**

Generally, by identification we understand the recognition of any entity by the system on the basis of a specific identifier which is associated with a particular person or thing, represents his/her identity, and can be known to other people. As far as humans are concerned, it is the first and last name, user name, birth certificate number, social insurance number, no-meaning ID, etc., for things it can be the car license plate, serial number, officially assigned number (e.g. personal document number), etc.

In this case, the identification means finding out the identity of the subject which is done by comparing personal data or expressions of personal nature of a natural person with other persons, while authentication is a verification that the subject is who he/she poses as (through this identity). (Smejkal, V., 2011a, Smejkal, V., 2011b, Smejkal, V., Porada, V. & Bruna, E., 2015, Smejkal, V., 2015 and Mates, P. & Smejkal, V., 2012, p. 216).

Authentication is the process of the verification of the declared identity of the subject. As far as humans are concerned, it is carried out by means of objects (cards, smart cards, mobile phones and others), witnesses, signs of a personal nature (signature, voice, gait, etc.), personal characteristics (fingerprints, iris), knowledge (password, PIN, security question, etc.). As far as things are concerned, it can be authentication against a checklist, sending an automated query and comparing answers with information stored in the system, etc.

At present, authentication (verification of the authenticity of the declared identity), or authorization (assignment of ICT services to an authenticated person) in the field of information systems and electronic documents is a very topical problem which faces several conflicting requirements: user simplicity, speed of authentication, security, credibility, and cost.

In the case of user authentication, information technologies have to ensure the same conditions as in standard implemented activities, i.e. to ensure the data exchange between authorized users while ensuring the performed actions not being declined. When communicating at a distance, as well as in the case of man/machine communication (or machine/machine), the situation is even more complex than in the case of personal contact (physical presence of both parties – the person being authenticated and the one authenticating) because the possibility of forgery of identity is far higher.

In the case of live voice communication (telephone banking), the level of the risk is very diversified – from high in the case of the identification of a recurring password or a small set of them (digits of the birth certificate number) to negligible (when using the chart of one-time passwords or the authentication

calculator). During authentication by means of technological tools, the risk is usually medium to high while the function is not only the properties of a method or product, but also the user behaviour and properties of the environment, in which the authentication is carried out.

During authentication of a subject, the verification occurs on the basis of:

- Ownership - magnetic or smart card, token, authentication calculator;
- Knowledge – password, PIN, the secret key;
- Characteristics – the biometric information. This can be obvious (fingerprint, iris) or hidden (dynamic, e.g. when signing or walking).

To a certain extent, success depends on a sophisticated process of the use of these parameters.

The choice of the right password or other authentication means is in terms of security of ordinary ICT users crucial, however, protection by a simple, recurrent, long-used password represents the lowest possible level of ICT protection and is not recommended. Or, we can also say that in case of the current most frequent authentication method – a simple password, this authentication can be falsified in the easiest way, which can have an effect on the inability to detect the perpetrator and prove his actions. There are also cases when the perpetrator successfully logged in by means of an identification of a co-worker, i.e. using the knowledge of his password, made an illegal operation, and then logged out again. The person under whose identity the operation was performed was considered the perpetrator for a long time while the real perpetrator was taking advantage of the money he got through this transaction.

Partially, this risk is reduced by using the so-called authentication phrase (passphrase) when, instead of a short password, we use a password created by a meaningful but long sentence, e.g. the phrase 'I enjoy going to the Slovak Tatra mountains' is definitely safer than the password 'Božena' and it is much easier to remember than the password 'qm0\* UT/edb\_7! w'. Of course, not even this type of protection protects against eavesdropping or extracting access data using social engineering.

Currently, we have to focus on powerful or multi-parameter authentication (Smejkal, V. & Kodl, J., 2009) when the solution is built on a combination of two or three authentication parameters. As currently the single-parameter authentication (password, often rather primitive) prevails, the introduction of the double-parameter authentication presents a higher level of authentication which nowadays uses more and more smart cards, or authentication tokens when we work with the combination of ownership and knowledge factors (ownership of a card or authentication calculator and at the same time the knowledge of the PIN or password). The three-parameter authentication is at an even higher level, works with biometric information and, to some extent, eliminates the basic weaknesses of the systems with the password or PIN where particularly the following dangers are:

- When using PIN or a password, users can intentionally compromise their private information by leaving the ID and PIN unattended.
- Users with multiple passwords usually take a note of them and store them in insecure places, or use the same password in different systems.
- Smart cards and tokens can be stolen.
- Users have the possibility to discredit both the passwords and the authentication device. Most often this happens by exposing passwords or the token including PIN to another person intentionally (in order to someone make the transaction for them) or unintentionally (e.g. by passing the computer for repair). Both cases have already occurred in forensic science practice. The person who gained access to the device abused it for the implementation of illegal operations under the name of the original, authorized user.

As far as the remote access is concerned, the attack can take place anywhere along the route from the authenticated person to the authentication place.

The attack can be aimed at:

1. the tool for authentication (card - magnetic stripe, chip; token; PC; ATM or payment terminal; fingerprint sensor, etc.),

2. the environment in which the authenticated person is (computer containing spyware, modified ATM),
3. the environment used for data transmission (protocol attack, Man-in-the-Middle, etc.),
4. the authentication place (data forgery in the process of authentication - changing of data in the authentication database, modification of software),
5. the user (to confuse him to log on to the system of the attacker, not the real one, e.g. in the case of phishing or social engineering based on manipulating people in order to perform a specific action or obtain certain information). (Smejkal, V., 2015, pp. 137–139)

### 3.2 Biometric authentication

Biometric identification is the use of the unique, measurable, physical or physiological features or expressions of people to unambiguous finding out (identification) or validation (verification) of their identity. We can understand biometrics as measurable biometric characteristics (shapes, data, etc.) of a living organism that are scanned, processed, assessed, and kept in the process of identification or verification. According to the basic principle of identity, any person is identical with himself/herself only. (Rak, R., Matyáš, V. & Říha, Z., 2008, p. 90)

A prerequisite for the use of each biometric characteristics is, therefore, uniqueness, stability, practical measurability and technological possibility of further processing aimed at evaluation of the compared characteristics belonging to different individuals. The automated use of the unique, measurable anatomical or physiological characteristics or manifestations of human beings to unambiguous identification or verification of their identity is a necessary attribute, a basic feature of the biometric identification.

We distinguish the following biometric identifications - police-judicial (forensic), security-commercial, and esoteric. The last group includes methods which are not common in practice and have not been profoundly tested on a large sample of test cases so far but they are the methods which are paid special attention to and, with time, they can become equal partners for judicial or security-commercial identification. Scent traces or imprints of the lips and pores, the topography of the bloodstream, salt content in the human body, etc. are the standard and constantly discussed method. A number of works and specific technical institutions deal with the identification which uses longitudinal ridging of nails which can be assessed similarly to bar codes. (Rak, R., Matyáš, V. & Říha, Z., 2008, p. 112) In the last period, the research in the field of forensic biometric identification has been focused on the identification of persons according to the dynamic expressions, e.g. the dynamic walking stereotype. (Porada, V. & Šimšík, D., 2010)

Adding an additional channel to the verification of the identity of the user can be another method of increasing security for authentication and authorization. Typically, this is done with the use of biometric methods as an addition to the traditional authentication methods. But not even the use of biometric information is all-powerful. First, there is a probability of an incorrect assessment (not accepting the right decision or accepting a wrong decision, i.e. denial of the right person or acceptance of a spurious person). Even here, there is the risk of biometric information forgery; this is especially valid for static biometry.

Because these days static biometric samples are quite easy to copy (typically fingerprints falsified using gelatine models, captured and by the attacker used image of the iris), in the spotlight there are dynamic methods (also known as behavioural methods) which capture a range of parameters of the expression of a specific person at a time. These include the signature capturing, typing on the keyboard, moving the mouse, the rhythm of walking, etc., as well as the voice verification. The utilization of the so-called dynamic biometric signature and gesture scanning (e.g. by means of a mobile phone) is nowadays in the centre of the attention and focus of the application practice.

The dynamic biometric signature is the most advanced option of the biomechanical signature using electronic means to scan the dynamic characteristics of the signature and to verify the person according to this signature. The characteristics of the right-now-written-signature are obtained on-line (in

real time) by means of a specialized tablet, or a specially adjusted pen or other specific hardware. All of these devices capture both static and dynamic characteristics of the signature in the course of its creation. (Smejkal, V., Porada, V. & Bruna, E., 2015, also Smejkal, V., 2015., pp. 137–139)

#### 4 Conclusion

Inspection of cybercrime is a never-ending spiral between the possibilities of new technologies and therefore options how to abuse them as well as the possibilities these technologies provide in prevention, detection and investigation of this type of crime. Recording of information about events occurring in a particular system and its surroundings so that it is possible to identify retroactively processes that took place in the system and demonstrate who their initiator was is a necessary prerequisite. Ensuring demonstrable identification and authentication of individuals, objects, processes, and systems is, therefore, one of the most important steps in the fight against cybercrime.

For the detection and investigation of cybercrime, general identification methods used in criminalistics need to be modified, i.e. broaden and completed by tools for unambiguous identification and authentication of people or processes which occur in systems which are a part of the cyberspace. Otherwise, the detection of the perpetrator and especially proving of his criminal activity will be limited by the inability of a clear assignment of responsibility of the suspect for committing a crime, i.e. for initiating processes which in a particular system have resulted in complying with specific facts of cybercrime.

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# CREDIT GUARANTEES: VEHICLES FOR RISK MANAGEMENT IN SME LENDING, IN LINE WITH THEIR VALUATION IN FINANCIAL AND ACCOUNTING TERMS

**Judit Sági**

*Budapest Business School – University of Applied Sciences, Faculty of Finance  
and Accountancy, Hungary  
sagi.judit@uni-bge.hu*

## **Abstract:**

The paper is about to examine the role of credit guarantees in financial markets where high risk-premia discourages the extension of new credit lines and the optimal allocation of financial resources. When pricing the credit guarantees, a new approach is put forward: a derivative instrument, namely the credit default swap is proposed to estimate the value of the different scenarios under the credit guarantee schemes. Finally, the evaluation in accounting is to be depicted, as the IFRS 9 requires a similar scenario-based modelling for the credit guarantees.

## **Key words:**

Credit guarantee, SME funding, lender's risk, financial instruments

**JEL Classification:** G23, G31, M41

## **1 Introduction: Heading for the introductory chapter**

The recent global financial crisis has questioned if market solutions can be counted on as the primary source of access to finance for SMEs, or, if not, then what kind of additional schemes could possibly promote the flow of credit. Financial institutions have become reluctant to extend uncollateralised credit to SMEs, even at high interest rates, in part because of the high costs of obtaining adequate information on the true credit quality of the borrowers. Also, many of these firms do not have the necessary amount and type of assets that could serve as collateral for the loan. As a result, many SMEs with economically viable projects cannot obtain the necessary financing from the regular system of financial intermediation. This phenomenon – often referred to as the SME financing gap – has laid down the basic need for designing the credit facility guarantees (or more simply, credit guarantees).

The recent upturn of state-supported counter-guarantee funds in Central and Eastern Europe has confirmed that the guarantee schemes are especially vital in the midst of the recession and that although the SME sector does require guarantee programmes to boost their loan accessibility their issues are much deeper than that. The guarantee programmes are anti-cyclic, and therefore are able to promote growth for the SMEs, by reducing their external cost of funding.

## **2 The rationalisation of credit guarantee funds, as depicted by the literature**

The roots of the first guarantee funds go back to the mid-nineteenth century (Deelen and Molenaar, 2004), when guarantee funds meant mutual assistance amongst small entrepreneurs – groups of entrepreneurs set up funds where they contributed their own funds to provide credit guarantees for each other. Since that on, mutual guarantee funds have largely been complemented by state-supported

(public) guarantee programmes, which underlines the primary role of these guarantees in the (re)activation in the SME sector. Public credit guarantee schemes are a common form of government intervention to unlock finance for small and medium enterprises.

Access to credit finance is difficult for SMEs, due to the lack of creditworthiness, the absence of collaterals, and the high cost of funding (the latter reduces the SMEs' willingness to raise credit). Because of that reason, a credit guarantee offers risk mitigation to lenders by taking a share of the lenders' losses on SME loans in case of default. In general, a credit guarantee scheme provides third-party credit risk mitigation to lenders through the absorption of a portion of the lender's losses on the loans made to SMEs in case of default, typically in return for a fee. The following part of this article describes the features of credit guarantees, and then investigates into their role (filling the credit gap).

## **2.1 The substance of credit guarantees by definition**

In order to make the point on the importance and essence of credit guarantees, a reliable definition is necessary – in this regard, the most comprehensive design for a credit guarantee is the following: A credit facility guarantee serves as a security for a credit line, in which the guarantor irrevocably undertakes to pay to the lender, upon the lender's first demand, any amount up to the maximum guaranteed amount (including principal, interest and all other charges), upon receipt of the lender's request stating that the borrower has not repaid the amount claimed under the guarantee on the due date (OECD, 2008).

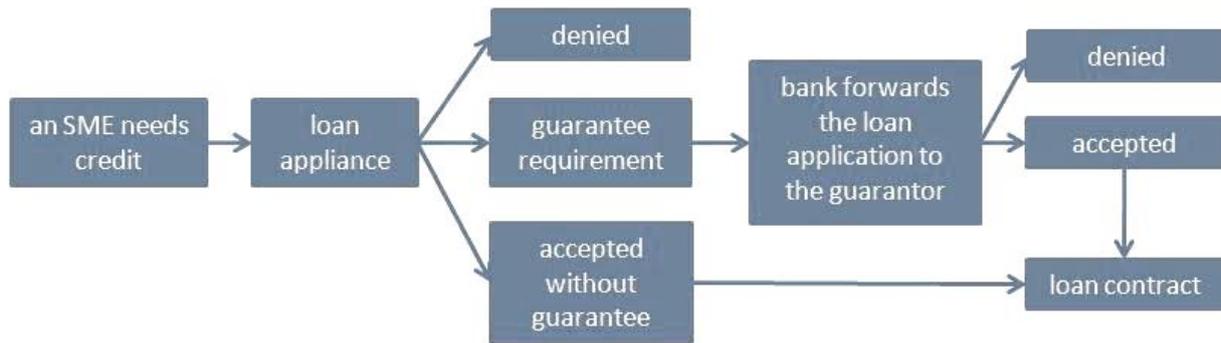
According to Deelen and Molenaar (2004), a credit guarantee is a financial product that a small entrepreneur can buy as a partial substitute for collateral. It is a promise by the guarantor to pay all or part of the loan if the borrower defaults. O'Bryan (2010) describes the guarantor as an independent entity that acts as a third party between the lending bank and a borrower.

However, the entity who provides the credit guarantee can be financed from state sources, and thus the credit guarantee scheme can perform as a mean of government intervention. In this case, a credit guarantee scheme is a policy instrument for easing financing constraints for SMEs. A credit guarantee of this kind also provides third-party credit risk mitigation to lenders with the objective of increasing access to credit for SMEs. This risk mitigation happens through the absorption of a portion of the lender's losses on the loans made to SMEs in case of default, typically in return for a fee (World Bank, 2015).

In contractual terms, a credit guarantee is a promise to carry out someone else's obligation in the event of default. Credit guarantee schemes provide guarantees on loans to borrowers by covering a share of the default risk of the loan. In case of default by the borrower, the lender recovers the value of the guarantee. Guarantees are usually provided against a fee, covered either by the borrower, the lender or both; and substantially funded by state initiatives. In case of a default, the lender usually is obliged to proceed with the collection of the loan and share the proceeds with the guarantor. Credit guarantees allow the partial transfer of credit risk stemming from a loan or a portfolio of loans. In this respect, they show similarity to credit insurance products and credit default swaps (Vienna Initiative, 2014).

From the lender's perspective, a credit guarantee is a form of security, linked to the creditworthiness of the guarantor. For illustration, Figure 1 shows the process of an SME loan appliance. First the SME decides to apply for loan at a financial institution, usually at a bank. The enterprise never gets in direct contact with the guarantee association. In case the bank decides that guarantee will be needed in order to issue loan they process the details of the loan appliance and the SME, and the guarantor decides whether it agrees to guarantee or declines. In case of portfolio based guarantee scheme, the process is automated.

Figure 4: The process of loan application with credit guarantee backing



Source: Own from OECD, 2008.

## 2.2 The key issue of trust in lending necessitates the involvement of credit guarantees

Reviewing the literature, it is clear that most of the guarantee schemes access public support as the government is directly interested in the success of the SME sector. However, small and middle enterprises do not get credit easily, mainly because of their lack of collateral, the unfavourable risk-reward ratio and the cost of administration. The emergence of credit guarantee schemes are rationalised by the reluctance of the lender to provide credit facilities for low credit rated enterprises, especially when the lack of creditworthiness is coupled with the lack of valuable collaterals.

In this regard, collateral issues are mentioned by Deelen and Molenaar (2004), and O'Bryan (2010), so it can be safely said that it is one of the key elements. In the current economic climate, with the low market activity disabling a speedy and successful capitalisation on collateral, banks are even stricter in terms of credit security. Experts state that a borrower who is willing to offer a higher level of collateral, particularly personal like a house, possibly has a higher intention of repaying the underlying loan, and is favoured by the banks. According to Deelen and Molenaar (2004), the features of a good collateral from the banks' perspective is that its ownership is easy to verify; it is easily and cheaply seized; it cannot be removed; the costs of converting it into cash or some other desirable asset are low and that its value remains relatively stable over time. The issue is that small entrepreneurs often lack collateral that's attributes match the list, so they need some kind of help.

An even bigger factor in the financial institutions' reluctance to provide loans to SMEs is the existent information asymmetry. In his analysis O'Bryan (2010) defines the asymmetry as that "the lender has much less knowledge of the potential borrower's likelihood of default than the borrower does". SMEs are unable to provide the banks with information on their creditworthiness, which can be the end product of the lack of appropriate accounting records and the above mentioned collateral issues. The integrity of the borrower is at stake, as the bank can only guess whether the enterprise is reliable, while obtaining the necessary information can also cost too much.

Green (2003) states that the third reason for the banks' reluctance to provide credits to SMEs is the 'high administrative costs of small-scale lending'. As the costs of administration aren't directly proportional to the size of the enterprise, it is more cost effective to have a lower number of loans with higher value than more loans with lower value. Another related issue is that for a number of reasons, the administrative costs of monitoring loans, loan applications, and information-gathering can be higher for SMEs than bigger firms with advanced accounting and administration expertise (Vienna Initiative, 2014).

Green (2003) ends his list with high risk perception as the fourth main issue in SME credit financing – he comments that "commercial banks tend to impute a high risk to small enterprises and are therefore reluctant to extend credit to them. Due to their small size and inherent vulnerability to market fluctuations, the mortality rates of small enterprises are relatively high". It is the nature of the enterprises which scares the banks away, as they are usually young, lack the financial history, lack expertise in business management and organisational management, lack a quality accounting and controlling setup,

which all raise different risks. Busetta and Zazzaro (2009) describe the issue as “they have a short credit history, meet less rigorous reporting requirements and the availability of public information on them is scarce”, agreeing with Green (2003) that the less ‘professional’ nature of the SMEs scare the creditors away.

**3 Paper results: valuation**

When pricing the credit guarantees by financial models, a new approach is put forward: credit default swap spreads are proposed to estimate the amount of credit guarantee fees. Credit default swap (CDS) agreements are a sort of derivatives, by which credit protection can be purchased. The buyer of a credit default swap receives credit protection, whereas the seller of the swap guarantees the credit worthiness of the reference entity. By doing this, the risk of default is transferred from the holder of the fixed income security to the seller of the swap.

CDSs are marketable instruments; the CDS market price, also called as CDS spread or fixed rate, should be multiplied by the notional amount of the swap in order to calculate the regular payment due under the swap agreement. The value of a CDS can be interpreted as a scenario analysis where the credit survives or defaults. In the next section (3.1.) this analysis is to be presented.

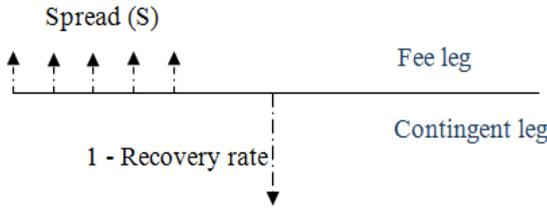
On the other hand, from the accounting perspective the evaluation of credit guarantees relates to the International Financial and Reporting Standards (IFRS) 9, which requires to consider the possible scenarios and also the risk or probability that a credit loss occurs. Section 3.2. deals with the accounting issues of credit facility guarantees.

**3.1 Financial valuation of credit guarantees**

In financial markets, CDS is an agreement between two parties to exchange the credit risk of an issuer (reference entity). The buyer of the credit default swap is said to buy protection, against losses in the event of bankruptcy, the issuer failing to pay outstanding debt obligations (called as credit event). The seller of the credit default swap is said to sell protection in the case of a credit event.

Under a CDS contract, the buyer usually pays a periodic fee and profits if the reference entity has a credit event, or if the credit worsens while the swap is outstanding. At the same time, the seller collects the periodic fee and profits if the credit of the reference entity remains stable or improves while the swap is outstanding. According to the ISDA standards, the CDS market price is a definite measure of the reference entity’s credit risk (the higher the spread the greater the credit risk is). The CDS market price, also called as CDS spread or fixed rate, should be multiplied by the notional amount of the swap in order to calculate the regular payment due under the swap agreement.

**Figure 2: Valuation of a CDS**



Source: ISDA standard model for computing CDS spreads (<http://www.cdsmodel.com/cdsmodel/>)

The value of a single name CDS can be interpreted as a scenario analysis where the credit survives or defaults. The protection seller (long risk) hopes the credit survives, and discounts the expected annual payments by the probability of this scenario (called the fee leg). The protection buyer (short risk) hopes the credit defaults, and discounts the expected contingent payment (Notional Value less Recovery Rate) by the probability of this scenario (called the contingent leg).

Since one type of CDS may be contracted for different maturities, each maturity represents a spread that ensures the present value of the expected spread payments (Fee Leg) equals the present value of the payment on default (Contingent Leg). The formula for a Par CDS contract can be written as:

$$S_n \sum_{i=1}^n \Delta_i P_{S_i} DF_i + \text{Accrual on Default} = (1 - R) \sum_{i=1}^n (P_{S_{i-1}} - P_{S_i}) DF_i$$

where,

$S_n$  = Spread for protection to period  $n$

$\Delta_i$  = Length of time period  $i$  in years

$P_{S_i}$  = Probability of Survival to time  $i$

$DF_i$  = Risk-free Discount Factor to time  $i$

$R$  = Recovery Rate on default

### 3.2 Evaluation of credit guarantees from accounting perspective

IFRS 9 (in Appendix A) defines the financial (credit) guarantee as a contract that requires the issuer to make specified payments to reimburse the holder for a loss it incurs, because a specified debtor fails to make payment when due in accordance with the original or modified terms of a debt instrument. This definition covers the “event of default” in financial terms.

Paragraphs 5.5.17–5.5.18 of IFRS 9 require that the measurement of expected credit losses should reflect an unbiased and probability-weighted amount that is determined by evaluating a range of outcomes. An entity need not necessarily identify every possible scenario, but it should consider the risk or probability that a credit loss occurs.

Paragraph B5.5.28 of IFRS 9 further explains how to measure expected credit losses. It states that expected credit losses are a probability-weighted estimate of credit losses (ie the present value of all cash shortfalls) over the expected life of the financial instrument. A cash shortfall is the difference between the cash flows that are due to an entity in accordance with the contract and the cash flows that the entity expects to receive. (IFRS, 2015) By introducing the term “credit shortfall”, the IFRS aims to measure the expected loss (1 – recovery rate on default). The net cash shortfalls for each scenario comprise of the net present value of: (a) the expected cash outflows to reimburse the holder for the expected loss it incurs on the guaranteed asset; less (b) expected future premium receipts.

Paragraph 4.2.1(c) of IFRS 9 requires that after the initial recognition of an issued financial guarantee contract at its fair value, the issuer shall subsequently measure the financial guarantee contract at the higher of: (a) the amount of the provision for expected credit losses; and (b) the amount initially recognised less, when appropriate, the cumulative amount of income recognised. (IFRS, 2015)

Comparing with the financial valuation of the credit guarantees, the consideration of the expected cash flows and the time value of money is similar in accounting, too. However, the accounting approach does not reflect the fact that cash outflows under the guarantee depend upon the risk of default of the guaranteed financial asset, whereas the premiums to be received are subject to the risk of default by the holder of the guarantee.

## 4 Discussion

The enhanced risk measures of recent years are considerable in respect of the lending capabilities and willingness of the bank-based financial intermediation, especially when the credit lending to SMEs is analysed. Guarantee programs are then designed to mitigate the lending gap of this concern. This paper has investigated to credit guarantees, by examining their means in SME funding, and by raising valuation issues.

The basis of financial valuation of credit guarantees was a derivative instrument, whereas the credit risk of a (sovereign) borrower is concerned and priced. The credit default swap (CDS) is an agreement in which one party buys protection against losses occurring due to a credit event up to the maturity date of the swap. Comparing with the financial valuation of the credit guarantees, the consideration of the expected cash flows and the scenario of default is also required in IFRS.

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# HUMAN CAPITAL AS A FACTOR OF ECONOMY'S COMPETITIVENESS OF WORLD ECONOMIES

**Galina N. Selyanskaya**

*Plekhanov Russian University of Economics, Management Department, Russia  
rea.quality@gmail.com*

**Yulia Y. Finogenova**

*Doctor of Economics, Plekhanov Russian University of Economics, Department  
of Finance, Russia  
jjfinogenova@gmail.com*

**Olga V. Boyko**

*Plekhanov Russian University of Economics, Department of Finance, Russia  
boyko.reu@mail.ru*

## **Abstract:**

The paper reviews the influence of various factors on regional economic growth and development of the world countries in the long term. Financing of education and investment in research and development are considered as the basic factors of economic development and improvement of the competitiveness of the regions. Correlation and regression analysis of the ten factors that influence the human development index was carried out with a view to identifying the causes of uneven economic development of the regions. The countries under consideration were divided into four clusters based on the degree of influence of the studied parameters. Regression equations were set up for each cluster, and the features characterizing each cluster were identified. Directions of higher education development were proposed to strengthen the innovation processes in the universities to form the creative personnel for the country's economy.

## **Key words:**

Technological mode, global competitiveness, sustainable development, human development index, innovative education, investment in education

**JEL Classification:** I25, C12, O15

## **1 Introduction: Determining the factors of an economy's competitiveness**

In this regard, the influence on the level of human development of various factors such as the gross domestic product (% per capita), public expenditure on education (% of GDP and % of total of public expenditure), expenditure on research and development (% of GDP) and vital rates of countries in different regions of the world was chosen as the objective of the study.

Investigating the processes of economic development of countries and regions, modern economic science highlights the technological mode, global competitiveness and the level of human development as basic concepts.

According to the prominent Russian economist N.D. Kondratyev, changing technological modes and cyclical processes in the global economy underlie the crises, wars, social disasters and revolutions. It

is Kondratyev's cycles in the leading countries of innovation development that are considered as a basis for industrial, technological and innovation policy.

From the point of view of leading economists, current global financial crisis results from rapid decline in the development potential of technological mode V industries. According to the researchers, the technological mode VI industries will include biotechnology, nanotechnology, new medicine, high humanitarian technologies, full-scale virtual reality system, multimedia networks, global communications systems, space technology, new environmental management, waste technologies, alternative energy, global knowledge base, including educational and cultural information systems, distance learning, home information systems, smart homes.

In the recent researches (for instance Bucci, 2015) were analyzed how population and product market competition (PMC) may interact with each other in affecting the pace of economic growth. It was found that a growth model with human capital accumulation à la Lucas (J Monet Econ 22(1):3–42, 1988) and a continuum of degrees of intertemporal altruism can predict an ambiguous link between population and economic growth rates, in line with the available empirical evidence.

(Elsadig, Krishnasamy 2011) analyzed the nature and extent of productivity changes of ASEAN5 countries, namely, Malaysia, Indonesia, Philippines, Thailand and Singapore over the period 1993 to 2006. The Malmquist total factor productivity (TFP) index was calculated within the framework of data envelopment analysis is next decomposed into three constituent elements accounting for different sources of productivity growth, which are technological progress, efficiency change and the effects of economies of scale. Results indicate that when human capital is included in the model, Malaysia and Singapore reported an increase in TFP and this growth in productivity is derived from both technical efficiency gain and technological progress. The model without human capital shows that there is a TFP reduction in Malaysia, Philippines and Thailand whereas Indonesia and Singapore recorded a growth in TFP. This suggests that human capital investment plays a pivotal role in driving TFP growth in Malaysia.

Another interesting aspect is the ambiguous role of universities in facilitating the transmission of knowledge to private-sector business enterprises, which was investigated by D. P. Leyden and A. N. Link (Leyden and Link, 2013) They developed a formal model of university-with-business enterprise collaborative research partnerships in which the outcome is both mutually desirable and feasible. This model showed that if a university seeks to act as a complement to private-sector collaborative R&D so that it will be attractive to both incumbent firms and startup entrepreneurs, it needs to structure its program so that business enterprise revenues increase and business enterprise R&D costs rise by a smaller proportion than revenues increase.

Sum, N.L. & Jessop, B. J (Sum, Jessop 2013) researched how the knowledge-based economy is being re-contextualised in part in terms of 'knowledge and higher education clusters', 'knowledge hubs', etc., and their role in competitiveness; They also analyzed some implications of these economic imaginaries, governmental technologies, and emergent modes of growth for higher education.

(Gu, Wong 2015) in their paper constructed a direct output measure of the education sector for Canada and used the measure to examine its productivity performance. The measurement of education output in the paper was predicated on the notion that the output of the education sector represents investment in human capital.

Thus, the level of public education, manpower advanced training and permanent access to new knowledge and technologies play an important role in the transition of the economy to the new technological mode.

Depending on the initial conditions and the current level of development, the factors determining the competitiveness of the economy have different effects on the economical systems of the countries around the world.

## 2 Methods: Clustering of the countries and regression analysis

Systematic approaches, structural-functional method, formalization method, scientific abstraction method, methods for stochastic modeling of economic activity, including correlation and regression analysis, were used in the study.

### Defining the factors that impact on Human Development Index (HDI) indicator and characterize the level of monetization of an economy

For the planned study, three functional indicators were chosen:

- f1 – Human Development Index;
- f2 – The Legatum Prosperity Index;
- f3 – Competitiveness Index.

The authors constructed a regression model with the following influence factors:

- x1 – Public expenditure on education, total (% of GDP);
- x2 – Expenditure on education as % of total government expenditure (%);
- x3 – Domestic expenditure on research and development, % of GDP;
- x4 – Population, million people, total;
- x5 – Urban population, % of the total population;
- x6 – Population density (people per sq km of land area);
- x7 – GDP per capita (constant 2010 US \$);
- x8 – Industry, value added (% of GDP);
- x9 – Agriculture, value added (% of GDP);
- x10 – Services, value added (% of GDP).

Due to the lack of complete data for study in other time intervals, a period from 2010 to 2015 was selected (Appendix 1).

Statistical data for the 16 countries of the various world regions with different levels of economic development were used: Argentina, Australia, Austria, Brazil, Finland, France, Germany, India, Japan, Mexico, Norway, Russian Federation, South Africa, Switzerland, United Kingdom, United States<sup>1,2,3,4</sup>. The initial hypothesis of the equivalence of Human Development Index, The Legatum Prosperity Index, GCI Global Competitiveness Index indications has not been confirmed. In this regard, each component was reviewed separately.

While building a regression model of dependence of the Human Development Index indicator for the groups of countries under consideration on the above parameters, the authors performed a correlation analysis. During the analysis, four groups of countries were identified, with similar factors used to build the regression models. The overall results of the correlation analysis of the dependence of GDP dynamics on the chain growth of factors that characterize the level of monetization of the economy are shown in the table.

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Below are brief descriptions of the clusters, into which the countries under consideration were divided. For each cluster, regression equation models were identified:

**Group I.** Countries characterized with negative dependence of HDI on the volume of public investment in education (Mexico, France, Australia, Canada, Denmark and Austria).

$$f_1 = 0.0036 \cdot x_1 + 0.038 \cdot x_4 + 0.0035 \cdot x_5 - 0.0127 \cdot x_6 + \varepsilon;$$

A positive correlation between the rate of change of HDI and the dynamics of change in the country's population and, to a lesser extent, the scope of public expenditure on education as a percentage of GDP, was identified. According to the resulting model, population growth by 1 million people is accompanied by a positive shift of the HDI index in the study group of countries by an average of 0.038 points.

**Group II.** Countries with a high index of competitiveness, characterizing a high level of other indicators (Norway, United Kingdom, Switzerland and Finland).

$$f_1 = -0.041 \cdot f_3 + 0.001 \cdot x_2 - 0.042 \cdot x_5 + 0.0205 \cdot x_6 + 0.0299 \cdot x_8 + 0.023 \cdot x_{10} + \varepsilon;$$

As in the previous model, a positive effect of changes in population dynamics within the averaged model of Group II country was found. At the same time, according to the built regression model, the increase in the urban population by 1% can be expected to reduce HDI index by an average of 0.042 points, which can be attributed to an excess of highly qualified urban personnel and shortage of blue-collar jobs.

This group is characterized by a significant positive impact of changes in the volume of industrial production and services sector.

**Group III.** Countries with a negative correlation between the level of industrialization and the HDI (Argentina, Israel, Brazil and China).

$$f_1 = 0.019 \cdot x_2 - 0.0045 \cdot x_4 + 0.2286 \cdot x_5 - 0.105 \cdot x_6 - 0.0612 \cdot x_8 - 0.029 \cdot x_{10} + \varepsilon;$$

According to the model for the countries with a negative correlation between the level of industrialization and HDI, a significant dependence of HDI dynamics on the changes in the proportion of the urban population was found. It was proved that the increase in the proportion of the urban population by 1% can increase the HDI index by 0.228 points. According to the constructed model, this can result from a decrease in population density by 2.17 persons per sq. km. That is, an increase in population density by 1 person per sq. km leads to HDI decrease by 0.1 point.

In contrast to the Group II model, the countries with a negative correlation between the level of industrialization and HDI show an inverse relationship between the dynamics of changes in the HDI function and the volume of the industrial sector and the service sector as a percentage of GDP. The constructed model suggests that an increase of this parameter by 0.1 point is associated with a reduction in the volume of industrial production in the average country of this group by 1.63% of GDP, or a decrease in the volume of services sector by 3.44% of GDP.

**Group IV.** Countries characterized by a negative impact of demographic factors on HDI (Japan, Germany, India, the Russian Federation, the United States, South Africa).

$$f_1 = -2.023 + 0.0698 \cdot x_1 - 0.0486 \cdot x_2 - 0.0001 \cdot x_7 + 0.0935 \cdot x_{10} + \varepsilon;$$

Like in Group I model, the countries with a negative impact of demographic factors on HDI show an inverse relationship between the scope of public expenditure on education and a change in the HDI

index. The constructed model suggests that an increase in the specified parameter by 1% of GDP is associated with a reduction in the HDI index in the average country of this group by 0.07 points.

The unique parameters influencing the change in the HDI index in the countries of this group include GDP per capita. This parameter has a significant impact on the studied function. According to the constructed model, the increase in GDP per capita by USD100 enables forecasting the increase in the HDI index by about 0.01 points in the group of countries with a negative impact of demographic factors on HDI.

### **3 Paper results**

Fundamental investment for the growth of national economy's competitiveness is investment in higher education.

Higher education has a direct impact on all components of human capital and promotes the formation of highly skilled professionals, whose work determines the pace of the country's economic growth.

A creative person is the main element in the process of innovative production development, and its human capital is the main resource of innovative production based on the generation of new knowledge.

The correlation and regression analysis identified four clusters of countries, characterized by varying power of the relationship of basic factors characterizing the country's economy and its human development index, and, as a consequence, the global competitiveness of the national economy.

These are the following groups of countries: countries that are characterized by a negative dependence of HDI on the volume of public investment in education; countries with a high index of competitiveness, characterizing a high level of other indicators; countries with a negative correlation between the level of industrialization and HDI; countries, characterized by negative influence of demographic factors on HDI.

### **4 Discussion**

The country's competitiveness in the globalized world is defined both by the level of economic development and competitiveness of the education system (including higher education), which is in turn determined by the competitiveness of each educational institution included in the system, and hence the level of development of their intellectual potential.

First, second and third groups models, received in the result of the correlation analysis are very similar. The overall analysis of the factors included in the models demonstrates, that the economy of countries and the index of human development are nowadays highly dependent on the initial conditions of their development, location, population density, degree of urbanization, as well as on the various historical and political aspects of countries' development. Meanwhile the second and third models differ only by one factor and the degree of influence of the factors included in the model.

Countries included in the second cluster, such as Norway, UK, Switzerland and Finland belong to the category of economically developed countries and are characterized by political stability, open economy, highly developed infrastructure and reliability of telecommunications, as well as the high level of cooperation between enterprises, research centers and universities. For these economies, the most important factors are: the speed in the development of new technologies, high educational level of the population, favorable business climate.

Countries included in the third cluster (Argentina, Brazil, Israel and China) are among the countries with rapidly developing economies. So, Israel is considered one of the most developed countries in southwest Asia in economic and industrial development. As of June 2015, the country occupies the 53rd position in the World Bank's "Ease of doing business" ranking of the world economic forum's "Global

competitiveness”<sup>5, 6</sup>. In the ranking, published in the December 2014 Israel was placed at 30th place in the world ranking of “best countries for business” by Forbes magazine’s opinion<sup>7</sup>. The economy of China, the second (after the U.S.) economy in the world by nominal GDP and the first by GDP purchasing power parity (from 2014)<sup>8</sup>. Despite the crises that affected Argentina in recent years, its economy is one of the major emerging economies. The size of Argentine GDP and its economic growth allow her to be part of the “Big twenty”.

The fourth group of countries differs sharply from previous ones by the composition of relevant indicators. In comparison with the other models here as significant are both factors that reflect the investments in education and GDP per capita. The derived equation allows to make the assumption, that the economies of fourth group’s countries are at the level of development when can be easily observed a direct correlation between the HDI and the cost of the education industry.

Among these countries got two world powers: Russia and the United States. Russian economy, according to the 2015 ranked the sixth among the world countries in terms of GDP at purchasing power parity<sup>8</sup>. The United States is the largest economy in the world by nominal GDP and it shares first place with China’s economy by GDP purchasing power parity. The US economy is one of the most diversified national economies in the world and its share in the global GDP (as at 2015) is about 15%<sup>9</sup>.

Selection of a source of investment in education on both economy and human scale is a highly controversial issue. The demand for higher education exceeds the government’s ability to provide everyone with the opportunity to study in selected fields of training at the expense of the state budget. Simultaneously, the state should regulate the production of specialists with a degree in various fields and training profiles, in order to meet the demand for the relevant qualifications. This is especially important in light of the need to make a breakthrough in the economy and an abrupt transition to the latest technological modes.

Only the state can create the conditions for the transition of the economy to the new technological mode, using as a tool the financial support for breakthrough areas of science and education development, creating and maintaining demand for educational programs that implement advanced training of graduates and ensure the replacement of technological modes through the mechanisms of funding distribution at the expense of the state budget.

It should be noted that two factors: internal expenses for research and development (in % of GDP) and value added in agricultural sector (in % of GDP) were not significant factors in any of the four obtained models. Thus, further research should aim to study the influence of R&D spending on the economic development of countries, seeking to occupy a leading place in terms of global competitiveness, prosperity and quality of life.

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<sup>5</sup> World Bank Open Data // The World Bank Group: Economy Rankings. Available at: <http://www.doingbusiness.org/rankings> (accessed 25.01.2017)

<sup>6</sup> The Global Competitiveness Reports // The World Economic Forum. Available at: <http://reports.weforum.org/global-competitiveness-index/> (accessed 20.01.2017).

<sup>7</sup> Best Countries for Business. Available at: <https://www.forbes.com/best-countries-for-business/list/> (accessed 15.01.2017).

<sup>8</sup> International Monetary Fund: World Economic Database. Report for Selected Countries and Subjects. Available at: <http://www.imf.org/external/index.htm> (accessed 25.01.2017).

<sup>9</sup> The World Factbook Country Comparison : GDP (Purchasing Power Parity). Available at: <https://www.cia.gov/library/publications/the-world-factbook/rankorder/2001rank.html> (accessed 20.01.2017).

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## Appendix 1

**Table 1: Correlation analysis of dependence of the dynamics of changes in HDI and the index of competitiveness from the chain growth of factors that characterize the level of spending for education and dynamics of value added by economics' sectors**

Group	Country	Competitiveness index	Public expenditure on education, total (% of GDP)	Expenditure on education as % of total government expenditure (%)	Domestic expenditure on research and development, % of GDP	Population, million people, total	Urban population, % of the total population	Population density (people per sq. km of land area)	GDP per capita (constant 2010 US\$)	Industry, value added (% of GDP)	Agriculture, value added (% of GDP)	Services, etc., value added (% of GDP)
		f3	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10
<i>I Countries with negative HDI dependence on the volume of public investment in education</i>												
	Mexico	0,63	-0,81	-0,10	0,77	0,94	0,94	0,93	0,98	-0,59	0,83	0,56
	France	-0,66	-0,90	-0,57	-0,09	0,95	0,97	0,97	0,81	-0,25	-0,48	0,46
	Australia	0,03	-0,73	-0,57	-0,73	0,97	0,97	0,97	0,98	-0,47	-0,55	0,45
	Canada	-0,41	-0,76	-0,28	-0,52	0,90	0,90	0,90	0,96	0,58	0,56	-0,24
	Denmark	-0,26	-0,40	-0,40	-0,20	0,75	0,78	0,75	0,25	0,51	0,09	-0,40
	Austria	0,54	-0,28	-0,53	0,35	0,85	0,72	0,85	0,75	-0,51	-0,48	0,54
<i>II Countries with a high index of competitiveness, characterizing by a high level of other indicators</i>												
	Norway	0,94	0,21	-0,15	-0,88	0,97	0,98	0,99	0,94	-0,76	0,26	0,79
	United Kingdom	0,91	-0,63	-0,53	-0,68	0,81	0,82	0,81	0,71	-0,18	-0,77	0,23
	Switzerland	0,61	-0,47	-0,71	-0,45	1,00	0,99	1,00	0,92	-0,92	-0,27	0,92
	Finland	0,71	-0,04	-0,05	-0,68	0,90	0,88	0,90	-0,53	-0,95	-0,05	0,95
<i>III Countries with a negative correlation between the level of industrialization and the HDI</i>												
	Argentina	-0,88	0,83	-0,06	0,37	0,95	0,91	0,94	0,02	-0,94	-0,77	0,87
	Brazil	-0,30	0,06	-0,44	0,49	0,98	0,98	0,98	0,44	-0,94	0,82	0,92
	Israel	0,13	0,14	-0,53	-0,10	0,97	0,98	0,98	0,99	-	-	-
	China	-0,76	-	-	0,50	0,95	0,96	0,95	0,95	-0,86	-0,83	0,86
<i>IV Countries characterized by a negative influence of demographic factors on the HDI</i>												
	Russian Fed.	-0,16	0,08	0,16	0,39	-0,49	-0,52	-0,49	-0,75	0,70	-0,19	-0,73
	South Africa	-0,69	-0,63	-0,62	0,43	-0,59	-0,61	-0,59	-0,87	0,51	0,75	-0,60
	Germany	0,92	-0,47	-0,15	0,24	-0,41	0,87	-0,41	0,92	0,49	0,11	-0,54
	United States	0,53	-0,75	-0,09	-0,13	0,73	0,73	0,73	0,66	0,92	0,51	-0,01
	Japan	0,87	-0,18	-0,07	0,50	-1,00	1,00	-1,00	0,96	-0,30	0,17	0,25
	India	0,41	-0,82	-0,94	-0,37	-0,63	-0,61	-0,63	-0,57	0,46	0,53	-0,50

Source: Prepared by the authors based on the research results.

# ANALYSIS OF THE DEVELOPMENT OF SMALL AND MEDIUM ENTERPRISES WITH MATHEMATICAL AND STATISTICAL METHODS

**Eva Sikorová**

*Moravian University College Olomouc, Department of Business Economics,  
Czech Republic  
eva.sikorova@mvsso.cz*

**Markéta Měřvová**

*Silesian University in Opava, School of business Administration in Karvina,  
Czech Republic  
o131884@opf.slu.cz*

## **Abstract:**

Quality and stable business environment is inextricably linked with the development of small and medium enterprises not only in individual regions of the Czech Republic. This is one of the prerequisites for a successful business. This article aims to introduce a model example of detecting the position of the selected business entity within the sectoral competition in the Olomouc region and the prediction of the future development of the business entity in the form of scenarios in response to changes in the business environment. The analysis of the selected position of the company is divided into several steps. They are: selection criteria of comparability of businesses, showing the examined group of enterprises, comparison of selected financial indicators of business entities (Analysis of external business environment), draw the basic statistical characteristics (analysis of the external business environment), followed by detection of the interdependence of financial indicators (such as return on equity and the quick ratio, which represents the analysis of internal business environment). The prediction scenarios of business entity is also divided into several steps. It begins with establishing criteria of economic efficiency, the following factors affecting choice of behaviour of the economic system, create scenarios, quantifying the value of the selected criteria, and finally evaluate the profitability of variants.

## **Key words:**

Business environment, small and medium enterprises, industry structure, industry competition, financial indicators

**JEL Classification:** H3, M2, L2

## **1 Introduction**

Decisions about business start-up or already existing business activity is always influenced by societal conditions - economic, political, technological, social and cultural. According to Kalínská (2010, p. 167) has the above summary of the factors „*impact on the quality of the conditions in which businesses develop their activities and significantly affecting their competitiveness, efficiency, growth potential and determine the attractiveness of the country for foreign investors.*” Summary factors is referred to as the **business environment**.

The quality not only of the Czech business environment evaluates the report **Doing Business**, published by the World Bank, which is focused on the impact of government regulations on business

development. The report evaluates ten areas, including: starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting investors, paying taxes, trading across borders, enforcing contracts, resolving insolvency. Czech Republic, according to World Bank data for June 2013 ranked 75 th out of 189 countries evaluated. According to the report Doing Business for the period June 2015 to June 2016, the Czech Republic ranked 27 place. A significant improvement in the position of the Czech Republic contributed to a user-friendly environment for payment of taxes and simplify the tax system. It was also clarified the methodology for the indicator getting electricity. Quality of the Czech business environment dealing with authors Belás, Bartoš, Habáník, Novák (2014), who in his analysis assesses the business environment in the Czech Republic and the Slovak Republic in terms of the impact of the global financial and economic crisis. Following comparison of the business environment in selected regions of the Czech Republic and Slovakia. When processing an analysis of the business environment watched Belás, Demjan, Habáník, Hudáková, Sipko (2015), the following variables – the motive to start a business, perception of business by the company, support from the state, the perception of corruption in business, the intensity of market risk, decreased output, approaches banks to finance SMEs, the ability to manage financial risks and business optimism. State influence on the business environment for SMEs in the Czech Republic describe Virglerová, Dobeš, Vojtovič (2016).

The business environment is monitored and abroad. It was processed many methods that assess the quality of the environment for SMEs. For example, comparison of methods and techniques QVP and PESTELE, STEEPEL and PIE made Duus, Bjerre (2015). The influence of European integration on the business environment in Georgia shows Abramishvili (2016). In the previous period, the relationship between unemployment, economic growth and growth in the business sector dedicated Dujowich (2010). For developing and maintaining the position of SMEs in the domestic and foreign markets, it is necessary to analyze the internal and external business environment. Therefore, the objective of the article present a model example of detecting the position of the chosen company within the sectoral competition and subsequent prediction of the future development of the company in response to changes in the business environment (internal, external).

## 2 Methods

The authors used data of secondary character. Secondary data are obtained from scientific papers published in the database ProQuest in the approach of the Silesian University in Opava, School of Business Administration in Karvina. Secondary data is used for the description of the current state of the research questions. They should reflect the current trends.

In the application of article examined secondary data that is gathered from financial statements of business entities in the Olomouc region through a database of Moravian College in Olomouc using financial, regression and multicriteria analysis of variants. The correctness of calculated data was verified program FinAnalysis 2.16 demo. And it is also relevant to the usability of these outputs for managerial studied business entity in the context of short-term and long-term planning of their own activities, so that there was a desired business development. Given the scope of the research questions the article, the article used the method of abstraction. It is also widely used theoretical scientific method of deduction. The method allows the deduction proceeded from general findings, conclusions and assertions to the courts special, unique events and so deduce necessary conclusions (Hendl, 2005).

Large range using the set objective article are mathematical methods that allow the formation of hypotheses mathematical formulations, including the use of statistical methods to precisely affect the relationship between the different economic quantities (correlation coefficients), degree of mean values, indices of variability, methods of probability theory, distributions, statistical hypothesis testing.

In this paper time series INFOA International Company, Inc. monitored through surveys of its market position in the seven-year period. At the time of analysis were not comparable public information sources from all business entities compared (table 1 and 2). For the application of correlation and regression analysis was used seven-year period due to incomplete financial statements (table 4) and the subsequent financial analysis take account of new data concerning the management also for 2015

(table 3). The hypothesis is based on examining the dependence of selected financial indicators through regression and correlation analysis. Hypothesis: There is a dependency on the amount of liquidity quick return on equity in the case of INFOA International, Inc.? From calculations and graphical display (index correlation, linear regression and point graph) shows that the quick ratio in the model example does not affect ROE (return on equity amount) or contrary. Testing the hypothesis was thus using three statistical methods.

### 3 Paper results

In the next chapter is given a model example of the use of financial analysis to determine the position of business INFOA International Inc. in the context of industry competition and prediction of the future development of the enterprise in response to changes in the business environment. When a company's rating as the most problematic area appears to be the choice of other comparable entities, since every company has its own specifics. The larger the sample is chosen, the greater the number of differences is in it, and thus decreasing the quality of the carried out by comparison.

A comparison of selected bodies active in the field of NACE 46-wholesale trade, except of motor vehicles. For completeness, the following parts of the text are listed in the individual criteria of comparability:

- industry comparability,
- the same legal form of the business,
- comparable to the size of the undertaking,
- headquarters of the Organization in the Olomouc region
- the availability of the financial statements in 2008-2014.

The term industry comparability means that the economic activity of the entity is registered under the CZ-NACE code section 46 - wholesale trade, except of motor vehicles. From the code group and class was abstracted for lack of relevant information sources. The criterion of the same legal form was chosen because of the need for approximately the same size and structure of assets and liabilities of the selected enterprises. In the model the example was chosen legal form or limited liability company. The seat of all elected bodies is in the Olomouc region, so as to ensure the comparability of economic, competitive, material, technical, socio-cultural and demographic conditions. Availability of financial statements (information) is not only for the financial analysis of the core.

The above criteria correspond to the four bodies, which will be with the above mentioned companies INFOA International Inc. is compared in table No 1., under the name comparison of selected financial indicators business in 2014. They are: ITEMA Inc., I. C. B. C., Inc., SIGMA, Inc., AQ PUMP, Inc.

**Table 1: Comparison of selected financial indicators of enterprises in 2014**

Small company	EAT (THS. CZK)	Revenues (THS. CZK)	ROE	Quick liquidity	Asset turnover	A measure of the total indebtedness
INFOA International Inc.	519	29 323	0,0498	0,7629010	1,17203	0,561093569
ITEMA Inc.	1010	137937	0,2629	1,1940565	3,40442	0,904681985
I. C. B. C. Inc.	644	95929	0,1318	0,3266907	2,15310	0,890335323
SULKO Inc.	2946	658204	0,0217	1,4267318	1,67278	0,632758971
AQ Pumpy Inc.	10734	52556	0,4059	4,1283193	1,46907	0,260628931
The average	3170,6	194789,8	0,1744	1,5677	1,9743	0,6499
The median	1010	95929	0,1318	1,1941	1,6728	0,6328
The standard deviation	3881,7	234677,7	0,1429	1,3345	0,7832	0,2377

Source: Own elaboration, 2016.

The above table shows selected financial indicators, from which it is apparent that the worst position within the file is divided business INFOA International Inc. and I.C.B.C. Inc. Highest profit achieved a firm engaged in the Pump AQ Inc. production and sales of pumping equipment, when in fact he had not reached his highest sales value in the file. Turnover of total assets should be in the interval from 1.6 to 2.9. The condition met I C. B. C., Inc. and SIGMA, Inc. For a better assessment of the situation should be monitored over time. For the company's downward trend unfavorable. A pointer to the creditor risks indicates what part of the assets of a business is financed by the capital creditors. The greater the value of the pointer, this is a business for lenders being more risky. For the insolvent undertaking would be in model example, marked the company ITEM, Inc.

In the table the number 1 were calculated from the values of indicators drawn from the basic statistical characteristics in more detail characterize the file of the selected enterprises and their indicators. If we evaluate the file in five companies of the median and average, we find that the above average is considerably adjusted remote values and take more radical than the median values. In terms of financial analysis, it is better to use as the basic statistical characteristics of the median, which is not affected by outlying values in the population of enterprises.

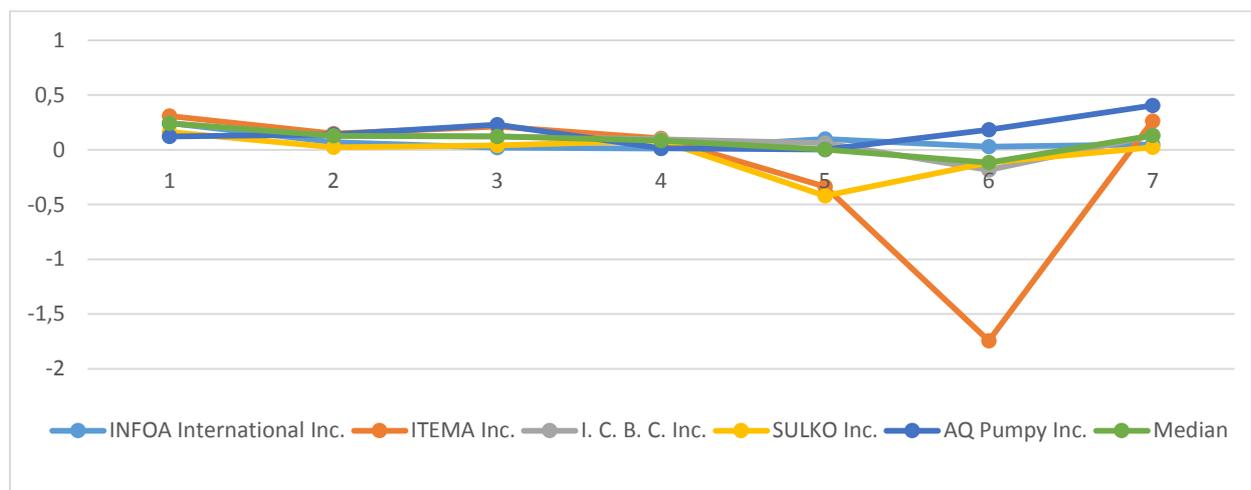
For comparison, in terms of the long-term development of profitability during the pointer was elected equity selected enterprises in the years 2008 to 2014, which is supplemented by statistical indicators expressing the point estimate of the position of the ROE in a given year and the present is and the standard deviation as a measure of the variability of the values for a given year. This fact is shown in table 2 under the name Development of indicators of ROE from 2008 to 2014. In that context, it is evident the continuity and on the chart 1 under the name Comparison of development indicators of ROE in each enterprise.

**Table 2: Development of indicators of ROE in 2008-2014**

Year	2008	2009	2010	2011	2012	2013	2014
INFOA International Inc.	0,2433	0,0689	0,0210	0,0099	0,0988	0,0285	0,0498
ITEMA Inc.	0,3076	0,1488	0,2111	0,1049	-0,3363	-1,7445	0,2629
I. C. B. C. Inc.	0,2412	0,1287	0,1221	0,0951	0,0614	-0,1855	0,1318
SULKO Inc.	0,1625	0,0226	0,0410	0,0831	-0,4207	-0,1177	0,0217
AQ Pumpy Inc.	0,1219	0,1389	0,2292	0,0147	0,0033	0,1817	0,4059
The average	0,2153	0,1016	0,1249	0,0615	-0,0582	-0,3675	0,1744
The median	0,2412	0,1287	0,1221	0,0831	0,0033	-0,1177	0,1318
The standard deviation	0,0656	0,0483	0,0850	0,0408	0,1869	0,7000	0,1429

Source: Own elaboration, 2016.

Chart 1: Comparison of development indicators of ROE individually



Source: Own elaboration, 2016.

It is evident that the value of the ROE INFOA International, Inc., if compared with the median, with slight variations follow the median value. The largest fall in the value of the ROE is recorded by the ITEMA, Inc. in the period 2011-2013.

Hypothesis: ***there is a dependency on the amount of liquidity available expeditiously the profitability of equity in the case of INFOA International, Inc.?***

### The company's liquidity indicators INFOA International, Inc.

The company's liquidity INFOA International, Inc. are analyzed in the eight-year time series, i.e. in 2008-2015. From the analysis of the values listed in table 3 can be seen that the highest ability to repay obligations, had business in 2012. But looking more closely into the table can say that calculated the company's liquidity have a different curve development.

The most unstable development was recorded in the current ratio. From 2008 to 2010 is the gradual rise. In the subsequent period of the years 2010 and 2011 is recorded the same amount of liquidity III. degree thus stagnation of development. From 2011 to 2012, the sharp rise in the value of the examined indicators 5, 3. It was subsequently recorded by 2014, a sharp drop in value 2.46. From 2014 to 2015 is a noticeable upsurge in current liquidity to 4.39 routine.

Since 2009 after a slight rise followed by a slight decline in the value of quick liquidity into 2010 to the level of 1.39. In the subsequent period of the years 2010 and 2011 is recorded the same amount of liquidity thus prompt indicators of stagnation of development. From 2011 to 2012, the sharp rise in the value of the examined indicators of 2.26. Subsequently recorded by 2014, a sharp drop in the value of up to 0.76. From 2014 to 2015 is a noticeable upsurge in liquidity II. degree to prompt 1.56.

For liquidity I. degree is from the level of year 2008 (0.43) recorded a slight decrease in until 2011, when the value reaches the level of 0.13. From 2011 to 2012, is the increase of the examined indicators of the value of the year 2008. From 2012, all the free cash resources have been exhausted. The year 2013 the value of 0.10, 2014 and 2015 identically 0.03.

**Table 3: Development of indicators of liquidity in 2008-2015**

n.		2008	2009	2010	2011	2012	2013	2014	2015
<b>Liquidity indicators</b>									
2.1.	Current ratio ((liquidity III. degree)	2,84	3,50	4,04	4,03	5,30	3,48	2,46	4,39
2.2.	Quit Asset Ratio (liquidity II. degree)	1,49	1,79	1,39	1,42	2,26	1,10	0,76	1,56
2.3.	Cash Position Ratio (liquidity I. degree)	0,43	0,30	0,20	0,13	0,43	0,10	0,03	0,03
2.4.	Operating (solvency)	0,67	0,34	0,39	0,29	0,51	0,15	0,10	0,24
2.5.	The share of working capital to total assets	0,60	0,67	0,69	0,72	0,79	0,70	0,59	0,75
2.6.	The level of commitments given to capital	0,58	0,50	0,64	0,65	0,66	0,77	1,35	0,61
2.7.	Ratio of liabilities to assets	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

Source: Custom processing of FinAnalysis\_ 2.16 \_demo, 2016.

The relationship of quick liquidity and profitability of capital it is necessary to describe in the first place. To the determination of the above mentioned relation has been used regression and correlation analysis. The time series have been created, the values of ROE (variable x) and values prompt liquidity (variable y). The table below captures the values of both financial indicators in the period 2008-2014.

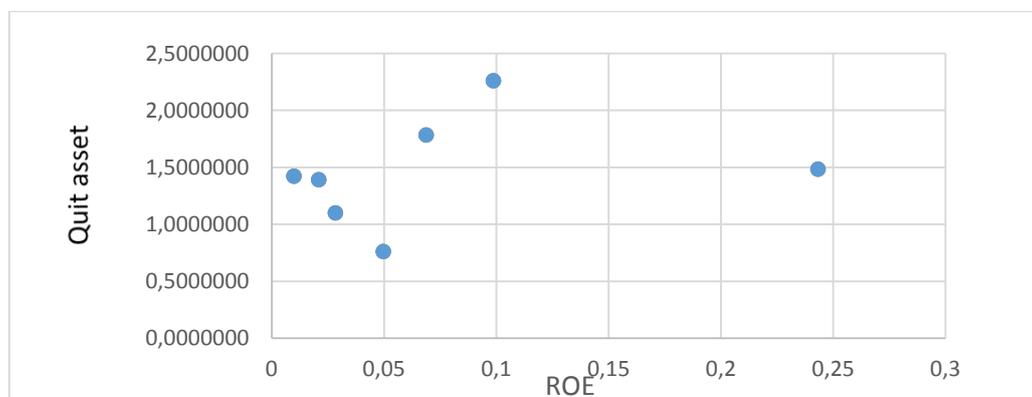
**Table 4: ROE and Quit Asset Ratio in 2008 – 2014 business INFOA International, Inc.**

Year	ROE (x <sub>i</sub> )	Quit Asset Ratio (y <sub>i</sub> )
2008	0,2433	1,4852293
2009	0,0689	1,7861209
2010	0,0210	1,3934758
2011	0,0099	1,4248762
2012	0,0988	2,2599676
2013	0,0285	1,1018393
2014	0,0498	0,7629010

Source: Own elaboration, 2016.

From the above data it is not possible to trace any dependency on the amount of liquidity available expeditiously the profitability of capital, such as: the deteriorating value of ROE can negatively affect the liquidity of the company swift and vice versa. Is a graphical display using a scatter diagram, in which each pair of values ROE and liquidity II. degree consists of one point (Chart 2).

**Chart 2: Point chart of liquidity II. degree depending on ROE**



Source: Own elaboration, 2016.

### Based on the analysis of ROE using responsive liquidity linear regression

The relationship of quick liquidity and ROE now determine using linear regression. Below are the enumerated values of the parameters of the linear regression function.

$$b_0 = \frac{\sum y_i \sum x_i^2 - \sum x_i \sum y_i x_i}{n \sum x_i^2 - (\sum x_i)^2} = 1,3419$$

$$b_1 = \frac{n \sum y_i x_i - \sum x_i \sum y_i}{n \sum x_i^2 - (\sum x_i)^2} = 1,5787$$

The final regression function with the trends of the values of the parameters has a final form:

$$Y_i = 1,5787x_i + 1,3419$$

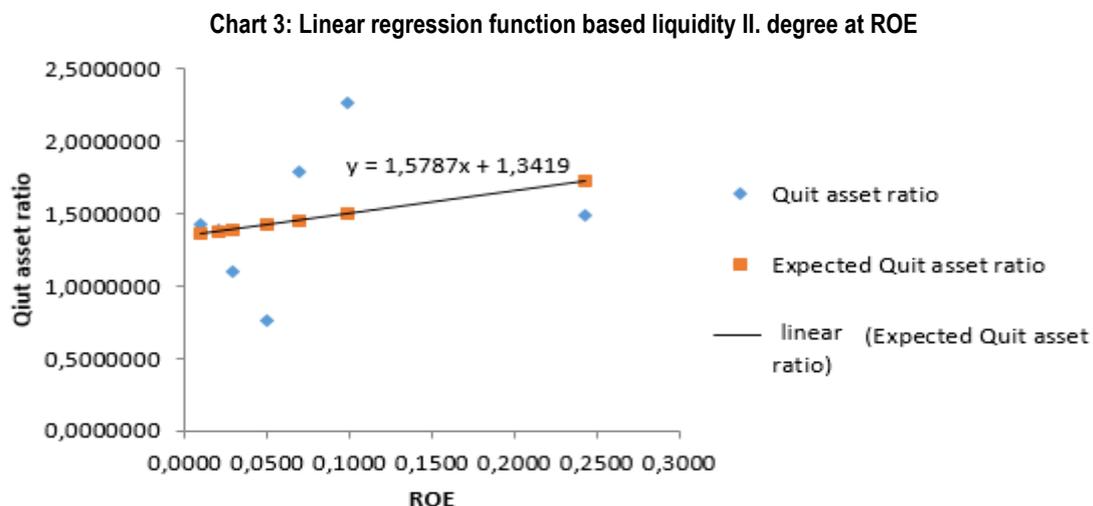
It is now possible by inserting the appropriate ROE for the explanatory variable values  $x_i$  to the equation obtained regression function to calculate the corresponding balanced values  $Y_i$ .

**Table 5: Balanced values based liquidity II. degree in ROE by using linear regression**

$Y_i$	1,726044619	1,450623982	1,374996383	1,357566083	1,497849	1,3868434	1,420486469
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Source: Own elaboration, 2016.

The furnishing of the balanced values from table no. 5 a line to a line chart, which captures the progress of the linear regression function that describes the dependence of the liquidity II. degree on the ROE.



Source: Own elaboration, 2016.

In order to assess the quality of the resulting regression function and intensity of addiction, it is required to submit to the correlation analysis. For this purpose you can use several computing – from the simple size of the residual variance, through the index of determination and its square root of index correlations to simplify correlation index specifically for the line regression, correlation coefficient. The calculation of correlation index for estimation of regression functions:

$$I_{yx} = \sqrt{\frac{\sum (Y_i - \bar{y})^2}{\sum (y_i - \bar{y})^2}} = 0,266298$$

The index of correlation for the linear regression function is the value closer to zero, which indicates operational independence, or if the value is not pointing to a sufficiently high tightness dependencies between swift and the liquidity of the ROE and the eventual regression estimates carried out based on the regression line cannot be considered of sufficient quality.

Another interpretation of the results: when evaluating the dependencies of variables, it is necessary to take account of the fact that I have enough data. This is possible by using the following table.

Table 6: Critical values for the correlation coefficient r

n	$\alpha$	
	0,05	0,01
3	0,9969	0,9999
4	0,95	0,99
5	0,8783	0,9587
6	0,8114	0,9172
7	0,7545	0,8745
8	0,7067	0,8343
9	0,6664	0,7977
10	0,6319	0,7646
11	0,6021	0,7348
12	0,576	0,7079
13	0,5529	0,6835

n	$\alpha$	
	0,05	0,01
14	0,5324	0,6614
15	0,514	0,6411
16	0,4973	0,6226
17	0,4822	0,6055
18	0,4683	0,5897
19	0,4555	0,5751
20	0,4438	0,5614
21	0,4329	0,5487
22	0,4227	0,5368
23	0,4132	0,5256
24	0,4044	0,5151

n	$\alpha$	
	0,05	0,01
25	0,3961	0,5052
30	0,361	0,4629
35	0,3338	0,4296
40	0,312	0,4026
45	0,294	0,3801
50	0,2787	0,361
60	0,2542	0,3301
70	0,2352	0,306
80	0,2199	0,2864
90	0,2072	0,2702
100	0,1966	0,2565

Source: [http://www.kmt.zcu.cz/person/Kohout/info\\_soubory/letnise/ruzne/krithodkorkoef.pdf](http://www.kmt.zcu.cz/person/Kohout/info_soubory/letnise/ruzne/krithodkorkoef.pdf)

In the above case has been worked on with a 95% probability and is known to 7 values. According to the table above would be the correlation coefficient was around 75%. INFOA International, Inc. does not exceed this limit. The correlation coefficient was detected at the rate of 26.6%. From the calculations show that with a 95% probability the liquidity does not affect ROE or nimble enough conversely.

In this context, solving the prediction of individual companies surveyed and their comparison may be based on an analysis of entrepreneurial potential or analysis under uncertainty, or a combination of both methods. The process can be observed in several steps.

1. Define a suitable criterion of economic efficiency.
2. Quantified decisive effects and factors.
3. Simulate scenarios of possible developments.
4. Consequences of changing behavior defined system will be reflected in a designated economic advantage criteria K and K'.
5. Conclusion presents an analysis of the results obtained in accordance with accepted rules and decision-election, or selection of relatively best option.

If the request such as the prediction of the company INFOA International Inc., can be recommended for evaluation advantageousness two criteria profitable type K and K'.

**A. Profitable criterion K**, according to the formula,

$$K = \frac{\Delta HZ}{J} \times 100\% / \quad , \text{ where HZ represents gross profit and J embedded resources.}$$

Selects the highest %, which is the best option.

**B. Criterion profitable K'**

$$K' = \frac{T\check{Z} \times \Delta HZ}{J}$$

, where TŽ is a lifetime or term sustainability of products on the market (in different years).

Calculation shows how much CZK effect accounted for 1 CZK invested funds. Criterion-type K' is used when the alternative solutions have different lifetime, or different time sustainability products on the market.

**Example** - realization of two variants (A and B)

**Version A** is based on the following premises

1. gross profit 440 000 CZK,
2. once embedded resources - the purchase of machinery, equipment, etc., amounting to 3.5 million CZK.

**Version B** is based on the following premises

1. gross profit 3 190 000 CZK,
2. once embedded resources 6 760 000 CZK.

**Solution**

K..... the criterion profitable type

- for version A  $K = (440\,000 / 3\,500\,000) * 100 = 12,6\%$
- for version B  $K = (3\,190\,000 / 6\,760\,000) * 100 = 47,2\%$

The service life is at variant A assumes the age of 12, variant B 8 years.

Calculation using the criteria K', based on the individual variants

- for version A  $K' = (12 * 440\,000) / 3\,500\,000 = 1,51 \text{ CZK} / 1 \text{ CZK}$
- for version B  $K' = (8 * 3\,190\,000) / 6\,760\,000 = 3,78 \text{ CZK} / 1 \text{ CZK}$

The next stage is to be noted influences and factors influencing the behavior of the system (for example: the percentage of increase in prices of raw material inputs).

Influence	Variants		(+ increase - decrease)
	A	B	
Product price	+20	+20	
Raw material prices	+ 5	+ 8	
Price of energy	+20	+20	
The cost of the (fixed assets, equipment,...)	+ 5	+25	

**During simulation scenarios are often** considered three possible states (X, Y, Z) or (A, B, C). These correspond to the three tendencies of development around the assessed economic system.

**Condition X** – for example: increase the prices of products, raw materials and energy variant A quicker than in variant B.

**Condition Y** - for example: envisages the development of both variants equally.

**Condition Z** - is expected stagnation in prices of products, increases in raw materials and energy - in variant B, stable growth – at variant A

**In measuring the value of the selected criteria** are factors influencing the behavior of the system reflected in the calculation criteria K and K' and considered the state of X, Y, Z.

	Condition	
<u>criteria K</u>	<u>version A</u>	<u>X Y Z</u>
<u>criteria K'</u>	<u>version B</u>	<u>X Y Z</u>

Again calculated criteria K and K', taking into account the main factors and influences.

**When evaluating the advantages** are compiled decision matrix. The lines are final values of the selected criteria columns - states X, Y, Z.

Table 7: Decision matrix

Variant	Condition		
	X	Y	Z
A	3,81	1,51	0,98
B	3,78	3,78	1,34

Source: Own elaboration, 2016.

Rating advantage is the use of three rules.

1. Rule „**maximax**“ – **variant A is advantageous**
2. Rule „**minimax**“ – variant A 0,98 CZK / 1 CZK  
– variant B 1,34 CZK / 1 CZK – **variant B is advantageous**
3. Rule „**minimum of regret**“

Matrix called as „ matrix of regret “ (from a maximum subtract the rest). **More preferred is the variant B.**

Table 8: Matrix of regret

Variant	Condition		
	X	Y	Z
A	0,00	2,27	0,36
B	0,03	0,00	0,00

Source: Own elaboration, 2016.

#### 4 Discussion

For the creation of short and long term business development strategies, it is necessary to specify the position of an SME in the market through the analysis of internal and external business environment. According to Gupta, Guha, Krishnaswami (2013), it is necessary to study the impact of internal and external factors in the business environment followed by the growth of the business. A model provides guidance for the management of small and medium enterprises, how to determine the position of the enterprise in a competitive market within the framework of the sectoral structure using the internal and external business conditions. In the context of the problems revealed are investigating the research question: would it be in the Czech business environment beneficial to creating analytical groups within the small and medium enterprise, which would be focused only on the area of the analysis of the position of the undertaking on the market and predict the future development of the company. The discovery followed according to financial indicators which it is necessary to predict the further development with an emphasis on the profitability of the business. In the investigation of the business subject dependence ROE and liquidity II. degree and vice versa was not demonstrated. The behavior of the economic operator with regard to the financing of the further influence the education system, economic system, the natural environment, and media-based and culture-based public and the political system, according to Gupta, Guha, Krishnaswami (2013) are Quintuple Helix Model.

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# ECOSYSTEM FOR SOCIAL INNOVATION SUPPORT – A NEED FOR SPEED?

**Jarmila Šebestová**

*Silesian University in Opava, School of Business Administration in Karvina, Department  
of Business Economics and Management, Czech Republic  
sebestova@opf.slu.cz*

**Zuzana Palová**

*Silesian University in Opava, School of Business Administration in Karvina, Department  
of Business Economics and Management, Czech Republic  
zuzana.palova@centrum.cz*

## **Abstract:**

Some social innovations will be developed by private funded social entrepreneurs. Others will be developed in public institutions by social intrapreneurs, here named as social entrepreneurs. However, there is also a difference between institutions and functions. Functions could be developed by social entrepreneurs inside or outside public funding institutions, while organisations/institutions create together a structure in form of ecosystem which can be less or more preventing or promoting the level of social innovations. The aim of this article is to design and recommend a suitable structure of the ecosystem that would help generate more social innovation. The ecosystem suggestion is based on primary data collection among the beneficiaries of operational programs 2007-2013.

## **Key words:**

Social innovations, support, ecosystem, policy

**JEL Classification:** L31, O35, R58

## **1 Introduction**

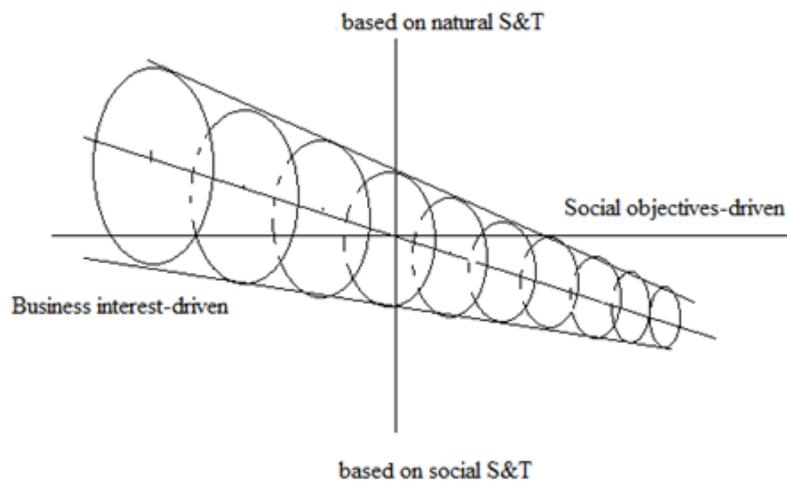
Social innovations are undertaken mostly by social entrepreneurs or groups of social entrepreneurs. Such social entrepreneurs can be individuals located within for- and not-for-profit organisations as well as public sector organisations, central agencies and policy-oriented organisations. It is not possible to forget on social entrepreneurs as individuals who try to actively influence policy measures which positively support social innovation. Social innovations can contribute to solving different types of social problems often involving innovations, which impact positively on the environment and sustainability. According to that definition, social entrepreneurs include individuals engaged in any type of social innovation as well as individuals who use policy measures to influence social innovations. In such a case, we regard them as political social entrepreneurs who can exist at local, regional, national or international levels.

Social innovations were first discussed by Drucker (1986). He argued that in the while previously years the dominant power in economies has been management, going forward social problems would dominate. Innovations should emerge to a higher degree in social sectors, rather than in business (Drucker, 2002; Mulgan et al., 2006).

Social innovations could be undertaken by private commercial companies, private or public social entrepreneurs, politicians, policy institutions and so forth. Social innovations and social entrepreneurship (SE) have been of increasing research and policy interest during the last decade (Zahra et al., 2009;

Boschee and McClurg, 2003; Emerson and Twersky, 1996; Reis, 1999; Thompson, 2002). These challenges and problems need models and tools to be created using different aspects of social innovations. There will also be a need for change suggestions both from a production as well as a consumption perspective, which considers account habits, discourses, strategies and policies. In a future, there may be a shift in the existing imbalance of the innovation map towards more social objectives driven and based upon social and technological (S&T, figure 1).

Figure 1: Sample image



Source: Lundström and Zhou, 2011, p 5

Social innovations must have the potential to improve societies' capacity in all these areas. There is also a demand for a combined bottom-up/top down process. One reason for this is that some of the areas, which have been developed during recent years, have been addressed from a bottom up perspective, e.g. concerning societal entrepreneurship while other areas such as future transportation systems will be developed mainly from a top down perspective. This process needs perspective type of supportive ecosystem.

Ecosystem is generally defined by Cohen (2006, p.3) as „an interconnected group of actors in a local geographic community committed to sustainable development through the support and facilitation of new sustainable ventures”. In area of not-for-profit organisations is suitable to use another type of definition, based on interaction and support between “bricks” of that ecosystem (Mack and Mayer 2015) based on networking. Performance of each depends on interactions between three components: individuals, organizations and institutions (Qian et al. 2013).

Many researchers believe that social entrepreneurs need better networking skills in ecosystem than commercial entrepreneurs (Purdue, 2001; Sharir and Lerner, 2006). This is because social entrepreneurs must work with different sectors including private, public and civil society and deal with complex and different stakeholder relations (Nicholls, 2006; Yitshaki et al, (2008). According to Van Ryzin (2009) having connections and networks in the community to carry out the mission is the single strongest predictor of a social entrepreneur.

The main objective of this paper is to design possible supportive ecosystem to promote social innovations and speed up their development in the Czech Republic.

## 2 Methods

The impact of social innovations varies across regional and country contexts and is also influenced by the extent of the social and environmental problems they seek to address. There is a need for specific model to influence social innovations creation. Lundström and Stevenson (2005) refer to this

problem as the OSV-model of policy development supporting social innovations and we will use this tool in our research. This impact can be measured by considering the Output (O) of social innovations, the ways in which social innovations influence existing Structures (S) and institutions and how their contribution to encouraging Vitality (V) across problem areas.

## 2.1 Research methodology

Given the objectives of the study – to generate and collect widely intelligible and comparable quantitative data of social innovation activity in the region – we opted for a survey method using a short and highly standardized questionnaire, designed for easy completion and return to achieve a high response rate. Researchers conducted several random checks for internal consistency in responses. The authors chose the following regions: the Moravian-Silesian Region, the Usti Region, the Hradec Kralove Region and the Plzen Region (NUTS III). These regions were chosen because these regions met the conditions of (1) not sharing a border, (2) they differ in regional competitiveness indicators (Viturka, 2007) as Hradec Kralove (HK) and Plzen Regions (PR) are both classified in B group (in good competitive position) and the Moravian-Silesian Region (MSR) and the Usti Region (UR) contrast with them (“C” group – in less favorable position). This classification was supported by Melecký and Staničková (2011) when they divided the NUTS II regions (8) as follows MSR (8th place), UR (part of the Severozápad region, 7th place), HK as part of Severovýchod (4th place) and PR as part of Jihozápad (3rd place). Those data were a primary source for ecosystem evaluation.

At the time of examination, the database contained data on 1,820 applications in the Human Resources and Employment Operational Program (HREOP) program and 1,665 applications in the Operational Program Education for Competitiveness (OPEC). A questionnaire survey was distributed to all the 3,485 program applicants in the selected regions at the beginning of 2016. Some of the applicants applied for EU funding several times. The survey obtained 158 valid responses from the OPEC and 165 valid answers from the HREOP program (Table 1). It was a statistically representative sample at a confidence level of 95% with a 5% margin of error.

**Table 1: Structure of research data in percentage shares**

	HREOP		OPEC	
	Percentage share in economic entities	Percentage share in of social innovations	Percentage share in economic entities	Percentage share in of social innovations
Nonprofit organizations	46 %	43.66 %	81.8 %	77.6 %
Business entities	52 %	54.54 %	8.8 %	12 %
Universities	2 %	1.8 %	9.4 %	10.4 %
Total	100 %	100 %	100 %	100 %

Source: Šebestová, Palová, 2017

Economic entities were divided into five groups per size according to the EU definition of small and medium sized companies (28% up to 9 employees; 28% up to 49 employees; 26% till 249 employees and 18% in size of 250+ employees).

## 3 Social innovation and its determinants

The most active segments in the area of social innovation are entities with up to 49 employees (56% of the sample). Based on the questionnaire survey, the minority of projects (30.3% in HREOP and 37.3% in OPEC) at the time of realization declared some type of social innovation to contribute to regional

development as sufficient output. To get widely comparable data for future research a classification of social innovations by Caulier-Grice et al. (2012) was used (Table 2).

**Table 2: Types of social innovations**

Type of social innovations	HREOP	OPEC
New products	20 %	38 %
New services	5 %	17 %
New processes	22 %	40.8 %
New markets	0 %	0 %
New platforms	38 %	4.2 %
New organizational forms	0 %	0 %
New business models	15 %	0 %

Source: Šebestová, Palová, 2017

The most important innovation for beneficiaries of the HREOP program were new platforms and cooperation to share knowledge from and to support their business ideas. Opposite to that, the OPEC program focused on the development of new processes, especially new methods of education and support for the education of disadvantaged persons. Those connections (the relationship between the focus of the program and social innovations) were evaluated by correlation analysis. A very strong, direct correlation (correlation coefficient was 0.69, Sig. 0.00,  $\alpha = 0.05$ ) between the amount of financial support (divided by priority) and number of social innovation (divided by priority axis) was found. This data represent output (O) part of the model OSV.

### 3.1 Determinants of Social innovations

Vitality part was evaluated as a linkage between financial support from the Operational Program and the creation of social innovation, when correlation analysis was used. The interpretation of correlation analysis results was based on the Liebetrau scale (1983). Other assumptions were tested in a partial dependency with cross tables, depending on the region and implementation of the priority axis. Table 3 summarizes the various factors of relationships. The evaluation was based on the value of Cramer V for nominal values (Sig. 0.00,  $\alpha = 0.05$ ) If a relationship between values has been statistically significant, the sign of "+" was used. In the opposite case, when the significance level was above 0.05 (the factor wasn't statistically significant,  $\alpha > 0.05$ ) a sign of "0" was used.

**Table 3: Vitality evaluation**

Variable	HREOP				OPEC			
	Relationship to the region		Relationship to priority axis		Relationship to the region		Relationship to priority axis	
	Cramer V	Sig.	Cramer V	Sig.	Cramer V	Sig.	Cramer V	Sig.
Legal form of beneficiary	0.271	0	0.444	+	0.390	+	0.851	+
Number of employees	0.243	0	0.328	+	0.535	+	0.327	+
Main business activity	0.297	0	0.486	+	0.571	+	0.261	0
Type of innovation	0.221	+	0.380	+	0.188	0	0.605	+
Amount of innovations per project	0.229	0	0.159	0	0.526	+	0.517	+
Willingness to continue in 2014-2020	0.220	0	0.187	+	0.283	0	0.218	+
Networking	0.325	+	0.471	+	0.590	+	0.181	0
<b>Total community impact (total "+")</b>		<b>2</b>		<b>6</b>		<b>5</b>		<b>5</b>

Source: Šebestová, Palová, 2017

In summary, better effectiveness in outcomes was measured in the OPEC program, because there is an equal relationship between regional development and program priority. On the opposite end, the HREOP cared only in the effectiveness axis, not in regional development; this was confirmed in the efficiency part as well. On the other hand, the HREOP program showed more suitable ties for the sustainable support of social innovation, not only in relationship with the priority axis, but also about the region a Structure (S) part of the model.

### 3.2 Ecosystem suggestion

The effectiveness of the ecosystem is therefore closely connected with overall stability, respectively the ability and the possibility of predicting individual factors. In times of turbulent changes (which is unfortunately the present day) analysis may be used as a tool for a negative recommendation ("what not to do") rather than the positive option ("what to do") to provide sustainable operations in area of social innovations. Therefore, according previous findings would be better to develop second generation of the model, presented by Lundström and Stevenson (2005), when the structure is replaced with the most important brick "network".

**Table 4: Ecosystem O-N-V**

Main stream	Type of member (brick in the ecosystem)	Product	Possible problems
Output	Governmental bodies, municipalities	Unified methodology of social innovations, statistics	Red tape growth
	Networks of socially innovative organizations	Support, clarification of relationships	
Networking	Governmental bodies, municipalities	Subsidies	Savings from public budget, innovative approach needed
		Public tenders	New product, low experience with public needs
		EU project support	Depending on demand and supply on project calls in area of social innovations, social business etc.
	Banks, investors	Socially responsible investments	New product, risky, low interest rate could
		Microloans	High interest rate, there is not connection with socially responsible investments
	Non-profit organizations	Membership fees	Builds responsibility on activities when you have to pay membership
		Products and services development	(1) Brings socially responsible customers into the market (2) Original, meets community needs
	Producers, socially responsible organizations	Support of re-selling products	Supports cooperation
	Citizens	New ideas, brainstorming	Own goal no added value for society
	Value	Social innovation parks	Support of cooperation
Coworking centres		Support of cooperation	Meeting the societal needs, speeding up, accelerators

Source: Own suggestion.

Creating value in suggested ecosystem is crucial for involved society in the region. Especially, social innovation parks (SIP) work with idea generation as with structure improvements, one idea being

about real change of existing structures instead of marginal improvements of these structures. One way to create such solutions would be to analyse how one could solve problems if one did not have any existing structure in the system. In summary, social innovations closely connected SIPs are new concepts and in many ways not an extension of more traditional technical social parks, which are about reindustrialization, regional development, the creation of synergies and are mainly concerned with commercial innovations (Castells and Halls, 1994). We would claim that policy can influence the number of social entrepreneurs by understanding their role in a changing society (Mack and Mayer, 2015).

#### **4 Discussion and Conclusion**

The role of social innovations will vary for each problem area in a future. These challenges and problems need models and tools to be created using different aspects of social innovations, not only general ecosystem models (Mulgan, 2006). One reason for this is that some of the areas, which have been developed during recent years have been addressed from a bottom up perspective, concerning societal entrepreneurship will be developed mainly from a top down perspective so O-N-V model is suggested as main result that paper.

Consequently, estimates of the impact of individual factors for closer time periods must be formulated as inherently unquantifiable statements, therefore, only in the form of the qualitative determination of decreasing or increasing influence of each member in ecosystem (Sebestova, 2014). As form of social innovation is different social innovation parks are suggested as accelerators of social innovations in the society.

The idea of ecosystem creation is that all as these factors influence the level of social innovations, some innovations can be seen of more importance, some as more radical, some more incremental, some long term oriented, some short term oriented, some more dependent of the sector and some not. To influence the level of social innovations one must know factors, which influence the level of entrepreneurship in a very broad and dynamic perspective on regional level.

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# CONSUMER BEHAVIOUR TOWARDS VEGAN PRODUCTS: A CASE STUDY OF PRIVATE LABEL BRAND “K – TAKE IT VEGGIE” IN SLOVAKIA AND THE CZECH REPUBLIC

**Peter Šedík**

*Slovak University of Agriculture, Faculty of Economics and Management,  
Department of Marketing and Trade, Slovakia  
sedik.peter@gmail.com*

**Michaela Šugrová**

*Slovak University of Agriculture, Faculty of Economics and Management,  
Department of Marketing and Trade, Slovakia  
michaela.sugrova@gmail.com*

**Elena Horská**

*Slovak University of Agriculture, Faculty of Economics and Management,  
Department of Marketing and Trade, Slovakia  
elena.horska@gmail.com*

**Ludmila Nagyová**

*Slovak University of Agriculture, Faculty of Economics and Management,  
Department of Marketing and Trade, Slovakia  
ludmilanagyova@hotmail.com*

## **Abstract:**

Interest towards vegan products has increased globally due to the new trends in diet. Consumers are more interested in adopting healthier lifestyle and eating healthy food than in the past. The aim of submitted paper was to examine consumer behaviour in terms of vegan products. We focused on private label brand “K - take it veggie”, due to the fact that this brand has just recently appeared in the market. We collected data by conducting a questionnaire survey on the sample of 816 consumers in the Slovak and Czech Republic. The results showed that in both countries, the majority of respondents evaluated this brand positively, however the most of them pointed out the insufficient promotion. Slovak and Czech consumers answered they received information about mentioned private label brand mostly from references and leaflets. In both countries, the most preferred type of plant-based milk was almond and soy milk. There was statistically tested dependence between the gender and type of plant-based milk. Based on the results can be concluded that in Slovakia the dependence was rejected while in the Czech Republic was accepted. Furthermore, there exist the significant differences in preferences of Czech consumers between genders where 54.17 % of males prefer soy milk, while 42.22 % of females prefer almond milk.

## **Key words:**

Consumer behaviour, vegan products, private label, K - take it veggie, Slovakia, Czech Republic

**JEL Classification:** M31

## 1 Introduction

Consumer behaviour has become an essential factor in each business and many companies do not develop a new product without proper consumer research. In general, consumer behaviour is defined as behaviour during searching, purchasing, using, evaluating and disposing the products and services which will satisfy consumer needs [1]. The new generation of consumers can be divided according to 5 E - egoistic, ecological, ethical, e - consumer and ethnical consumer. Ethical consumers consider the consequences of their private consumption on society [2].

Nowadays, a food market is influenced by the new trends connected with healthy lifestyle, animal welfare, ethical consumption. In addition, the level of income has a certain influence on consumption patterns [3]. More and more consumers are aware of how their consumption affects the environment. Many of them become more informed and attached to healthier lifestyle including dietary system [4]. One of the most popular trends in healthy diet is veganism, which can be described as a higher level of vegetarianism where is banned eating animal products as well as exploiting animals. Many consumers became vegans due to ethical, moral and health issues. Furthermore, some cases can include the meat disgust or friend influence. Being a vegan involves the consumption of plant-based diet. Therefore market for vegan products is still growing [5]. The word vegan was firstly used by Donald Watson, who is considered as a founder of British organisation "Vegan Society" [6]. Moreover, veganism is a lifestyle or philosophy based on animal rights and planet protection and vegans are people who do not eat animal products such as meat, dairy products, honey, eggs as well as do not use the products made from animal materials - wool, fur, leather and feathers [7]. The most essential motives in becoming a vegan are health issues, ethical consumption and environmental concerns. The first motive includes personal well-being, while the rest is connected with animal welfare and eco - friendly consumption. Moreover, these motives affect not only food trends but also consumer lifestyle [8]. The majority of consumers who follow vegan diet have strong social network that helps them to adjust their lifestyle with veganism [9]. This current trend shifts the needs and wants as well as forces the producers to offer healthy food products with certain functionality. For example, plant-based milks in beverage sector are produced as alternative to milk, made for consumers who have lactose intolerance, cow milk allergy or simply, want to live healthier [10]. The most vegan products can be found in supermarkets either without label or with the label "Vegan" as a guarantee certificate which claims that product is free of animal ingredients. Many food corporations label their products as vegan in order to attract this segment and even some supermarket started to label their assortment like this. During the purchase, the majority of vegans are looking for vegan trademark which indicates that particular product does not include any animal-derived ingredients [11].

Private label brands are produced for retailers and wholesalers in order to increase assortment, profit and satisfaction of customers. They are sold predominantly in the stores of particular retailer. They are less costly in terms of production, research and development, advertisement and sales promotion [12]. The good private label can create a strong consumer loyalty to certain product [13]. Hypermarket Kaufland responded on changing trend in food consumption by creating its own private label brand "K -take it veggie". This brand is focused primarily on vegans and vegetarians as well as on consumers who want to eat healthy. The products are mostly plant based and organic. The company objective is to attract consumers who search for certain alternatives to animal products and consider themselves as ethical consumers. Each product of this private label has trademark V - label which informs consumer whether it is a vegetarian or a vegan category. In spite of narrow product range, consumers can find different types of plant based milks, various tofu products, spreads, yogurts, ice-creams, ready to serve products such as falafel, lasagne, spaghetti or pizza. All these products are offered to consumers with conscious consumption [14].

## 2 Methods

The aim of the scientific paper is to point out the strong trend in diet – veganism. We especially focused on consumer behaviour regarding the vegan products in Slovakia and the Czech Republic, where we examined the private label brand "K - take it veggie" of the company Kaufland. In order to obtain the primary data was conducted a questionnaire survey in two countries – Slovakia and the Czech Republic in January 2017. The questionnaire results were compared between mentioned countries. There were reached 816 respondents from which 408 were from Slovakia (14 % males and 86 % females) and 408 ones from the Czech Republic (12 % males and 88 % females). The questionnaire was divided into two parts, the first one consisted of questions towards consumer behaviour and the second one involved demographic questions. The data from the survey was evaluated by using contingency table in Excel and afterwards it was statistically tested by using statistical methods, such as Chi-Squared goodness of fit test, Chi-Square Test of Independence, Cramer's V Coefficient, Testing for equality of proportions between two samples. We verified obtained data and set out several assumptions for each country. Furthermore were formulated the null and alternative hypothesis based on assumptions.

### Slovakia and Czech Republic

Assumption No. 1: We assume there exists the dependence between the type of diet and respondent's education.

Assumption No. 2: We assume the private label brand "K - take it veggie" is more promoted in the city than in the countryside.

Assumption No. 3: We assume there exists the dependence between the type of preferences of plant-based milks "K - take it veggie" and respondents gender.

Assumption No. 4: We assume there exists the dependence between the purchase frequency of plant-based milks and respondents place of living.

Assumption No. 5: We assume there exists the dependence between the type of preferences of soy yogurts "K - take it veggie" and respondents gender.

### 3 Paper results

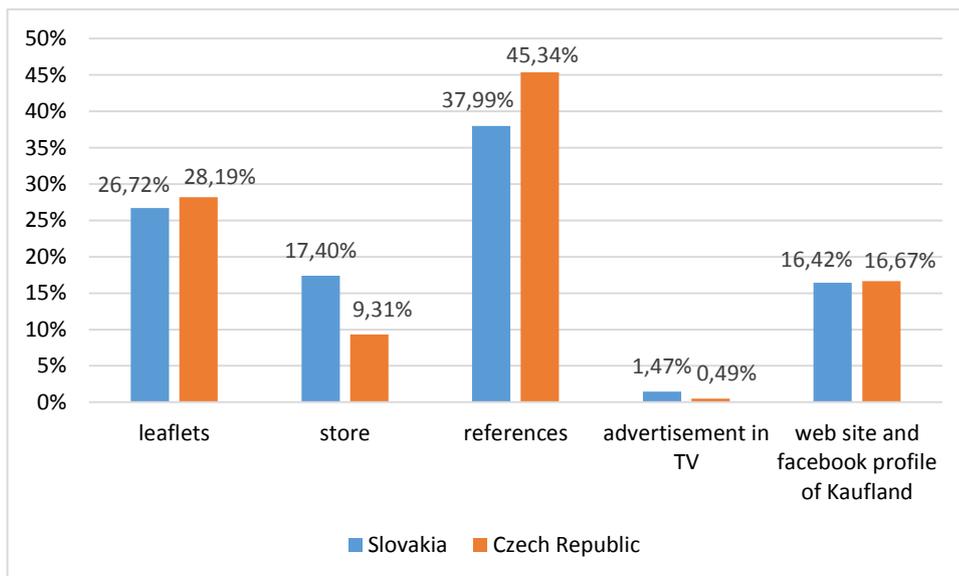
For the purpose of submitted paper had been selected few questions from questionnaire survey from Slovakia as well as the Czech Republic. The data were analysed, graphically illustrated and compared between countries. Moreover, some questions were examined by statistical tests in order to verify assumptions.

In the first assumption we investigated whether type of diet depends on respondents' age. Based on Chi-Square Test of Independence results was confirmed the dependence in both countries. The value of test statistic was for Slovakia 33.4427 and the Czech Republic 19.7130 while the critical value was the same 18.3070. We can conclude that at the significant level of  $\alpha = 0.05$  we rejected the null hypothesis and accepted the alternative which means that our first assumption is correct. In the next step we quantified the strength of dependence through Cramer's V Coefficient and in both countries was determined as weak (Slovakia 0.2024, the Czech Republic 0.1554).

In the following question we studied how respondents evaluate the decision of Kaufland to create their own private label brand which includes vegan products. The majority of Slovak respondents (99.02 %) as well as Czech respondents (94.61 %) consider this as a positive step.

The next question examined how respondents inquired information about Kaufland private label brand of vegan products "K - take it veggie". Figure 1 shows that the most frequent source of information in both countries were references and leaflets while the least frequent was advertisement on TV.

Figure 1: Source of information about the private label "K - take it veggie"

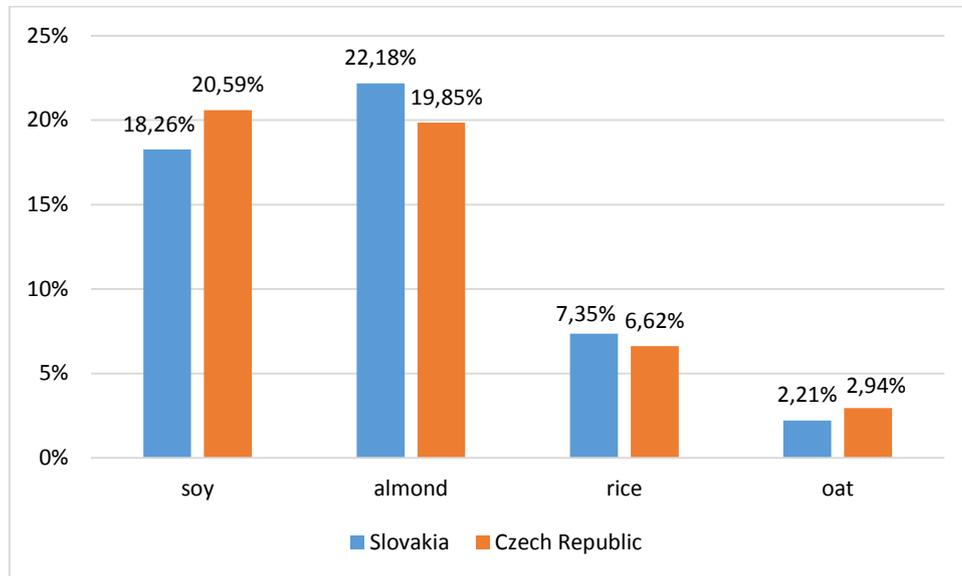


Source: Own processing 2017.

Moreover, we examined whether the private label "K - take it veggie" brand is promoted sufficiently in the market with vegan products. The majority of respondents from Slovakia (68.38 %) as well as from the Czech Republic (66.18 %) think that this brand has insufficient promotion and there should be used more marketing tools. Due to the fact that company Kaufland is situated in large cities, we tested whether this brand is more promoted in the city than in countryside. Based on the Testing for equality of proportions between two samples, we can conclude that in both countries the private label brand "K - take it veggie" is equally promoted in city as well as in countryside. The rightness of assumption was not confirmed. The value of test statistic was for Slovakia 0.2155 for Slovakia and 2.6424 for the Czech Republic while for both countries the critical value at the significant level  $\alpha = 0.05$  was 1.6448.

Figure 2 illustrates plant based milk preferences according to the type. The most preferred type for Slovak respondents is almond milk (44.36 %) followed by soy milk (36.52 %) while in comparison to Czech respondents, the most preferred is soy milk (41.18 %) followed by almond milk (39.71 %). In both countries, the least preferred type is oat milk.

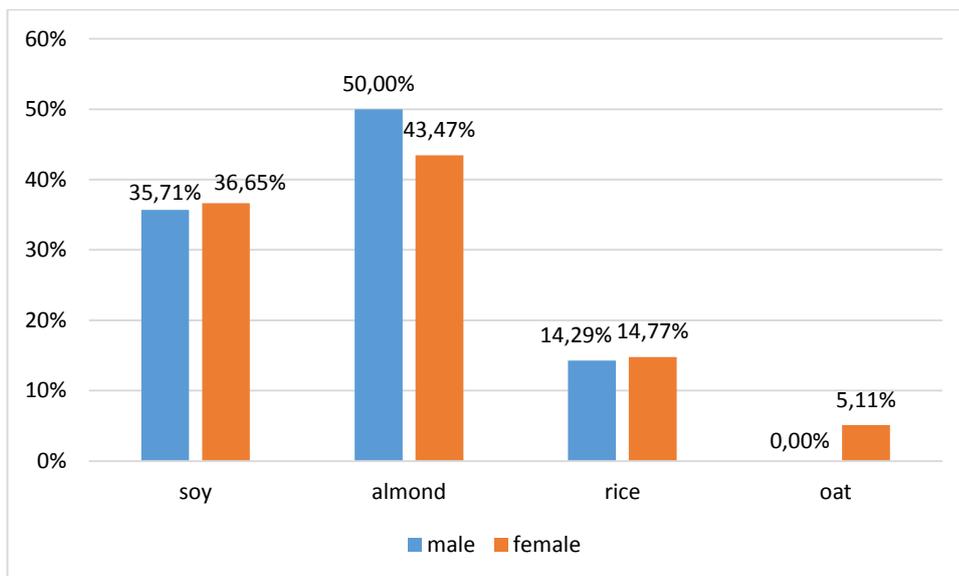
**Figure 2: Plant-based milk preferences according to the type**



Source: Own processing 2017.

Besides respondents preferences of plant based milks in general were also examined preferences according to the gender, see Figures 3 and 4. In Slovakia we can see that there does not exist differences in preferences between males and females. Both genders preferred the most, almond milk (males 50 % and females 43.47 %) and the least preferred was oat milk (males 0 % and females 5.11 %).

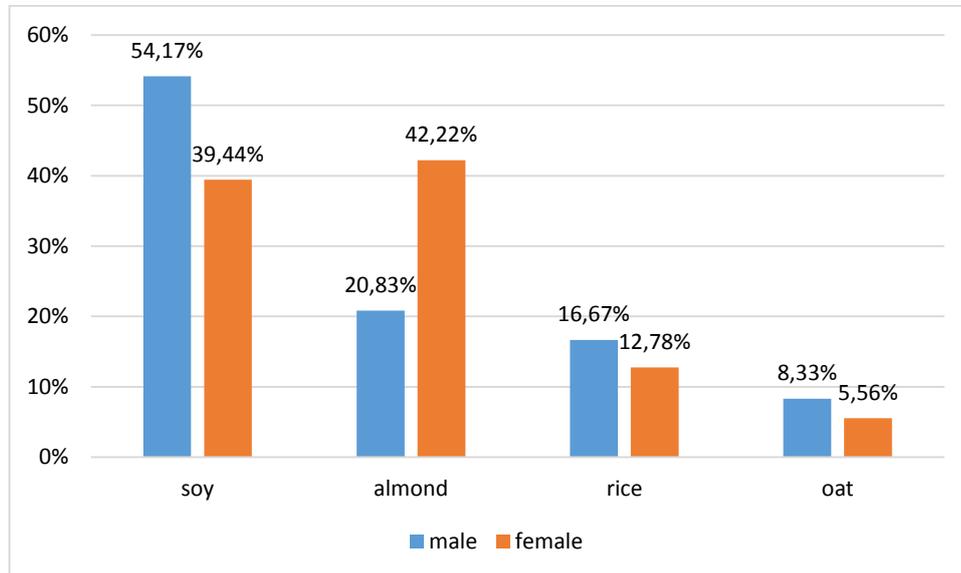
**Figure 3: Plant - based milk preferences according to gender in Slovakia**



Source: Own processing 2017.

In figure 4 is shown that there exist certain differences in preferences of plant-based milks between genders in the Czech Republic. Soy milk is preferred by males (54.17 %) while almond milk is preferred by females (42.22 %).

**Figure 4: Plant-based milk preferences according to gender in the Czech Republic**



Source: Own processing 2017.

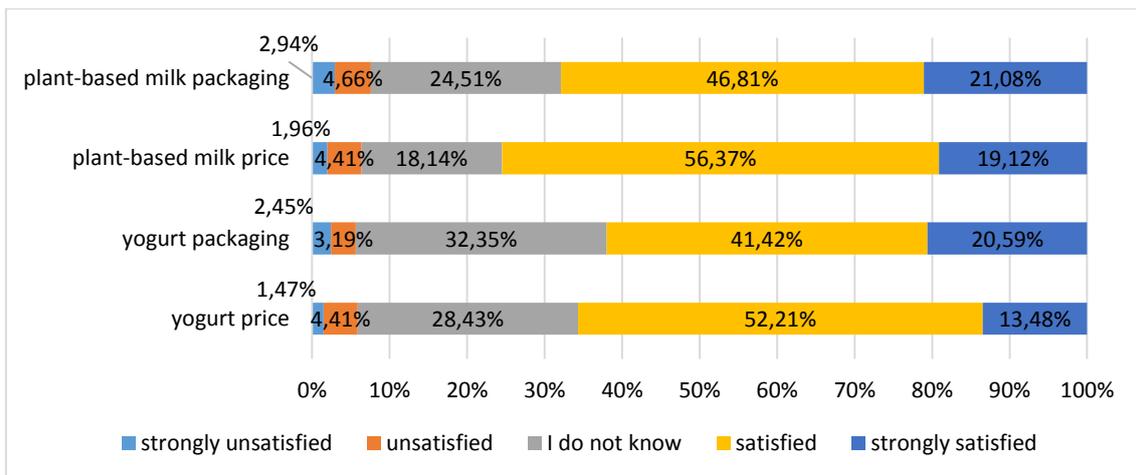
In addition, we statistically tested the dependence between plant-based milk preferences and respondents' gender. Based on the results of Chi-Square Test of Independence we determined certain differences between the countries. In Slovakia we rejected this dependence while in the Czech Republic it was confirmed. The value of the test statistic for Slovakia was 3.3479 and critical value was 7.8147. It means that at the significant level of  $\alpha = 0.05$  we accepted the null hypothesis and we can conclude that our assumption is not right. The value of the test statistic for the Czech Republic was 8.1487 and critical value was 7.8147. It means that at the significant level of  $\alpha = 0.05$  we accepted the alternative hypothesis and we can conclude the rightness of our assumption. The next step was to quantify the strength of dependence through Cramer's V Coefficient which showed that the dependence is weak (0.1413).

Furthermore, we examined whether there exists the dependence between the purchase frequency of plant-based milks and respondent's place of residence. The results of Chi-Square Test of Independence showed that in both countries this dependence was proved. The value of the test statistic was 8.2102 for Slovakia and 9.8209 for the Czech Republic, while the critical value for both countries was 7.8147. It means that at the significant level of  $\alpha = 0.05$  we accepted the alternative hypothesis and it can be concluded that our assumption No.4 is correct. Afterwards we quantified the strength of dependence through Cramer's V Coefficient which showed in both countries that the dependence is weak (Slovakia 0.1419 and the Czech Republic 0.1551).

In the last assumption No.5 we examined dependence between the flavour of soy yogurts of the private label brand “K - take it veggie” and respondents gender. The value of test statistic for SK was 0.7257 and for CZ – 0.0642 and the critical value for both countries was 3.8414. We can conclude that at the significant level of  $\alpha = 0.05$  we rejected the null hypothesis and accepted the alternative. The rightness of assumption n.5 was not confirmed in the case of both countries.

The next figure 5 shows the satisfaction of Slovak respondents with price and packaging in case of plant-based milk and soy yogurt regarding the private label brand “K - take it veggie”. According to the graph, it can be concluded that the majority of respondents are either satisfied or strongly satisfied with the price as well as with packaging of both products.

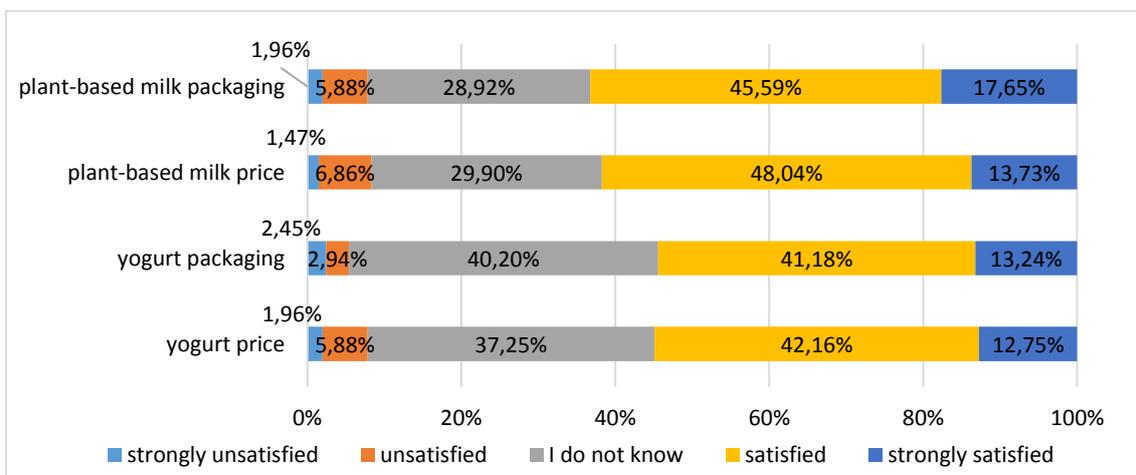
**Figure 5: Satisfaction of Slovak respondents with price and packaging of selected products**



Source: Own processing 2017.

The figure below illustrates respondents satisfaction with price and packaging in terms of plant-based milk and soy yogurts regarding the private label brand “K - take it veggie” in the Czech Republic. We can see that again the majority of respondents are either satisfied or strongly satisfied with the price and packaging of both products.

**Figure 6 : Satisfaction of Czech respondents with price and packaging of selected products**



Source: Own processing 2017.

## 4 Discussion

The aim of this paper was to examine consumer behaviour towards vegan products of the private label brand “K - take it veggie” in Slovakia and the Czech Republic. This brand has been introduced to the market just recently as a response to changing trends in diet and the majority of consumers from both countries consider this as positive step however they think that the brand should be more promoted among potential consumers. Company Kaufland operates only in large cities however promotion of its private label brand is the same in the city and countryside. In both countries the most common source of information about this brand were references and leaflets. In terms of plant-based milk, both Slovak and Czech consumers prefer soy and almond milk the most. The least preferred is rice and oat milk. In the Czech Republic we confirmed certain dependence between gender and plant-based milk preferences while in Slovakia was rejected. Can be concluded that Czech males prefer soy milk while females prefer both almond and soy milk. In Slovakia there is no difference in preferences according to gender and the most preferred plant-based milk for both genders is almond milk. The next statistically tested dependence was between purchase frequency of plant - based milks and consumers place of residence and we can state that in both countries very weak dependence was confirmed. In terms of soy yogurts we tested dependence between gender and flavour of yogurts and we rejected it in both countries. In terms of price and packaging satisfaction regarding plant-based milks and yogurts of the private label brand “K - take it veggie” was can be concluded that in general respondents in both countries are satisfied or strongly satisfied.

The given study is focused especially on selected vegan products of the private label brand “K - take it veggie“. Therefore it is suggested that future consumer research should cover more vegan products. Furthermore would be interesting to study consumer preferences regarding vegan products in other countries for the purpose of mutual comparison.

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# THE IMPORTANCE OF STUDYING THE HISTORY OF THE ECONOMIC ANALYSIS, ITS SUBJECT, FUNCTIONS AND PERIODIZATION

**Luboš Štancl**

*Moravian University College Olomouc, Czech Republic  
lubos.stancl@mvso.cz*

## **Abstract:**

The article discusses the importance of study of the historical origins of economic science as a whole, the formation and development of individual schools, which constitute the main stream of thought for understanding the nature of basic paradigms of contemporary economic theory and assumption of theoretical and methodological contents. The main attention is paid to the concept paper in the history of economic analysis of its subject, functions and periodization, which is explained as the study of the origin of the formation of analytical tools, methods and practices of the contemporary economic theory in its historical context.

## **Key words:**

Economic science, history of economic analysis, analytical tools, methods

**JEL Classification:** A21, A22, B00

'An economist needs, firstly – a good economic theory to guide him; secondly - statistics to provide him with quality empirical data; and thirdly – he needs to know the history. And it is the knowledge of the historical context that the contemporary economists miss the most [13].'

*J. A. Schumpeter*

## **1 Introduction**

Two closely related moments were the incentive to write this paper. The first one was the introduction of the subject History of Economic Thinking as one of the preconditions to overcome the superficial and static approach to the study of economic theory and thus achieve greater efficiency of it being taught to the common base of the master's degree studies at MUCO (and also as an optional subject for the bachelor study programme students).

Everyday experience provides us with plenty of evidence that many students, but also graduates in economics, believe that it is sufficient to know only '... the contemporary textbook economics that is already more or less linked with canonization,' which is 'no longer a full economic science [6].' We consider these facts to be very serious reasons why our students should not only know the contemporary economic theory, but also its history.

Although the curriculum enrichment in terms of the history of economic thinking is a significant change, we cannot talk about it as about a revolutionary change, as familiarizing students with the development of economic thinking has a long tradition at Czech universities, especially the economic ones [7].

The second moment that led us to write this paper was to stimulate the debate over our approach to interpreting the history of economic thinking as the development of the economic analysis, when the students' attention is focused on the internal logic of the development and improvement of the economic theory, the development of economic thinking in time. In this context, it is interesting that J. A. Schumpeter devoted his time to the studies of the history of the economic analysis, his work 'History of Economic Analysis' is a proof of it [12]. This work laid the foundations of the current approach to the interpretation of the history of the economic analysis.

The aim of this paper is to highlight the importance of studying the origin of economic science as a whole, the formation and development of individual schools which constitute the main stream of thoughts for understanding the nature of basic paradigms of the contemporary economic theory and acquiring of the theoretical and methodological contents. In the paper, the main focus is on the understanding of the subject of the history of the economic analysis, its functions and periodization which is explained as the study of the origin of the formation of analytical tools, methods and practices of the contemporary economic theory in its historical context.

## **2 Subject and function of the history of the economic analysis**

The study of the evolution of the economic theory and the basic peculiarities of its main scientific directions – schools of the economic analysis are the subject of the history of the economic analysis. The history of the economic analysis fulfils its mission through its functions which include:

- a. The function of *the illustration of historical processes of the natural selection* of viable ideas, concepts and theories and the rejection of others. The knowledge of these processes allows a deeper understanding of current microeconomic and macroeconomic concepts and models as well as the specific historical context of their creation. The understanding of current economic schools, concepts and models is incomplete without such knowledge.
- b. The function of *detecting the historical origin* or studying historical relationships between the current economic concepts and the respective schools of the economic analysis. The vast majority of current microeconomic and macroeconomic concepts is formed in the theoretical-methodological framework and against the background of some of the existing schools of the economic analysis. Therefore, knowledge, deep understanding and mastering of contemporary economic theories is impossible without the knowledge of the main peculiarities of particular schools of the economic analysis and their historical development.
- c. The function of *theoretical-methodological basis* for the generation and formulation of new concepts and models. Knowing the history of the economic analysis is also necessary for making attempts to create new paradigms of the economic theory not to 'invent the already invented' or not to repeat the methodological errors already detected during the previous development. 'The new' in the economic theory has never arisen in theoretical environments, but in the real world full of the pressing economic and political issues and disputes that have made great thinkers to take a clear-cut stand of them and inspired them to write their works. And at the same time, they started to discover the tools of the economic analysis [6]. The origin of 'the new' in the economic theory is therefore inseparably linked with the prior knowledge and previous experience.

The features and functions of the history of the economic analysis show that the knowledge of it is the prerequisite for mastering the content of not only the subject Economics (microeconomics and macroeconomics), but also other economic subjects.

### 3 Periodization of the history of the economic analysis

The foundation of the history of any scientific field is always based on its well-founded periodization. The periodization of the history of the economic analysis is derived from differences in understanding the subject of the economic theory in different historical periods of the development of the society. Using this criterion, it is possible to define the following periods in the development of the history of the economic analysis.

*The first period* includes the development of economic thinking since the 5<sup>th</sup> century BC until the mid 18<sup>th</sup> century. From the ancient Greek thinkers who first used the term 'economy' to the Mercantilists, *economic theory was understood as a part of moral philosophy*, i.e. ethics. During this period, the general economic theory was more of a *normative value*. All those who have dealt with economic issues, drew their attention to the search for answers to the questions like: 'What is a fair price?', 'Is usury a right thing?', 'Which areas of the economic activity are honourable, and which are not?', etc.

*The second period* includes the development of the economic analysis that lasted from the second half of the 18<sup>th</sup> century until the 19<sup>th</sup> century. In this period, *the economic theory was understood as the science of material wealth*, the laws of production and distribution of material possessions. This understanding of economic science was mostly used by physiocrats who were representatives of classical political economy and also by K. Marx and his followers. The concept of material wealth as the subject of economic science has led to the fact that economic science was understood as the science of the economy which then equated to only one of its segments (production) which is directly connected with the production of material possessions. It simultaneously led to the fact that the *area of services* was excluded from the subject of economics.

*The third period* of the development of the economic analysis began in the late 19<sup>th</sup> century and has continued up to the present day. In accordance with the current interpretation, economic science has been perceived as a science of a particular type of human behaviour - the rational behaviour. One's rational behaviour is then understood by the economists as one's efforts to achieve the objective (selected by the person), taking into account all the possibilities and limitations. In other words, economic science is the science of studying human behaviour from the perspective of relationships between objectives and limited resources which can have different uses.

Usually we presume that the rational human behaviour assumes that this behaviour is an *optimizing one*. This means that the subject compares all available options and finds one (optimal) which allows him/her to achieve that goal in the best way. All the basic economic dependencies (functions) in 'mainstream economics' are derived based on *optimizing behaviour* (maximization or minimization) of individual economic *entities*.

The beginning of the third period in the history of economic thinking is linked with 'Marginal Revolution' that brought a fundamental change in the approach to the subject of economics. This change had two major consequences:

- a. Economic theory ceased to be only a science of the material wealth. In addition, it went beyond the economy studies and *all areas of human activity in which rational human behaviour has its place* became its focus, e.g. marriage, raising children, attending the church service, crime and suicide.
- b. All types of behaviour that are not rational, e.g. behaviour based on habits, affective behaviour, etc. are beyond the interests of the economic science. 'Economic' began to identify with 'rational'. Economic science conception which is characteristic for the third period of the history of economic thinking has its pros and cons.

Each school of economic thinking and its approach can be interpreted as orthodox or 'heretical,' alternative, depending on whether its approach to the subject of economic science can be linked with the widely recognized approach in that period or not. For example, in the second period, the classical political economy represents the orthodox direction, but the German historical school represents the alternative direction ('heretical'), because the analysis carried out by its representatives goes far beyond the study of production and distribution of material possessions. It is, of course, possible to provide more similar examples on this topic.

#### **4 Theory of the evolution of economics**

The significance of the history of the economic analysis is dependent on the fundamental peculiarities of the evolution of the science as such, in particular, the evolution of the economic science. Currently, we can find two basic theories of the development of evolutionary science in the contemporary scientific literature.

The first evolution theory is the 'Theory of Scientific Revolutions' which was presented by the author Thomas Kuhn in the 60s of the 20<sup>th</sup> century. This concept of evolutionary development of science is based on a process of changing the gradual accumulation and improvement of scientific knowledge through a system of universally recognized, systematically divided theoretical views; it is called a 'paradigm', with a sudden shift from one paradigm to another.<sup>8</sup> T. S. Kuhn called this transition a 'scientific revolution' which interrupts the current cumulative development; the old paradigm is totally replaced by a new one, without any links between them at all. Scientific revolutions occur only when the theoretical and empirical unsustainability of the old paradigm interferes with the formation of a new paradigm. A special feature of this approach to evolutionary development of the science is the fact that during the particular period each science, therefore even the economic science, finds a consensus with the ruling paradigm as its role model. The process of the creation of new concepts and models within the space created by the new paradigm has no links to the content of the previous, by the 'scientific revolution' outdated, paradigms. From the perspective of this evolutionary theory, the history of science, including the history of the economic science, has no justification or importance in the process of the development of the scientific knowledge.

The vast majority of economists prefers the second option, the alternative science evolution theory - a conception based on the 'scientific-research programme.' The author of this conception is Imre Lakatos who does not agree with the idea of radical paradigm substitution ('scientific-research programmes' in his terminology). Those who agree with this theory argue that the development of science is a constant competition of scientific-research programmes that form the theoretical framework for the creation of new scientific findings, concepts and models. Each of these programmes represents the unity of its two parts: an unchanging 'core' of indisputable axioms that form the essence of the programme, and several other layers of the variable 'protective cover' of auxiliary hypotheses (terms, concepts, models) which protect the 'core'. The protective cover of the core accepts and absorbs 'the first fundamental revision brunt' of the programme.

A disruption of the 'first' protective cover of the scientific-research programme does not mean the rejection and termination. New conditions, assumptions, concepts, etc. can lead to the gradual modification, all the way to creation of a new cover and protection of the 'core' against the changes. This programme is spared from its deterioration and loss of popularity and can re-take the lead. For example, if 'the core' of neoclassical 'scientific-research programme' consists of, among other things, the assumption of rational behaviour and the idea of neutrality of money in the long run, the monetarist theory of demand for money represents a modification of the first protective packaging of the 'core' of this 'programme'.

*The importance of the history of science and especially the history of the economic science is extremely large* with this kind of approach. Basically, the history of economic science transforms into the analysis of the historical evolution of various competing scientific-research programmes. The knowledge of the historical evolution is of great importance for research, studies and full understanding of the contemporary economic theory.

## 5 Conclusion

Mastering of the subject History of economic thinking taught as the 'history of the economic analysis' (that is the content of the subject is not reduced to simply naming the names of economists and their theories in a chronological order) assumes that students understand and are able to explain the factors affecting the formation of certain conceptions in the development of the economic science in different periods of the development of the society.

One of these factors is a 'specific economic situation.' Often, new economic theories arise to explain the problems in the real economy that people can recognize before the formulation of these theories. As an example, Keynesian revolution can be mentioned as an expression of the efforts of its representatives to find an explanation of the world economic crisis of the late twenties and thirties of the 20<sup>th</sup> century. Another example can be the origin of monetarism as a result of the efforts of its representatives to create recommendations on how to prevent the transition of the economy to an inflationary spiral trajectory.

Conclusions of the study of the economic science origins lead us to the fact that the main factor determining the emergence of new economic conceptions is the factor, 'of the internal logic of development.' In other words, categories, concepts, models and schools of economic thinking originated, and even today originate due to the internal logic of the development of the economic analysis. The evolutionary development of the economic science is carried out depending on how the depth of knowledge of the subject matter and the methods of the economic analysis changes with people (specifically, the academic community). As an example, it is possible to introduce the evolution of macroeconomics. On the one hand, the development of the main direction of the macroeconomic analysis-monetarism, the new classical school, the new Keynesian economics was dependent on the efforts of economists to create an entire macro analysis on the basis of optimization. On the other hand, the evolution of post-Keynesian macroeconomics was a response to the 'extremes' of the idea of full optimization of the macroanalysis and the marginalization of significant conclusions of the theory of J.M. Keynes by the mainstream macroeconomics. The same factor also influenced the origin of the classical political economy and the German historical school, marginalism and the old institutional school.

We cannot understand the nature of the basic paradigms of the contemporary economic theory or acquire the theoretical and methodological content without the knowledge of historical origins of the economic analysis, development of individual schools, which constitute the main stream of thinking in the economic theory. Likewise, we cannot ignore those schools of thinking that are not a part of the contemporary 'mainstream', but that can be a source of stimuli to theoretical considerations and searching of the possible solutions of problems of the current economic practice. To be precise, it is necessary to add: it is very difficult to understand the history of the economic thinking without sufficient knowledge of economic theory. Therefore, the study of 'History of Economic Thinking' should take place, if possible, in parallel with the study of general economic theory.

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# EVALUATION OF PRODUCT QUALITY, USING AVAILABLE METHODS OF QUALITY MANAGEMENT

**Petronela Tarinová**

*Slovak University of Agriculture in Nitra, Department of Management, Slovakia  
xtarinova@uniag.sk*

**Zuzana Kapsdorferová**

*Slovak University of Agriculture in Nitra, Department of Management, Slovakia  
zuzana.kapsdorferova@uniag.sk*

## **Abstract:**

Ice cream was previously considered as marginal product, but today it becomes extremely popular and is produced and consumed almost in every country in the world. The global ice cream market is exponentially growing. Nowadays is this market one of the most dynamic and innovative industry in the world. As reported by Pinar Hosafci, senior food analyst at Euromonitor the sales of lower-quality ice cream have been on the decline in favour of premium offerings. Consumers are demonstrating that they will pay more for more adventurous and unique flavours. In the Slovakia the ice cream and frozen desserts current value sales grew by 2% in 2016, totalling €53 million. The category was positively impacted by an earlier summer season with above-average temperatures, while growing average unit prices also had positive effects on value sales. Strengthening purchasing power among Slovak households combined with a greater preference for higher-quality products facilitated slightly better growth than that seen over 2015. According to the situation in the market, where consumers are willing to pay more for higher quality the primary objective of this paper is to identify customer's requests on the artisanal ice cream quality in the city of Nitra and its subsequent transformation into technological characters, using the Quality Function Deployment – QFD method.

## **Key words:**

Quality, quality management, QFD method, artisanal ice cream, ice cream market

**JEL Classification:** O31, O21

## **1 Introduction**

Presumption of the successful business in a competitive market is to satisfy needs and wishes of customers. Intolerance of the mistakes and the poor-quality leads to customer dissatisfaction, which can easily, caused his absolute loss. In the age of the affluence, when the supply exceeds over demand is the only choice of the suppliers to diversify themselves from the competitors by quality.

One of the option, how to keep the specific level of the quality is to implement a quality management system (QMS) in a company. The QMS can bring a large number of pros and cons. In general, effectively working QMS contributes not only quality products and services, but helps also to manage and stabilize processes, ensuring the financial health of the company as well as its overall stability.

Advanced market is asking for the companies, which are trying to achieve effectiveness of their products by establishing the QMS as the successful implementation of business strategy.

This day is in production of the ice cream extremely difficult offer to customers' significantly different product compared to the competitors in the market, which can easily produce almost the same. For that reason, we decided to distract customers from the price of the ice cream and focus just on the quality because the product quality has become in the ice cream market a complex and a key aspect of current business management and success of an organization. Generally higher quality means for companies' lower costs.

## **1.1 Literature overview**

In this competitive world is quality so important, that understanding its theoretical platform is highly important for every manager. There is no concerted approach to quality definition. Quality experts perceives the concept of quality differently. Quality experts' definitions of quality can be categorized by Nanda (2016) into two main categories: quality is satisfying applicable specification or quality is satisfying the customer. Evans – Lindsay (2016) said that quality can be confusing concept. Siebes (2004) in the Quality Improvement Glossary defines quality as subjective term for which each person has his or her own definition. People understanding quality subjectively and in relation to different criteria based on their individual roles in production-marketing value chain.

Elevation on the quality and its definition have changed during years and is still changing. Development of the term – “quality” adapted to changes, not only in production process, as well as to changes in the conditions, in which products are realized.

Dora – Kumar – Goubergen – Molnar – Gellynck (2014) stressed that the importance of quality has significantly grown over the last decades as well in the food sector. Increasing consumers' expectations, governmental regulations and expanding competition in the market are reasons why food companies deal with the quality.

Kapsdorferová – Svitová (2014) states that the main Quality Management Systems (QMS) that are implemented by food companies are those in the International Organization for Standardization (ISO) 9000 series, such as ISO 9001: 2016. The ISO 9000 series of quality management standards provides the framework for organizations to install a QMS following certain guidelines and leads to continually improved processes that satisfy customers' requirements.

Currently, there is proliferation of standards worldwide. One effect is that, in particular, companies from developing countries and emerging economies have problems to comply with these standards. Another important effect is increasing marginal costs of certification and accreditation, which also puts pressure on company profits in industrialized countries. The combined impacts of these effects ask for strategies to revalue the cost/effectiveness of the certification and accreditation system.

## **2 Methods**

Understanding other people is a fundamental human need provided by social interaction. People have developed the useful tools and methods to communicate between each other over the centuries. The main goal of the presented paper is to show how the innovation of the product might be realized according the implementation of newest methods. In current research were deployed only product characteristics such as natural taste, colour, consistency, sugar quantity and inputs quality. The research was focused only on inherent product features not price, communication and distribution policy. Other tree marketing policies are increasingly important for increasing sale of the product but in our research, were not tested. In this paper are presented data used from Statistical office in Slovakia, State Veterinary and Food Administration of the Slovak Republic, Ministry of Agriculture of the Slovak republic and own obtained data based on own research. According to this research a large number of the methods have been used, but the most important of them was methodology Quality Function Deployment, which we chose to be described in the article.

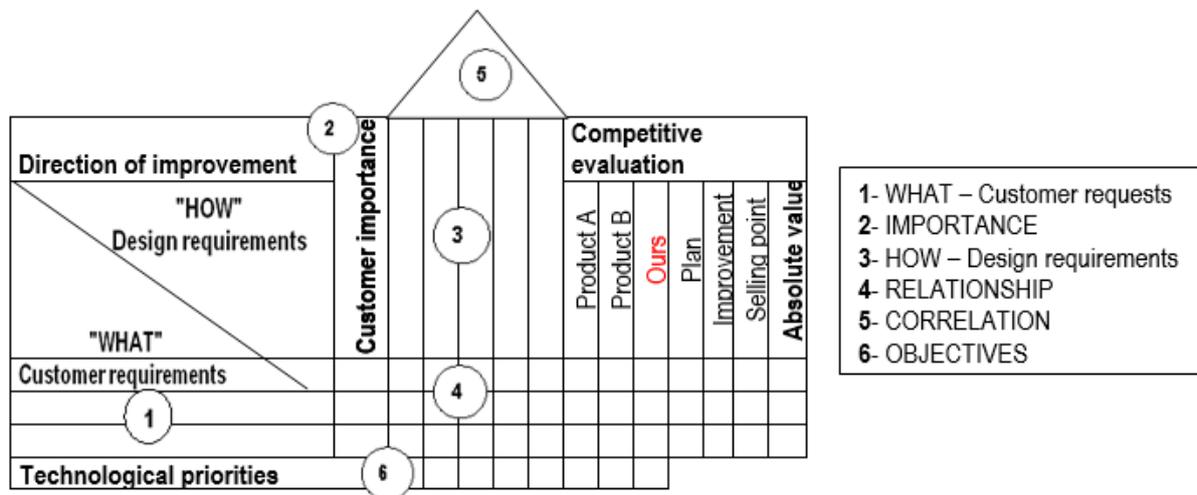
## 2.1 Quality Function Deployment (QFD)

This Japanese methodology was developed in 1966, by Yoji Akao and it takes its name by three Japanese words: Hinshitsu (Quality) - customer expectations, Kino (Function) - how to meet customer expectations, Tenkai (Deployment) - how to manage the flow of development efforts. The Quality Function Deployment (QFD) Akao (2004) defines as a method for satisfying customers by translating their demands into design targets and quality assurance points.

Although the QFD method was originally used just in automobile industry nowadays has its wide application in many different industries. The QFD method can be used in developing new products but it can be extended to a wide variety of neighbouring situation, like quality management, customer needs analysis, product planning, and etc. The QFD method can be described as the one of the best proactive tools to support decisions-making process in complex environments.

In relation to quality management the most understandable way how to communicate between the customer and the supplier of the product is methodology Quality Function Deployment (QFD). Maritan (2015) added that the QFD method makes us think, play, sketch, write, draw and express complex concepts in structured way. The QFD method is not only useful for its numerical results but also and particularly for its apparently slow process of systematic analysis. In general, this method is relatively simple and time-saving.

Figure 1: Quality function deployment (QFD) – „House of Quality“



Source: Own work, based on OAKLAND, J.1995. Total quality management. Oxford, 1995. 370 p. ISBN 0-7506-2124-9.

### Methodical approach:

1. List of customer requests on the ice cream quality obtained from the questionnaire survey is the first and also the most important part of the "House of Quality". – "Voice of the customers"
2. Weight of each customer requests was assigned in accordance with questionnaire survey too.
3. List of technical requirements was determinate in collaboration with the company and inserted in the "House of Quality". – "Voice of the company"
4. Transformation of customer requests into technological characters was done.
5. After this we identify interactions between all the technical requirements by correlation matrix.
6. Output of all imported data is construction of the whole "House of Quality".

### 3 Paper results

#### 3.1 The EU ice cream market

The ice cream business is industry, which offers consumers a wide range of safe, high quality, great tasting and healthy products to serve consumers of all ages. According to the monitoring of The European Ice Cream Association (Euroglaces), the ice cream industry across the EU comprises circa 100 companies operating in the various Member States. The vast majority of these companies are small and medium-sized enterprises employing around 15.000 people. The market volume for industrial produced ice cream is estimated at 2. 2 billion litres and valued at 9 billion euro. The annual average consumption per capita is approximately 6. 8 litres. The most powerful trend in these days across the EU ice cream market is strong interest in buying ice cream with locally sourced ingredients.

#### 3.2 The Slovak ice cream market

In the Slovak ice cream market is currently dominated ice cream made from prefabricated elements. This kind of ice cream is considered as a semi product (blank), since the production is based on a pre-prepared paste which is mixed with additional raw materials as water or milk. Prefabricate is prepared as a specific flavour of the ice cream. In this fact ice cream made from prefabricated has any nutritional value. The costs of production of this kind of ice cream are at a very low level. These costs depend on the price of selected prefabricates.

Table 1: Percentage of inconvenient ice cream samples

Ice cream	2011	2012	2013	2014	2015
	12.4 %	10.6 %	8.9 %	15.5 %	17.8%

Source: Own work, based on data from Ministry of Agriculture and Rural Development - Green Report (2011-2016)

In the Table 1, we can firstly see decreasing character of inconvenient ice cream samples (2011-2013), but on the other hand in the last 2 years, (from 2014) was recorded enormous high increase 6.6 %, compared to the previous year. This number represents the highest growth and is the highest percentage of inconvenient ice cream samples during the monitored period. In the last monitored year (2015) we can easily see that the percentage of inconvenient ice cream samples is still growing.

#### 3.3 Ice cream consumption in Slovakia

According to the Table 2 in recent years' consumption of the ice cream hasn't notice notable changes. One of the lowest levels, which were 2.1 kg, was recorded in 2012. The paradox is that this year, was one of the warmest years in the last 150 years. Ice cream is in general considered as a seasonal product, where the impact of seasonality plays important role in its consumption. According to the data from Public Health Authority of Slovak Republic, this year Epidemiological Information System (EPIS) informed about increasing danger of salmonella infection. Based on the above decreasing character of the consumption of the ice cream could be caused by the increased danger of salmonella infection.

Table 2: Development of ice cream consumption in SR per capita

Ice cream	2008	2009	2010	2011	2012	2013	2014	2015
	3.0	3.0	3.4	2.3	2.1	3.0	2.1	2.5

Source: Own work, based on data from Statistical Office of the Slovak Republic- Food Consumption in the SR (2011-2015)

In the monitored period was average consumption about 2.7 kg per capita. In the last monitored year consumption of the ice cream is slowly increasing, but this number is still below the average.

### 3.4 Product innovation using QFD method

In the age of changeable and forceful markets is innovation beating heart of corporate success. Understanding customer needs should be motive force of every company. In relation to existing situation, when customer needs are more exacting than ever before, innovation itself needs to be innovated. Organisation for Economic Co-operation and Development - OECD defines product innovation as a good or service that is new or significantly improved primarily in technical specifications, components and materials, software in the product, user friendliness or other functional characteristics.

#### 3.4.1 Determination of customer's requests on quality of artisanal ice cream

Sine qua non-per elaboration of QFD method is to identify, prioritize and translate customer's requests on the product. There are a variety of methods for obtaining information pertaining to customer's requests, including surveys, questionnaires or focus groups. Data in our paper were obtained by questionnaire, where customers were asked to assign weight of each factor on a scale from 1 to 5 (1- least-important, 5- most-important). The most important requests on the quality of the artisanal ice cream in the city of Nitra are shown in the Table 3 below.

**Table 3: Customer requests on the quality of the artisanal ice cream**

	<b>Customer's requests</b>	<b>Significance</b>
<b>Ice cream</b>	natural taste	5
	Colour	3
	consistency	4
	sugar quantity	3
	inputs quality	5

Source: Own work, based on data from questionnaire.

Customers assigned natural taste and inputs quality as the most important factors, which influence them by choosing the ice cream. Apparently, expectations of customers on quality of ice cream are connected with its natural taste. In general taste of ice cream is represented by its flavour. Ice cream flavour depends on the selected ingredients and of course its quality. If in production of ice cream were used poor quality inputs it's obvious that neither output will be of high quality. Coming out of above we can state the fact that natural taste and quality of inputs are in continual proportion relationship.

Next in order of importance is consistency. Under the ice cream consistency, we understand its texture. Quality texture should be soft and light, on the other hand powdered consistency with frazil is an indicator of poor quality texture.

Related to the near future, sugar quantity and colour might interest us by their possibility to influence customers in their choice of ice cream. Common customers firstly take a look at the colour of ice cream and then decide. According to this additional research, it possible to state that colour significantly affects customers by deciding which ice cream customer will choose. Ice cream colour indicates for customers its quality. Regarding to sugar quantity request, we incline to the actual trend of healthy way of living, where a normal sugar is changed by sugar-substitutes, which don't contain calories.

Generally using QFD method to innovate a product means to focus on those requests, which are the most important for the customers. In our paper is necessary to target innovation at inputs quality and natural taste of ice cream. If the company chose to improve nutritional value of the ice cream, which is the least significant factor by choosing ice cream, is possible that customer will not notice this change because this request is for him irrelevant.

### 3.4.2 Cross-correlation of technical parameters

After clarified a list of „WHATS” are the most important customers’ requests should be a list of „HOWS” developed. In cooperation with the company were determined engineering specifications, which answer the question “HOW?”, how the company wants to improve the most important customer’s requests on the ice cream quality. In general, this change can affect customer requests and offers him higher quality of the product.

All individual technical parameters, which were determined in collaboration with the company, can be seen in the Table 4 below. To each parameter was assign weight on a scale from 1 to 5 (1- least significant effect, 5- most significant effect).

Table 4: Relationship matrix

Direction of improvement "HOW" Design requirements "WHAT" Customer requirements	Customer importance	Inputs	Additives <sup>3</sup>	Technology	Recipe	Sugar quantity	Machinery
natural taste	5	5	5	2	4	4	2
inputs quality	5		4	3	5	4	
consistency	4	5	3	5	3		5
Colour	3	5		2	1	2	
sugar quantity	3	4	3		5		

Source: Own work, based on cooperation with company.

Every house needs its own roof; therefore, the next step is laying the roof of our „house of quality”. Roof represents a correlation matrix that illustrates interactions between technical requirements. Correlation between different technical parameters can take form of positive correlation (+) or negative correlation (-). Such relationship between these technical parameters implies that there is a conflict in trying to achieve both requirements together. It is needed to consider, how one parameter impacts another. Positive correlation (+) between the technical parameters means that one is being achieved, the other is being compromised. On the contrary negative correlation (-) means that is possible to change one parameter without compromising other one.

This conflict needs to be resolved or a trade-off decision has to be made. Such decision could involve retaining the technical requirement that has the higher importance weighting.

Positive correlation was proofed between these technical parameters:

- Inputs – additives, technology, sugar quantity, recipe
- Additives – recipe
- Technology – recipe, machinery
- Recipe – sugar quantity

For better imagination, if the company decides to change a technology to produce higher-quality ice cream, it will have impact on the recipe, the company usually uses and on the machinery as well. This

<sup>1</sup> By the term “additives” in our work we understand synthetic dyes, preservatives or essences. Additives are something undesirable, what in the production of high-quality artisanal ice cream have to be avoided.

means that company have to deal with this conflict and decides according to higher importance weighting. It is impossible to have conflict between parameters, NO CONFLICTS = ERROR.

### 3.4.3 Output from the application of QFD method

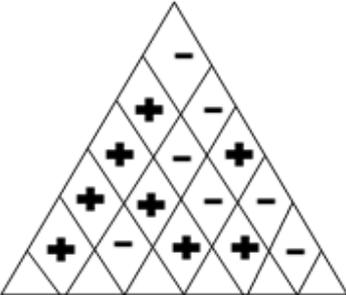
Before constructing our "house of quality", group of customers compared 3 ice cream samples, each from different company, in blind testing. Customers during the testing didn't know which sample belongs to which company. Individual samples were labelled just with numbers (1, 2, and 3) to maintain transparency in research. Selected flavour of the ice cream for all samples was chocolate flavour.

All ice cream samples were chosen from different competitive traders in city of Nitra. Customers were divided into four different categories following the age.

Basis of QFD method is done graphically by developing charts to organized customers' requests and technical requirements needed to satisfy customers. This relationship matrix together with correlation matrix forms a structure known as the "house of quality". Company benefits from constructing "house of quality" regarding to large number of information, which are necessary to product innovation.

On the construction of our "house of quality" participated all employees of the company and output can be seen in the Table 5 below.

Table 5: „House of Quality“



Direction of improvement "HOW" Design requirements	Customer importance	Competitive evaluation												
		Inputs	Additives	Technology	Recipe	Sugar quantity	Machinery	Product A	Product B	Ours	Plan	Improvement	Selling point	Absolute value
"WHAT" Customer requirements														
natural taste	5	5	5	2	4	4	2	3	1	5	5	1	5	1600
inputs quality	5		4	3	5	4			2	5	4	0,80	4	192
consistency	4	5	3	5	3		5	3	1	5	5	1	3	1125
colour	3	5		2	1	2		3	1	5	5	1	4	20
sugar quantity	3	4	3		5			3	5	2	4	2	1	120
<b>Technological priorities</b>		<b>500</b>	180	60	<b>300</b>	32	10	16	10	<b>22</b>				

Source: Own work, based on the research.

Applying QFD method we found out that the most important request on quality of ice cream is already mentioned its natural taste. Ice cream producers may satisfy this request by correct combination of qualitative inputs and appropriate recipe, used by production of the ice cream. Additives are the next in technological requirements, what influence a natural taste of ice cream. In this case, to satisfy this customer request, it is necessary to eliminate additives in ice cream to minimum or totally remove.

According to the taste, customers selected our product as the most delicious between others. In evaluation, our ice cream sample achieved highest score (5) in consequence of its marked difference in

taste, colour and consistency. Customers primarily from 1<sup>st</sup> age group (under 18 years) complain just about its bitter taste, what is normally according to our selected ice cream flavour – chocolate.

Other samples (Product A and Product B) in accordance with colour were right from the beginning for the customers unattractive compared to our product. In blind testing, where customers have possibility to compare samples just by sensory analysis, completely failed competitive sample – Product B. Customers couldn't identify it as an ice cream with chocolate flavour according to its taste and as well colour. For the customers wasn't possible to determine what flavour of ice cream Product B was.

In blind testing Product A obtain a second place in between the other samples. Average valuation of the Product A according to the taste and colour is possible to interpret as: no significant interest, but on the other hand no significant disappointment as well. The customers from 4<sup>th</sup> age group (over 50 years) evaluated Product A very positively, while customers from 3<sup>rd</sup> age group (from 30-50 years) have said that natural taste of the ice cream with chocolate flavour is interrupted by kind of rum essence.

Product B obtain last place in between other competitive samples with the worst evaluation from customers. Customers from the 2<sup>nd</sup> age group (from 18-29 years) inhibit from its natural taste, watery consistency, sugar quantity and pale colour, which didn't indicate what flavour of the ice cream Product B was. On the contrary, Product B dominated to the 1<sup>st</sup> age group (under 18 years) thanks to its sweet taste.

Relate to the customer requests – inputs quality and consistency, customers designated Our Product as the most satisfying compared to other competitive ice cream samples. In overall assessment, Our Product achieved highest number of points (22) with the only loss in sugar quantity. On the other hand, with increasing trend of healthy way of living we consider it as plus factor in nearly future.

#### **4 Discussion**

One of the objectives of this paper was to identify customer's requests on the artisanal ice cream quality in the city of Nitra and its subsequent transformation into technological characters, using the Quality Function Deployment – QFD method.

The whole paper was elaborated in cooperation with selected company in the city of Nitra. All the samples of the ice cream in our study were from rival companies in the same city.

Data in our paper were obtained by questionnaire and blind test, what is a scientific test in which the participants cannot identify the products that they are testing. On the research participated in 100 responders, who were divided into four different age categories (less than 18 years, from 18-29 years, 30-50 years, over 50 years). Customers identified the most important requests on the quality of the artisanal ice cream in the city of Nitra - natural taste, inputs quality, colour, consistency and sugar quantity.

Applying QFD method we detected that the most important request on quality of ice cream was its natural taste. Ice cream producers may satisfy this request by correct combination of qualitative inputs and appropriate recipe, used by production of the ice cream. In general taste of ice cream is represented by its flavour. Ice cream flavour depends on the selected ingredients and of course its quality. If in production of ice cream were used poor quality inputs it's obvious that neither output will be of high quality, no matter how good the recipe was.

Output from the application QFD method is that Our Product offers, compared to the other competitive products, ice cream of highest quality, whereby satisfy all customer requests. Our product is offered for the same price as the competitive product of lower quality. Based on the above our suggestion is to keep current level of quality, what could help to company in its further progress. Possible improvement within the product innovation we see in producing ice cream with chocolate flavour, with a lower cocoa content, how company could satisfy the younger age categories with their request on the sweeter taste of ice cream with chocolate flavour. After visiting the company, we would recommend to change the type of deep- freeze counter from non-transparent to a clear one according to the customer request- colour. Colour significantly affects customers by deciding which ice cream they will choose. Based on the research, common customer firstly takes a look at the colour of ice cream and then he

decides. Changing the type of freezer should increase its sales therefore we consider this as a very important in the near future.

In conclusion, our recommendation is to keep on producing such quality products as is their artisanal ice cream with the chocolate flavour. After removing some of the identified weaknesses and especially listening to customer requests, our company will be one of the leading producers of artisanal ice cream in competitive markets, not only in Slovakia but also in foreign markets.

### Recommendations:

- increase consumer awareness regarding chemical composition of the ice cream,
- evaluation of customer satisfaction, in order to receive feedback,
- differentiation from the competitors by adventurous and unique flavours of the ice cream,
- offer a qualitative service to customers,
- increase the price of the ice cream.

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# ANALYSIS OF DEVELOPMENT OF NUMBER OF NON-PROFIT ORGANIZATIONS IN THE CZECH REPUBLIC WITH REGARD TO NEW CIVIL CODE

**Andrea Valentová**

*Silesian University in Opava, School of Business Administration in Karvina,  
Czech Republic  
o121935@opf.slu.cz*

## **Abstract:**

The aim of this paper is to analyze the development of the non-profit organizations in the Czech Republic after year 2014 when the new Civil Code came into effect. The Civil Code meant an important milestone in the legal system of the Czech Republic and has influenced also non-profit sector. In the first part, the paper describes the changes that arose and touched non-profit organizations. Secondly the development of number of non-profit organizations since year 1995 is analyzed using statistical methods as a time series analysis and a correlation analysis. It is shown that number of foundations, endowment funds and subsidiary civil associations has decreased in year 2014 more than would trend analysis anticipate. On the other hand, number of community interest societies has grown in 2014. Number of civil associations has increased in 2013 and grew slightly in 2014.

## **Key words:**

Non-profit organization, Civil code, Association, Foundation, Endowment fund, Community interest society, Institute

**JEL Classification:** K15, L31

## **1 Introduction**

The new Civil Code (Act no. 89/2012 Col.) which came into validity since January 1<sup>st</sup> 2014 brought many changes to various sectors including the non-profit sector. Some of non-governmental non-profit organizations are now set up and run according to the new rules, registration in public registers and also the terminology of them has changed. The Civil Code provides the length of three years according to temporary provision which gives the organizations possibility to adjust to new conditions. For the purpose of this article, the attention is paid mainly to changes of legal entities of non-governmental non-profit organizations which are directly influenced by the Civil Code. However, there are of course also other types of non-profit non-governmental organizations – churches, political parties, professional chambers etc.

Apart from the “organizational” changes, the new Civil Code has brought also new term - “public utility” which is related to the topic as well. The definition of “public utility” is nevertheless not included in the Civil Code but is part of another regulation. First of all, the non-governmental non-profit organizations are defined according to [6] in following way:

- civil associations (according to the Act no. 83/1990 Col.), now called associations and subsidiary associations (according to the Civil Code),
- foundations and endowment funds (formerly according to the Act no. 227/1997 Col.), now according to the Civil Code,
- a religious legal entities according to the Act no. 3/2002 Col.,
- a community interest society according to the Act no. 248/1995 Col., which is already cancelled,
- an institute according to the Civil Code and education legal entities.

As it is stated already above, some of non-profit organizations are now derived directly from the Civil Code. Together with the change of the Civil Code, some of Acts became invalid – Act no. 83/1990 Col., about association of citizens, Act no. 248/1995 Col. (but still rules the community interest societies), Act no. 248/1995 Col., about community interest society and Act no. 227/1997 Col., about foundations and endowment funds [6].

Civil associations/associations is very popular and citizens set up these organizations because of different reasons and provide different public or mutually beneficial activities. The specific feature of these organizations is the membership. One of reasons why civil associations/associations are so widespread was the easy way of their establishment and cancellation as well as minor requirements of duties. On the other hand it had also significant disadvantages, these organizations were not transparent and could be easily misused. Since 2014, newly registered civil associations are considered as associations. These civil associations which were founded before year 2014 can change its status to an institute or a social cooperative [6]. They will keep their name, official seat, ID number, historical records and all responsibilities and rights from their contracts. Only the legal form of them undergone a transformation and the organizations have to adjust their statutes and add necessary data to the public register [1].

Foundations and endowment funds were mainly influenced by the change of the law in year 1997 with the Act no. 227/1997 which determined necessary property base (in case of foundations it is a property in a value of 500 000 CZK). Unlike associations, the base of the foundations and endowment funds is not represented by the membership but the property. This transformation caused sharp drop of number of foundations because they did not manage the amendment and from about 5000 there were only 250 left. The year 2014 brought liberalization of rules, one of them is no longer existing rules of frugality [6]. Just as association, also foundations and endowment funds have to adjust their documents, in this case the memorandum and submit it to the register.

Community interest societies could have been established till 31<sup>st</sup> December 2013 and their main purpose was to create a transparent subject which would serve to a community and had prescribed duties (including record in the public register). However, from the 1<sup>st</sup> January 2014 no new community interest societies can be set up, only these existing before can continue with their activities. Also, the community interest societies could transform to an institute, a foundation or an endowment fund [6]. This change shall ensure that a community interest society, as a legal entity which was since its creation considered as non-systematic, will in the future disappear [7].

An institute is a completely new form of a legal entity which shall serve for social or economically useful activities [6].

Probably the most challenging was the change for civil associations which were providing services because they had to transform themselves into a community interest society or wait for the validity of the new Civil Code and transform in an institute or a social cooperative. These civil associations which were securing their activities only for their members, were not restricted. To enable the civil associations to change their status, the Act no. 68/2013 Col., was created and according to this one, civil associations could transform into a community interest society [7].

The main points arising from transformation of non-profit non-governmental sector are described below based on [1]:

- up to 31<sup>st</sup> December 2013 – associations could create a community interest society if they wanted to continue with providing paid public services and leave activities of members in the association,
- since 1<sup>st</sup> January 2014 all associations transformed automatically into an institute or a social cooperative,
- since 1<sup>st</sup> January 2014 foundations and endowment funds continue with their activities but are governed by the Civil Code,
- since 1<sup>st</sup> January 2014 new community interest societies cannot be established.

## 2 Research methods and data

Changes which occurred in the legislation were examined using general theoretical methods, specifically the method of comparison. This method is widely used and helps to determine concordance or differences [8].

**Table 1: Comparison of old and new types of non-profit organizations**

Old type	Act No.	New type – Act No. 89/2012
Public benefit corporation	248/1995	Institution
Foundations, endowment funds	227/1997	Foundations, endowment funds
Citizens civil law associations	83/1990	Association

Main facts, which arise for non-profit sector from the change of the Civil Code, are summarized in following points [2, 9]:

- new definition of civil law subjects (association, “fundace”, institution),
- necessity to adjust a memorandum of association, statutes etc. so that they fit with the new law,
- necessity to adjust a name of the organization according to the new law,
- add necessary data to a relevant register,
- definition of “public benefit”,
- impossibility to set up a new public benefit corporation.

Based on the overview of changes and determined differences, which influenced non-profit non-governmental organizations, following research questions are formulated:

- “Did change of the Civil Code lead to decrease of newly founded associations?”;
- “Did the liberalization of legal environment led to increase of number of foundations?”;
- “Did the community interest societies change their status to another organization?”;

To answer the questions, the analysis of time series is carried on. This analysis was specified for two data series for years 2005 – 2012 and 2005 – 2013 to focus on prediction for years 2013 and 2014 and compare them with real number of organizations. Data for the analysis are gained from the Czech Statistical Agency, specifically from the time series in the satellite account of non-profit organizations. Data provided by the agency cover years 2005 – 2014.

## 2.1 Data about non-profit organizations

Following table 2 summarizes number of particular non-profit organizations in years 2005 – 2013.

**Table 2: Number of chosen organizations in years 2005 - 2013**

Name	2005	2006	2007	2008	2009	2010	2011	2012	2013
Foundation	293	302	302	379	413	434	435	444	511
Endowment fund	725	649	697	966	1 061	1 129	1 195	1 245	1 343
Community interest society	511	631	879	1 035	1 508	1 671	1 848	2 027	2 265
Civil associations (including labor unions)	37 688	39 725	43 717	45 690	61 919	66 259	70 292	73 267	81 576
Subsidiary civil associations	24 110	22 101	21 914	26 594	29 130	29 586	30 166	30 908	31 207

Because of the change of legislation, also the categories used in the time series are different since year 2014. For example civil associations are divided into two groups – associations and labor unions [5]. Due to that, the original data are adjusted so that they correspond with previous years. This adjustment together with the number of organizations is shown in following table 3. Originally, labor unions had own line, however in last years they were included under civil associations and that is why they are included to this item. Same is valid also for subsidiaries of labor unions which were not reported separately in last years, but now they are. For purpose of the analysis they are included to subsidiaries of civil associations. There is also new item Institute which shall represent new form of community interest society. This type of organization is not subject of further analysis.

**Table 3: Number of chosen organizations in year 2014**

Name	2014	Adjustment
Foundation	490	490
Endowment fund	1 331	1 331
Community interest society	2 710	2 710
Institute	142	142
Labor unions	695	0
Subsidiary of labor unions	5 777	0
Association	82 597	83 292
Subsidiary civil associations	24 739	30 516

## 2.2 Analysis of time series

The times series which are analyzed are considered to show data at particular moment, with mid-term horizon (annual) and show absolute values. For the purpose of this research, the data series are not “cleared” because the difference which arises from the number of days in a year does not play significant role in this case. Among elementary statistical characteristics which are used for first analysis belong an absolute difference and a coefficient of growth.

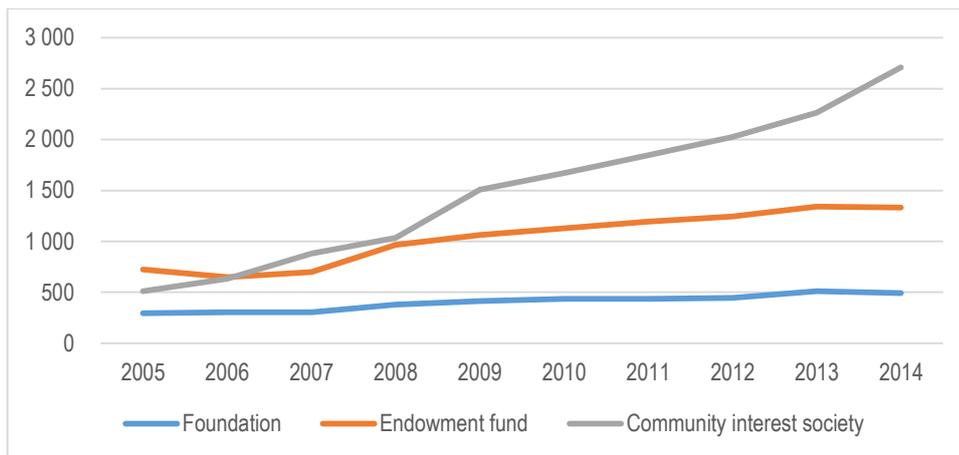
Every time serie can consist of four components – trend  $T_t$ , season  $S_t$ , cyclical component  $C_t$  and accidental component  $\varepsilon_t$ . For description of trend, linear trend function is used. Linear function was chosen because it is mostly used and fits also to these time series. This choice is later also verified with residual dispersion [4].

With usage of formulas it is possible to calculate trend in following years. To calculate also borders within which the future values shall be, it is necessary to calculate the confidence intervals.

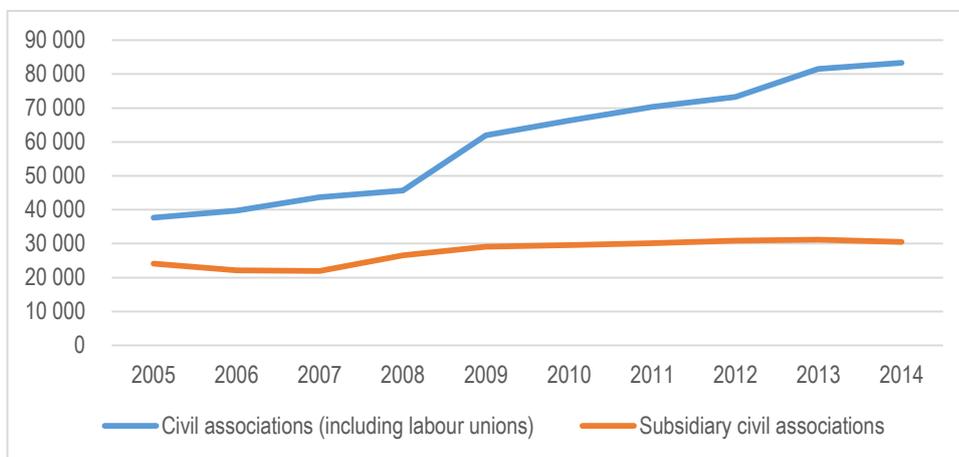
### 3 Results

Following figures 1 and 2 show number of chosen types of non-profit organizations in years 2005 – 2014. For the year 2014, the adjusted quantities are taken into consideration. Data are divided into two tables to enable better understanding because there is a big difference in quantities between civil associations and their subsidiaries and other types. It can be said that number of all organizations was growing in years 2005 – 2012. However, in year 2013 and 2014 the number of community interest societies increased sharply and also number of civil associations was slightly growing. On the other hand, number of foundations, endowment funds and subsidiary civil associations had decreased in 2014. Based on this first impression, it was decided to use linear trend function for the analysis of time series.

**Figure 1: Number of chosen organizations in years 2005 - 2014**



**Figure 2: Number of chosen organizations in years 2005 - 2014**



First impressions stated above in the text are supported also with data in following table 4 and 5 which shows absolute difference and a coefficient of growth. It can be said that years 2013 and 2014 meant significant changes in numbers of non-profit organizations. There were 67 more foundations in 2013 than in 2012 but in 2014 the number decreased by 21. Also endowment funds had such a development but it was not so sharp. Community interest societies were growing in both years, but the rise in 2014 was almost twice as higher than in previous year. Civil associations were also growing in both years but mainly in 2013. On the other hand, their subsidiaries decreased rapidly in 2014. Similar situation happened already in the past in years 2008 and 2009 which show steep increase of numbers.

**Table 4: Absolute differences in number of organizations in years 2005 – 2014**

Non-profit organization	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Foundation		9	0	77	34	21	1	9	67	-21
Endowment fund		-76	48	269	95	68	66	50	98	-12
Community interest society		120	248	156	473	163	177	179	238	445
Civil associations (incl. labor unions)		2 037	3 992	1 973	16 229	4 340	4 033	2 975	8 309	1 716
Subsidiary civil associations		-2 009	-187	4 680	2 536	456	580	742	299	-691

**Table 5: Coefficient of growth of organizations in years 2005 – 2014**

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Foundation		1,031	1,000	1,255	1,090	1,051	1,002	1,021	1,151	0,959
Endowment fund		0,895	1,074	1,386	1,098	1,064	1,058	1,042	1,079	0,991
Community interest society		1,235	1,393	1,177	1,457	1,108	1,106	1,097	1,117	1,196
Civil associations (incl. labor unions)		1,054	1,100	1,045	1,355	1,070	1,061	1,042	1,113	1,021
Subsidiary civil associations		0,917	0,992	1,214	1,095	1,016	1,020	1,025	1,010	0,978

Also these tables confirmed that apart from community interest societies and civil associations, the number of non-profit organizations has declined. Using the analysis of time series and regression analysis for data series 2005 – 2012 and 2005 – 2013, it was found out that development in year 2013 was following the trend and 2014 did not fit to estimate numbers based on calculated linear trend despite the fact that trend is modeled quite precisely. Tables 6 and 7 describes a calculated linear trend function  $\hat{T}$  for each type of organization, a coefficient of determination  $R^2$ , standard error of the estimate  $S_R$  and also intervals of reliability. The probability is calculated on the level of 95%.

**Table 6: Calculated statistical values for time series 2005 - 2012**

	Linear trend function $\hat{T}$	$R^2$	$S_R$	Interval		Estimate of 2013
				Left	Right	
Foundation	$\hat{T} = 375,25 + 12,81t'$	0,898	22,79	456,50	524,57	490,54
Endowment fund	$\hat{T} = 958,38 + 46,20t'$	0,905	79,38	1 257,50	1 490,84	1 374,14
Community interest society	$\hat{T} = 1263,75 + 116,35t'$	0,982	84,35	2 228,66	2 393,06	2 310,86
Civil associations (incl. labor unions)	$\hat{T} = 54819,63 + 2891,33t'$	0,943	3 752,27	75 997,80	85 685,35	80 841,57
Subsidiary civil associations	$\hat{T} = 26813,63 + 675,38t'$	0,809	1 731,90	29 866,88	35 917,12	32 892,00

**Table 7: Calculated statistical values for time series 2005 - 2013**

	Linear trend function $\hat{T}$	$R^2$	$S_R$	Interval		Estimate of 2014
				Left	Right	
Foundation	$\hat{T} = 390,33 + 26,98t'$	0,928	21,97	496,50	554,00	525,25
Endowment fund	$\hat{T} = 1001,11 + 90,32t'$	0,927	74,08	1 355,39	1 549,99	1 452,69
Community interest society	$\hat{T} = 1375 + 229,63t'$	0,986	79,28	2 454,56	2 591,77	2 523,17
Civil associations (incl. labor unions)	$\hat{T} = 57792,56 + 5831,62t'$	0,960	3 480,82	83 016,46	90 884,82	86 950,64
Subsidiary civil associations	$\hat{T} = 27301,78 + 1238,42t'$	0,823	1 680,29	30 738,58	36 249,14	33 493,86

Table 8 shows estimated values for years 2013 and 2014 which result from the time series analysis and compares them to real quantities of organizations.

**Table 8: Comparison of calculated intervals and reality in 2013 and 2014**

	Interval		Estimate of 2013	Reality 2013	Interval		Estimate of 2014	Reality 2014
	Left	Right			Left	Right		
Foundation	456,50	524,57	490,54	511	496,50	554,00	525,25	490
Endowment fund	1 257,50	1 490,84	1 374,14	1 343	1 355,39	1 549,99	1 452,69	1 331
Community interest society	2 228,66	2 393,06	2 310,86	2 265	2 454,56	2 591,77	2 523,17	2 710
Civil associations (incl. labor unions)	75 997,80	85 685,35	80 841,57	81 576	83 016,46	90 884,82	86 950,64	83 292
Subsidiary civil associations	29 866,88	35 917,12	32 892,00	31 207	30 738,58	36 249,14	33 493,86	30 516

#### 4 Discussion

Based on the results shown above, it can be said that number of some of non-profit organizations have developed in a different way that it would be expected. The absolute differences in number of foundations, endowment funds and subsidiary civil associations were negative in year 2014, on the other hand absolute values for community interest societies and civil associations were positive.

The number of foundations and endowment funds has decreased in year 2014. This finding is in contrary to expectation based on the liberalization of legal environment caused by the new Civil Code. This shall lead rather to increase of the number. The number of foundations and endowment is lower than estimation calculated with the probability on level 95%. The interval was calculated as 496,50 and 1355,39 and in reality there were only 490 and 1 331 organizations.

There was no influence on the development of civil associations/associations, the growth was higher in year 2013 but still within the calculated interval. Nevertheless, the same is not valid for the subsidiary civil associations because their number in 2014 was 30 516 and lower limit of the interval with probability 95% was 30 738,58.

Also according to [3], number of civil associations was growing by thousands between years 2005 and 2013. There is also mentioned that according to the legislation valid till year 2013, civil associations did not have duty to unsubscribe from the register let by the Ministry of the Interior and because of that, the number of associations is much higher than it shall really be. According to some estimation, it might be up to one third or one half.

Number of community interest societies grew in 2014, this growth was exceptional because exceeded the interval, calculated value for year 2014 was 2 523,17 organizations, but in reality there were 2 710 organizations. It might be that these civil associations which needed to change their status has decided to do this change with validity of 1<sup>st</sup> January 2014 and turn to the community interest society.

However, all these finding shall be verified also during following years to see if the change of the Civil Code really made a difference or if the differences which occurred in years 2013 and 2014 were only deviations.

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# DEBT AROUND WORLD

**Vendula Večeřová**

*Silesian University, School of Business Administration in Karvina, Czech Republic  
o131885@opf.slu.cz*

**Eva Sikorová**

*Moravian University College Olomouc, Czech Republic  
eva.sikorova@mvsso.cz*

## **Abstract:**

This report analyzes insolvency procedures in 88 countries. Indicators as period of time in which the insolvency procedure takes place, the share of cost in total assets in insolvency, recovery rate of creditor claims. This report analyze these indicators for period 2004-2017. Findings are based on data on various insolvency law in 88 countries. Report analysis problems that have impacts on national boundaries. This article reports about the duties and liabilities of directors, rules on ranking of claims/order of priorities and the conditions; conditions that exist for the opening of insolvency proceedings. The main indicator is the share of cost an insolvency procedure in total assets. This article shows strong link between quality and efficiency and the „resolving insolvency“ indicator. Creditors will recover a larger share of the amount due when is good legal Framework for insolvency. 90,1 cents on the dollar is the average recovery rate. Average efficiency is for foreclosure 33,32, for liquidation is 34,342 and for reorganization is 40,52. Higher framework index is linked with recovery rate. In average takes resolving insolvency 11 months, costs 4 % of the debtor’s estate and sold as a going concern. The highest recovery rate is in Finland 90,2 %, Netherlands 89,2 %, Belgium 89 %, England 88,6 % and the lowest in Romania 30 %. The highest efficiency is in Finland 60,85, Norway 60,08, Canada 57,75, the lowest efficiency is in Angola 1,2.

## **Key words:**

Insolvency, recovery rate of creditor claims, indicators used in insolvency procedures

## **JEL Classification:** M41

## **1 Introduction**

Debt needs to be enforced through the reorganization or liquidation or foreclosure. Insolvency is the collective procedure which is under judicial control. Some of the debt enforcement such as foreclosure proceedings do not require courts. Companies with multiply creditors rely on courts usually through bankruptcy or insolvency or insolvency procedures. In advanced market especially in developing countries are generally insolvency institutions perform poorly. How restrict the function of these institutions? Why to restrict the function of these institutions? Is any chance to improve them? The functioning market economy requires the removal of nonviable companies from the economy because some debtors are kept “alive” artificially through government support.

We study debt enforcement in 88 countries consistent with each country and the same case study of an insolvent firm. All dates are based of answers of insolvency practitioners which were collected by Committee on Bankruptcy of the International Bar Association. The same case is the company with given number of employees, capital and ownership structure, value as a going concern, and a lower value of sold piecemeal. It is identical company across countries except that the economic values are all

normalized by the country's per capita income. They asked each practitioner to describe details in bankruptcy procedure step by step. All bankruptcy narratives inform about each country which procedures are used for debt enforcement (foreclosure, liquidation, or an attempt at reorganization). In each country we collected detailed data about legal and economic characteristics and how assets are conducive to the economic conditions in the countries. We evaluated many advantages of debt enforcement in different countries. We analyzed the efficiency of these procedures in 88 countries. We provided quantitative measures of enforcement and so are less vulnerable to the critique, sometimes levelled against La Porta et al. (1997, 1998), that we are just looking at law on the books. We also measured the enforcement across 88 countries.

Around the world is used only three basic procedures (1) foreclosures by the senior creditor, which may or not may involve court; (2) liquidation; and (3) reorganization. Foreclosure can solve debt with minimal court involvement rather than bankruptcy or insolvency. World statistics shows that all bankruptcy procedures are extremely time-consuming, costly and inefficient. Companies as a going concern achieve only 36 percent from the 88 countries. 48 percent of the value company is lost in bankruptcy due to transaction costs of debt enforcement, the delay cost and the loss from reaching the wrong outcome. Richer countries have a comparative advantage at more complex procedures (see Djankov, Glaeser, et al. 2003; Franks and Lóránth 2005; Gennaioli and Rossi 2007; Ayotte and Yun 2009). Efficiency of debt enforcement depends on various specific economic and legal rules across countries. Very important is absolute priority of the secured senior creditor which is poorer in French legal origin countries. Development of debt markets across countries shows efficiency of debt enforcement and is statistically significant predictors of the development.

Section 2 presents our data collection and case. Section 3 presents determinants in 88 countries and basic results on the time, cost, resolution and efficiency of the procedures. Section 4 presents conclusions.

## **2 Methods**

We analyse the effectiveness of insolvency in 88 countries and measure the time, the cost of the procedure and recovery rate of creditor claims.

Our data are based on results of questionnaires by judges from 88 countries. These data were collected by International Bar Association (IBA). Data cover all countries with income per capita greater than 1 000,00 USD and population more than 1,5 million in 2004-2017. Research includes 30 high income, 20 upper-middle-income, and 38 lower-middle-income countries.

All respondents answered to a standardized case. The insolvent company is a limited liability company which owned a hotel in the most populous city. The company has 50 suppliers and owes money for its last delivery. The company has borrowed money from a bank five years ago. The money was used for buying the hotel. The loan has a 10-year term. The company has the payment schedule up to now. No other shareholder has above 5 percent of the voting power. The total debt is 136 units. Unsecured creditors (including suppliers, the tax authority and the employees) has 36 units- 26 percent as a whole. The balance of total debt held by the bank – 74 percent- equivalent to 100 units. The company has only one large secured creditor. In the past the company paid regularly the loan and covered all costs and every year turned a profit. The company plans that in two years will cover all expenses from projected revenues. We determine that the value of the company is higher as a going concern than sold as piecemeal (building, furniture, etc.). For the company is efficient to turn over to the bank and to let the bank run it or sell it as a going concern. The company must keep in operation and jobs. In countries where wages have priority over secured creditors must keep the company as a going concern. The case is very simple. We focus on formal insolvency proceedings and ignore informal workouts (Gilson, John, and Lang 1990; Asquith, Gertner, and Scharfstein 1994). In poor countries financial contracts indeed adjust to the legal environment but also that judges often fail to enforce them (Lerner and Schoar 2005; Gennaioli and Rossi 2007; Qian and Strahan 2007). Problems make uncommon rules for midsize firms (Bebchuk 1988; Gertner and Scharfstein 1991; Aghion, Hart, and Moore 1992; Bolton and Scharfstein 1996; Stromberg 2000; Roland and von Thadden 2007). The

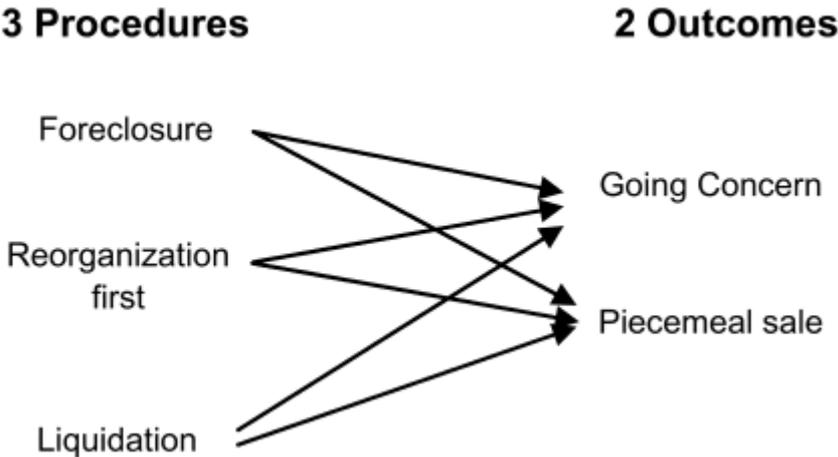
company is not import for politicians is not in public interest. "Politicization of bankruptcy is also an important concern (Weiss and Wruck 1998, Chang and Schoar 2007; Lambert-Moglianski, Sonin, and Zhuravskava 2007). We explicitly rule out tunnelling. In the developing countries in particular may cause a major problem (Johnson et al. 2000; LA Porta, Lopez-de-Silanes, and Zamarripa 2003; Gennaioli and Rosii 2007). With tunnelling could bankruptcy procedures work even worse than without.

The article also introduces a series of scientific methods. In particular, the method of analysis and description that is used when working with secondary sources of literature. Also, the method of synthesis in the context of interlinkages analysis and synthesis. Abstraction method determines that the article is abstracted from less essential issues while deduction method was used when drawing conclusions article. The article also does not overlooked method of comparison (in the basic research and in Table 2. Data procedure and by income group. Secondary data are obtained from surveys 88 countries, as well as a database of the International Bar Association (IBA), scientific publications, international scientific journals and databases ProQuest outputs in the approach of the Silesian University in Opava, School of Business Administration in Karvina. Secondary data is used for the description of the current state of research questions. They should reflect the current trends. And it is also relevant to the usability of these outputs for management decisions.

**2.1 Data**

Foreclosure is focused on secured creditors and does not protect unsecured creditors who must rely on insolvency proceedings. In some countries unsecured creditors can cause foreclosure by initiating a reorganization or liquidation without foreclosure. Foreclosure is out of court procedure which is focused on sale of assets. Some countries oversees foreclosure and is less involved than bankruptcy. "Floating charge" is known only in some countries and allows creditor to take security over an entire business. In our case we use floating charge.

Figure 1: Procedures and outcomes



Source: Doing business.

Liquidation is process under court control. The company could be sold as a going concern and not as the picemeal of its assets.

Reorganization is used for rehabilitating

Table 1 defines the main variables used in the analysis company itself in financial distress but is in not available in all countries. During reorganization the current management may or not retain control of the company. The first is the time to resolve the insolvency proces. Time covers the period from the moment that company defaults and is kept as a going concern or sold piecemeal. All delays are included

f. e. disputed claims, appeals. The time is from company delay to when is bank paid. Time is relevant for computing the efficiency of debt enforcement, whereas time to payment is relevant for computing bank's recovery rate (Davydenko and Franks 2008). Time and time to payment are reported in years.

The cost is the second item and is expressed as a percentage of the bankruptcy estate at the time of entry into bankruptcy.

Third is dummy variable GC, equal to one if the company stays as going concern and zero if sold as a piecemeal.

Two additional assumptions are used to assess the efficiency of each procedure. First we need assume if the costs are incurred at the beginning or at the end. We assumed that in the end. The second is the value of the hotel. We assume that the company covers only variable costs and generates no value during the insolvency process. These assumptions obviously make bankruptcy costlier for the poorer countries, with longer durations of proceedings and higher interest rates.

The data displayed in the article are given because of the confrontation and the comparison with other studies abroad and in the Czech Republic. Emphasized in particular the average effectiveness, efficiency means that more than half the value of the company is lost in insolvency proceedings. For each country observe significant differences between time, cost and efficiency in the context of debt collection and debt management in terms of closure, liquidation and reorganization. A significant issue is the relationship of costs to insolvency proceedings and the expected result.

Table 1: Descriptions of the variables

Variable	Description
A. Main variables:	
Foreclosure	= 1 if Mirage is most likely to undergo a foreclosure or similar debt enforcement proceeding, 0 otherwise
Liquidation	= 1 if Mirage is most likely to undergo a liquidation proceeding, 0 otherwise
Reorganization	= 1 if Mirage is most likely to undergo a reorganization proceeding, 0 otherwise
Time	Estimated duration, in years, of the time to resolve the insolvency case of Mirage; measures the duration from the moment of Mirage's default to the point at which the fate of Mirage is determined, i.e., when Mirage is either sold as a going concern, sold piecemeal, or successfully reorganized
Time to payment	Estimated duration, in years, of the time from the moment of Mirage's default to the point at which the secured creditor receives payment
Cost	Estimated cost of the debt enforcement proceeding for Mirage, reported as a percentage of the value of the estate, borne by all parties; costs include court/bankruptcy authority costs, attorney fees, bankruptcy administrator fees, accountant fees, notification and publication fees, assessor or inspector fees, asset storage and preservation costs, auctioneer fees, government levies, and other associated insolvency costs
Going concern	= 1 if Mirage continues operating as a going concern both throughout and upon completion of the insolvency process, 0 otherwise
Lending rates	The bank lending rate to the private sector (source: International Monetary Fund's International Financial Statistics [IFS] online database, line 60P.ZF): line 60P.ZF is defined as the "bank rate that usually meets the short and medium term financing needs of the private sector" (in cases in which lending rates are not reported in the IFS, we obtain data directly from central banks)

Source: Doing business.

With help of these assumptions we could measure the efficiency as the present value of the terminal value of the firm after bankruptcy cost, or

$$E = \frac{100 \times GC + 70 \times (1 - GC) - 100 \times c}{(1 + r)^t}$$

Here  $GC$  equals one if the company stays as a going concern and zero otherwise,  $c$  is the cost and  $t$  is the time to resolve insolvency, and  $r$  is the nominal lending rate. The results and we assume the same 8 percent rate for all countries.

### 3 Basic results

The insolvency takes in average 2,60 years to resolve, costs 13,33 percent of the estate and only 35,6 percent of the cases preserves the company as a going concern. The worldwide average efficiency is 36,05 percent. If we compare the same study with dates from the years 1998-2005 the results are at least the same. The time was 2,64 years, costs 14 percent and 36 percent of cases preserved the company as going concern. 52,97 percent was the worldwide average efficiency. The efficiency means that more than half value of the company is lost in the insolvency proceedings.

Countries have big differences between time, cost and efficiency. In 14 countries takes less than a year to resolve – (all of them rich) but in mostly poor countries it takes more than 5 years. More than 30 percent the value of the company is lost in seven countries with very long proceedings. These countries have very high dominant attorney fees. 5 percent the value company is wasted in Netherland, Japan and Singapore. Only 7 percent value of the company is left in Turkey and in Angola. We correlate our estimate of formalism of judicial procedure and that expelled the plausibility of the measures. (Djankov, LaPorta, et al. 2003). The correlation is 0,522 with a p-value of 0. Two measures of efficiency of debt collection are so high to being collected so differently and it is indicator of validity.

In table 2 are measures of time, cost and efficiency of debt enforcement divided independently into three per capita income categories (high, upper-middle and lower-middle income) and debt procedure (foreclosure, liquidation and reorganization). We report time and cost of its procedure, the expected outcome (whether the firm continues as a goings concern), the lending rate and the summary efficiency measure 88 countries divided into nine groups. From our report is clear that any procedure has no prior to other. It is interesting that in theory is said that foreclosure is the first best. The suitable debt enforcement can not be resolved at such broad level.

The richest countries are more efficient at debt enforcement than poorer ones. The richest countries take 1,5 years to resolve debt enforcement, at a transaction cost of 9 percent of the cases, have an average interest rate of 5,9 percent, and achieve the average efficiency score of 77,3. The corresponding numbers of upper-middle-income countries are 2.8 years, 16 percent of the estate, only 20 percent of the cases preserving. An interest rate of 12,7 percent, and the average efficiency score of 46,1. For the lower-middle-income countries the time is 3,45 years, the cost is again 16 percent, the going concern outcome also materializes in 16 percent cases, the interest rate is 20,3 percent, and the efficiency score is 35 on average. The decline in the efficiency score compared to upper-middle-income countries comes from higher interest rates and longer delays in the lower-middle-income countries.

In higher income countries is foreclosure efficient as liquidation but reorganization procedure is the most efficient – 80 percent of the time to 63 percent for foreclosure and 71 percent for liquidation. In the lower-middle-income countries is reorganization as efficient as liquidation, but foreclosure is the most efficient procedure. Save the company as going concern is rarely manage to save. For upper middle-income countries is the most efficient procedure liquidation. The richer countries are doing better at procedures involving higher level of court intervention.

Table 2: Data by procedure and income group

Data by procedure and income group					
Country	Time	Cost (%)	GC	Interest	Efficiency
<b>A. High-Income Group</b>					
<b>Foreclosure</b>					
Singapore	0,58	5,3	1	5,3	55,74
United Kingdom	0,5	6	1	3,7	56,52
New Zealand	0,67	4	1	9,8	50,56
Hong Kong, China	0,63	9	1	5	52,14
Australia	0,58	8	1	8,4	87,8
Kuwait	4	1	0	5,4	23,35
Slovenia	1,67	8	0	10,8	39,97
United Arab Emirates	4,96	38	0	8,1	22,25
<b>Average</b>	<b>1,7</b>	<b>9</b>	<b>0,63</b>	<b>7,05</b>	<b>48,54125</b>
<b>Liquidation</b>					
Netherlands	1,42	1	1	3	57,26
Sweden	1	9	1	5,8	51,58
Austria	0,92	18	1	5,6	54,91
Denmark	2,5	9	1	7,1	54,47
Israel	1,5	23	1	10,7	41,55
Germany	0,92	8	0	9,7	57,63
Greece	1,92	9	0	6,8	32,98
<b>Average</b>	<b>1,45</b>	<b>11</b>	<b>0,71</b>	<b>6,96</b>	<b>50,05428571</b>
<b>Reorganization</b>					
Japan	0,58	4	1	1,8	49,88
Taiwan, China	0,83	4	1	3,4	53,58
Canada	0,75	4	1	4,7	57,75
Finland	0,92	4	1	4,8	60,85
Norway	0,92	1	1	8,5	60,08
Belgium	0,92	4	1	6,9	57,345
Ireland	0,42	9	1	2,9	55,25
Korea, Republic	1,5	4	1	6,2	56,61
United States	2	7	1	4,1	43,75
Portugal	2	9	1	5,2	52,1
Spain	1	15	1	4,3	49,87
Puerto Rico	3,79	8	1	4,7	49,54
Switzerland	3	4	0	3,3	35,39
France	1,89	9	0	6,6	38,38
Italy	1,17	22	0	5	46,07
<b>Average</b>	<b>1,45</b>	<b>7</b>	<b>0,8</b>	<b>4,83</b>	<b>51,09633333</b>
<b>High-income average</b>	<b>1,51</b>	<b>9</b>	<b>0,73</b>	<b>5,92</b>	<b>50,575</b>
<b>B. Upper-Middle income</b>					
<b>Foreclosure</b>					
Oman	2,75	4	0	8,2	26,13
Hungary	1,88	15	0	9,6	29,05
Croatia	1,92	15	0	11,6	26,85
Panama	2	18	0	9,9	19,79
Chile	5,08	15	0	6,2	25,27
Lebanon	4	22	0	13,4	19,99
Uruguay	1,92	7	0	50,9	30,41
<b>Average</b>	<b>2,79</b>	<b>13</b>	<b>0</b>	<b>15,7</b>	<b>25,35571429</b>
<b>Liquidation</b>					
Botswana	1,33	15	1	16,6	36,02
Poland	2	22	1	7,3	33,95
Slovak Republic	4,08	18	1	8,5	37,94
Lithuania	1,25	7	0	5,8	32,36
Estonia	2	9	0	5,5	33,19
Latvia	2,75	13	0	5,4	31,97
Malaysia	2,25	15	0	6,3	20,63
Czech Republic	6	15	0	5,3	33,25
Saudi Arabia	2,71	22	0	6,4	0
Venezuela, RB	3,96	38	0	25,2	7,67
<b>Average</b>	<b>2,83</b>	<b>17</b>	<b>0,3</b>	<b>9,23</b>	<b>26,698</b>
<b>Reorganization</b>					
Mexico	1,83	18	1	6,9	72,6
Argentina	2,75	12	0	19,2	35,8

Costa Rica	0,5	15	0	25,6	25
<b>Average</b>	<b>2,69</b>	<b>15</b>	<b>0,33</b>	<b>17,21</b>	<b>44,46</b>
<b>Upper-middle-income average</b>	<b>2,8</b>	<b>16</b>	<b>0,2</b>	<b>12,69</b>	<b>46,1</b>
<b>C. Lower-Middle income</b>					
<b>Foreclosure</b>					
Bosnia and Herzegovina	1,83	9	1	10,3	32,239
Jamaica	1	18	1	18,9	42,19
Armenia	1,58	4	0	18,6	26,98
Sri Lanka	1,42	18	0	9,5	29,49
China	1,79	22	0	5,6	23,06
El Salvador	3,67	9	0	14	24,04
Honduras	2,88	8	0	19,9	16,57
Guatemala	3	15	0	15	18,44
Georgia	2,83	4	0	31,2	30,8
Paraguay	3,92	9	0	50	17,1
<b>Average</b>	<b>2,39</b>	<b>12</b>	<b>0,2</b>	<b>19,29</b>	<b>26,0909</b>
<b>Liquidation</b>					
Jordan	3,25	9	0	10,2	19,07
Albania	0,5	38	1	11,8	33,37
South Africa	1,92	18	0	15	29,42
Russian Federation	3,67	9	0	13	27,74
Syrian Arab Republic	5,42	9	0	9	49,87
Kazakhstan	2,83	18	0	19,5	30,88
Egypt, Arab Republic	4,08	22	0	13,5	18,45
Brazil	3,67	12	1	67,1	17,46
Dominican Republic	3,33	38	0	31,4	9,74
<b>Average</b>	<b>3,52</b>	<b>19</b>	<b>0,22</b>	<b>21,15</b>	<b>26,22222222</b>
<b>Reorganization</b>					
Colombia	3	1	1	15,2	42,21
Tunisia	1,25	7	0	9	35,55
Thailand	2,67	36	1	5,9	40,05
Algeria	3,5	7	0	8	33,162
Bulgaria	3,33	9	0	8,8	29,3
Namibia	1,5	15	0	14,7	25,22
Morocco	1,83	18	0	12,6	22,39
Peru	3,08	7	0	14,2	23,62
Iran, Islamic Republic	4,5	9	0	17,5	14,6
Serbia and Montenegro	2,67	23	0	21	37,96
Macedonia, former Yugoslav republic	3,67	28	0	12,4	35,04
Indonesia	5,5	18	0	14,1	19,99
Belarus	5,75	22	0	16,9	18,23
Ecuador	8	18	0	13,1	13,4
Ukraine	2,92	42	0	17,4	11,28
Philippines	5,67	38	0	11,2	17,44
Romania	4,58	9	0	45,4	25,03
Turkey	5,88	7	0	46,7	17,91
Angola	6,17	22	0	82,3	1,2
<b>Average</b>	<b>3,97</b>	<b>18</b>	<b>0,11</b>	<b>20,34</b>	<b>24,39905263</b>
<b>Lower-middle-income average</b>	<b>3,45</b>	<b>16</b>	<b>0,16</b>	<b>20,257</b>	<b>25,305</b>
Average by procedure:					
<b>Foreclosure</b>	<b>2,28</b>	<b>11</b>	<b>0,28</b>	<b>14,37</b>	<b>33,32</b>
<b>Liquidation</b>	<b>2,7</b>	<b>16</b>	<b>0,38</b>	<b>13,74</b>	<b>34,324</b>
<b>Reorganization</b>	<b>2,84</b>	<b>13</b>	<b>0,41</b>	<b>13,8</b>	<b>40,52</b>

Source: Own processing.

## 4 Conclusion

Debt enforcement is highly inefficient due of high administrative cost and long delays and sales the company as piecemeal. Everything is linked with underdevelopment which probably proxies for poor public-sector capacity of a country and to French legal origin, which probably proxies for excessive formalism. The rich developing countries save and rehabilitate insolvent firms. All procedures are time-consuming and expensive, they typically succeed in preserving the firm as a going concern. 80 percent of the companies being sold as piecemeal and always fail in their basic economic goal of saving the firm. These countries have the French legal origin countries, which have highly formal bankruptcy procedures. Middle-income countries nearly always fail to save a viable firm, despite time and cost. When more than one creditor is secured, foreclosure should work well if the efficient outcome is to sell the firm piecemeal. The case for quick foreclosure is the risk of tunnelling by management. Less formalistic mechanisms might improve debt enforcement in a developing country. Restricting appeals might shorten the proceedings and improve efficiency.

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