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# STRENGTHENING OF REGIONAL TOURISM DEVELOPMENT BY CREATING TOURISM CLUSTERS IN THE CITIES OF UKRAINE

**Anastasiiya Bezkhlibna, Svitlana Nykonenko**

***Abstract:** In the article it is considered the topical issues of creation of tourist clusters in regions. Tendencies of the international tourism development demonstrates growth of employment in the economy. Functioning of tourist clusters as tourist centers is obviously possible only when there are functioning and harmonious cooperation of systems of tourist attractiveness, transport, service and quality service control, insurance system and support of tourists' personal security, systems of tourist pointers and tourist infrastructure. There were chosen the following factors of a tourist cluster creation: geographical closeness, demand availability, formation of the general development strategy, hierarchical functional communications between participants.*

*For the purpose of clarifying the relevance of creation of a regional tourist cluster, the estimation algorithm of the ability of its creation was proposed, and it consists of 8 stages. Each stage is detailed. The participants (subjects) of a potential cluster are systematized.*

*SWOT analysis is proposed for determination of drawbacks and advantages of tourist clusters functioning. This will allow to improve work of a cluster participants.*

*The document can be downloaded at <http://hdl.handle.net/10195/67922>.*

**Keywords:** *Regional development, Tourism perspectives, Partnership, Cooperation, Tourism cluster.*

**JEL Classification:** *R58.*

## **Introduction**

The modern cities perform multiple functions: political; economic; scientific and educational; transport; informational; cultural; tourist. The tendency of consecutive strengthening of tourist functions is a characteristic feature for the majority of the cities in the world.

Over the last 10 years Zaporizhzhya has become to be associated with the tourist city capable to actively develop and have the wide potential for attracting foreign tourists. The Zaporizhzhya region is located in the southeast of Ukraine, borders on the Kherson region in the west, on the Dnipropetrovsk region in the north, on the Donetsk region in the east, in the south it is washed by the Azov Sea. The Zaporizhzhya region has considerable tourist potential as of forming and strengthening the benefits of a regional tourist product.

The territory with the population makes up about 1860 thousand people. It occupies 27,2 thousand sq.km and has the developed system of transport: railway, automobile, water and aviation. The favorable climate, nice coastal landscapes of the Dnieper, mineral water springs and therapeutic muds, the tender, warm Azov Sea attract tourists. Cities of Berdyansk, Primorsk, Kirillovka (urban village) enjoy wide popularity as resorts among holidaymakers. In 11.01.2005 the Verkhovna Rada of Ukraine passed the Law of Ukraine "About the announcement of the medical and health-improving area of Berdyansk in the

Zaporizhzhya region being the resort of the state value”. Within the area mineral waters and therapeutic muds of practically all known balneal types are prospected and used. For health-improving and medical purposes ozocerite and speleotherapy are widely used. Ozokerite and speleotherapy are widely used for the recreational and curative purposes. About 15% of the region’s area is occupied by resort and recreational territories. Nearly 600 health-related facilities are located on the Azov Coast and along the Dnieper River waterfront. Farms for agri- and ecotourism are created in a number of districts. The regional distinctiveness is based on an unparalleled mix of natural environment, landscapes, various recreational resources, deeply moving archeological, historical and architectural monuments and landmarks (The regional center of tourist information).

## **1 Statement of a problem**

Creation of cluster formations helps to perform the organization of travel business more effectively and opens benefits to its participants.

On the basis of the research made by expert methods in Australia, Germany, Austria and Switzerland (Zehrer, 2016: 81-94) the scientists proved that today tourist field is undergoing irreversible process of gradual innovative development. Cluster process in the economy is a key factor in the development of innovative enterprises, including in the international aspect.

Thus, determination and refinement of theoretical basics of cluster formations in tourism gains the increasing currency from the point of view of scientific research and practical strategy implementation of tourism development in Ukrainian regions.

By Voinarenko's definition cluster is a “territorial and sectoral voluntary association of companies that cooperate closely with academic institutions and local authorities to improve the competitiveness of its products and growth in the region”. (Voinarenko, 2001: 25-33)

According to the English scientists clustering can bring a wide range of benefits for business and economy in general (Bergman).

Despite a significant amount of researches, nowadays in Ukraine there is no competent scheme of planning of the tourist centers taking into account spatial disproportions of economical and geographical development of regions. For the first time clusters were described by Porter (Porter, 1998,1990) in his works, in Ukraine (Kraynik A. (Krainik), Trebukh A. A and Bandura of N.B. (Trebuch, 2010: 265-270) ) and the world there are also many works on this subject, but the principles and approaches concerning activities organization of these structures aren't developed yet and not systematized.

The objective of the research is a scientific explanation for need of tourist clusters creation for the Zaporizhzhya region for the purpose of strengthening the tourist potential in general and expansion of opportunities of a certain tourist enterprise due to experience exchange with others.

## **2 Methods**

Progress in studying approaches of assessment the potential of clustering regions is to study the problem on the basis of system approach, proposed by Havura (Havura, 2012). The result of this research is the development of the regional economy clustering algorithm, which provides a set of rapid analysis stages based on the methods of logic generalization, synthesis, analysis and comparison. But while determining the potential level of economic

activity in the region the author doesn't distinguish the main signs of potential clustering - geographical location and the presence of stable economic relations between the contractors of cluster.

The methods used in the work: analytical (for the analysis of tendencies of international tourism development), the system analysis (it is used as an instrument of system components description of the functioning tourist cluster and development of an estimation algorithm of an ability to create a tourist cluster), the SWOT analysis method for description of shortcomings and benefits of creation of a regional tourist cluster, and also methods of induction and deduction are used while characterizing the evaluation stages of an ability to create a tourist cluster.

S. Sokolenko (Sokolenko) states that study of cluster activity should be based on the principle of historicity, describing the existing clusters and the the nature of its origin. The result of this research is the development of three types of clusters: based on innovation component of its origin, based on large-scale public investment, based on cooperation with major foreign companies, based on the scientific research institutions power of the region.

### **3 Problem solving**

Growth of amounts of the international tourism is shown by the key facts, that are published in annual reports and regular articles of the UNWTO experts (World Tourism Organization, 2016). The number of international tourist arrivals over the last two years significantly increased and composed 84 million people more by results of 2015 in comparison with 2014. (1 184 million in 2015 in comparison with 1100 million in 2014), which made an increase of 4,4% a year according to statistical data of the UNWTO World Tourism Barometer publication (World Travel and Tourism Council, 2016).

The increase in the international tourist arrivals in comparison with 2010 were encouraged by the following macroeconomic factors: a considerable exchange rate fluctuation of the main tourist destinations, reduction of prices of oil products in the world markets, natural and technological factors of a human civilization development in many parts of the world. Based on the current positive trends in growth of tourist arrivals, UNWTO predicts increase in the international tourist arrivals by 4% in 2016.

According to the macroeconomic researches of World Travel and Tourism Council and Oxford Economics the sector of tourism creates about 108 million workplaces for employment. Over the last 10 years investments into development of the economy and, in particular, tourism to the enormous amount - 2100000000000 euros were made by countries of Europe. The amount of investments denotes the priority and efficiency of realization of capital investments which it is appropriate to call "smart investments".

The cluster approach to the development of the tourism industry was successfully implemented in countries such as Italy, Hungary, France, Ireland, Norway, the Russian Federation, Poland, Estonia. For example, in Italy, one of the most famous tourist cluster is "Trasimene Lake" (Umbria), which in addition to tourist enterprises, cooperate institutions for accommodation and food trade organizations, companies producing products specific for the area (such as wine, olive oil). Also among Italian clusters should be mentioned "Salinuntinski terma" (Sicily), "Adriatic Sea and Coast", "Cities of Arts, Culture and Business" (Emilia-Romagna). In France, there are numerous clusters of leisure. In the Russian Federation the great tourist cluster of northwestern cities is very popular (Novgorod, Pskov, Vologda, Smolensk). Among the first in Ukrainian clusters at the end

of the 1990s. there were created Kamenetz-Podolsk cluster (Khmelnitsky region), cluster of agrarian ecotourism "Charm" and tourism cluster of souvenirs production "Constellation" (Ivano- Frankivsk region) (Kal'chenko).

The "Agreement on cooperation and collaboration in socio-economic development of small cities of Western Ukraine in the field of Tourism and Crafts" provides the establishment of tourist cluster in small historical cities of Western Ukraine. To the initiative group there were included administrations of small towns of Western Ukraine (Berezhanu, Borschiv, Buchach, Zbarazh, Zboriv, Kremenets, Koropets, Pochayiv, Pidhaitsi, Zolochiv, Zhovkva, Galich, Yaremcha, Izyaslav, Hawtin), the Union of tourism and crafts "Golden Opole", the State tourism administration of Ukraine and the Research Institute "Triangle" (Tymchyshyn-Chemerys, 2015: 44-57).

Cluster of boating tourism in Chernihiv region has existed for over 10 years. At the end of the 10th season of rafting in 2016 there has been 5 rafting water areas, 6 tourist rafts, 12 venture investors. There were developed new logistic routes, new programs and trips for walks 2-4-6-8 hours. Currently, there has been connected 45 partners to this cluster, their collaboration gives 45 new job places. Following the results of 2007 - 2016 there were provided 398 raft tours on the river Dysna, Snov and Seim and made 183 excursions for 1,694 tourists, also a raft instructor preparation program was created (Chernihiv European).

Today in Zaporizhzhya there are many potential and unique tourist attractive objects (the island Khortitsya, the historical and archaeological reserve "Stone Grave", "Popov's Estate", "Zaporizka Sich", a unique construction of the Dniprogas dam, etc.). The city is an interesting area with diverse culture. In the region tourist infrastructure is actively developing and there is a viable tourist sector.

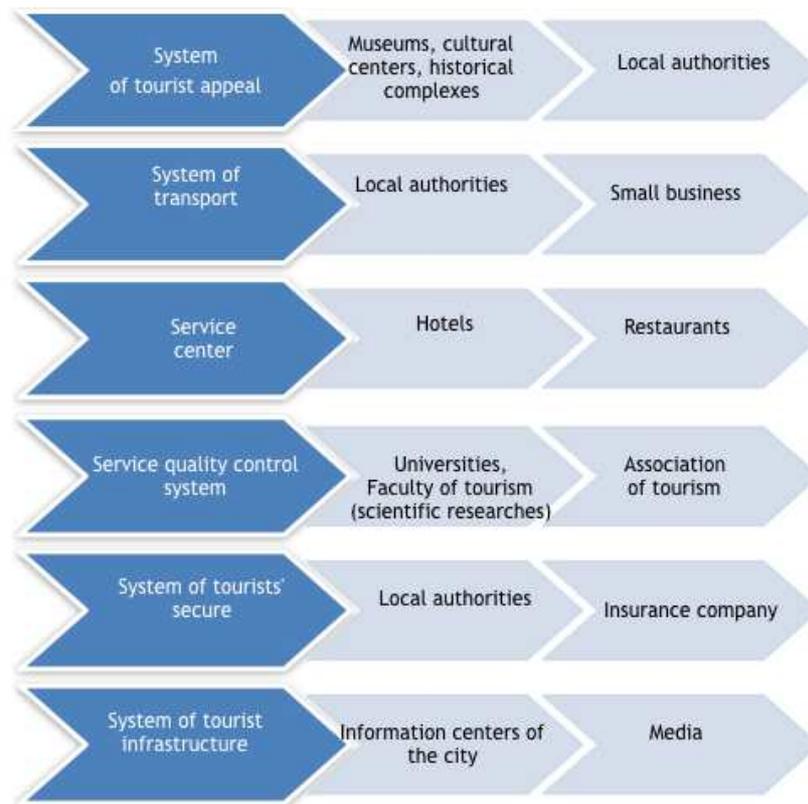
It is considered that the development of tourist clusters as tourist centers it is possible only, when the following system functions:

1. System of tourist appeal. Including the original sights and cultural monuments, customs, historical places, it must completely represent characteristic features and cultural filling of the city.
2. System of transport. Function of this system is shown in the organization of convenient movement of tourists to these or those objects of tourist appeal.
3. Service system. Its function is directed mainly to high-quality service of recreants. It includes catering services, residence in the place of attendance.
4. Service quality control system. It is reasonable to single out as a separate system, as it is very important to track correctly the working efficiency of all above-mentioned systems and to amend their work in time.
5. Insurance system and personal security of tourists.
6. System of tourist indexes. The system of indexes is an important part of internationalization of the city, including designing of signs, system of their explanation and system of the explaining languages, which is very important. English is the basic for foreign tourists.
7. System of tourist infrastructure. By this term the system of information centers which will be able to offer help to the tourists by various methods is meant.

In the Zaporizhzhya region, as well as in the majority of other Ukrainian regions, there are special corresponding sub-units of local government for each of these functions. Experience of uncoordinated work of all these sub-units doesn't strengthen the tourist capacity of the city, but only interferes with its development. The idea of tourist clusters arose to combine efforts of different sub-units in order to create a single effective management system of tourist flows.

Let's examine this issue in a practical sense. For this purpose it is necessary to determine structures responsible for each system, which will further become subjects of a tourist cluster (fig. 1)

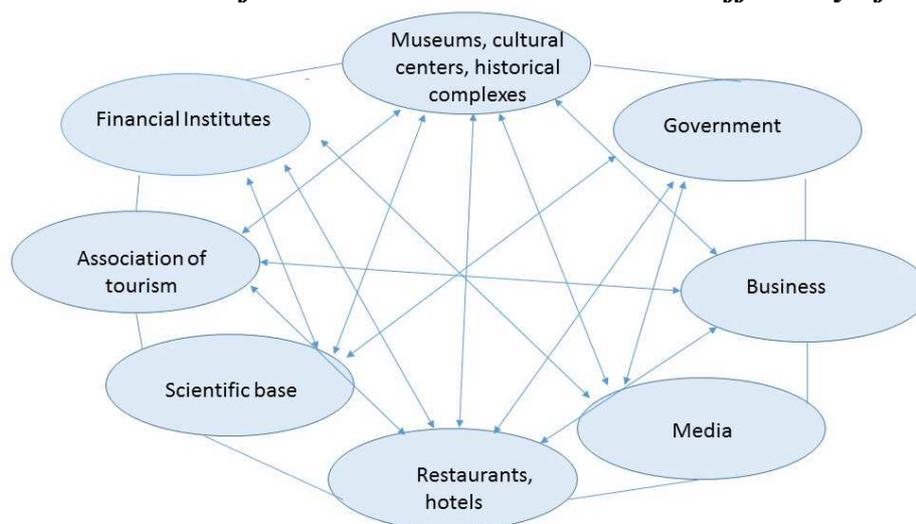
**Fig. 1: System of tourist cluster's subjects.**



*Source: authors development*

So each system, which is the basis of a single mechanism, has its own divisions, responsible for its functioning. Let us show schematically an example of interaction of some local structures in order to organize the effective work of a tourist industry in Zaporizhzhya (fig. 2.).

**Fig. 2: Interaction of structural divisions to increase efficiency of its work.**



*Source: authors development*

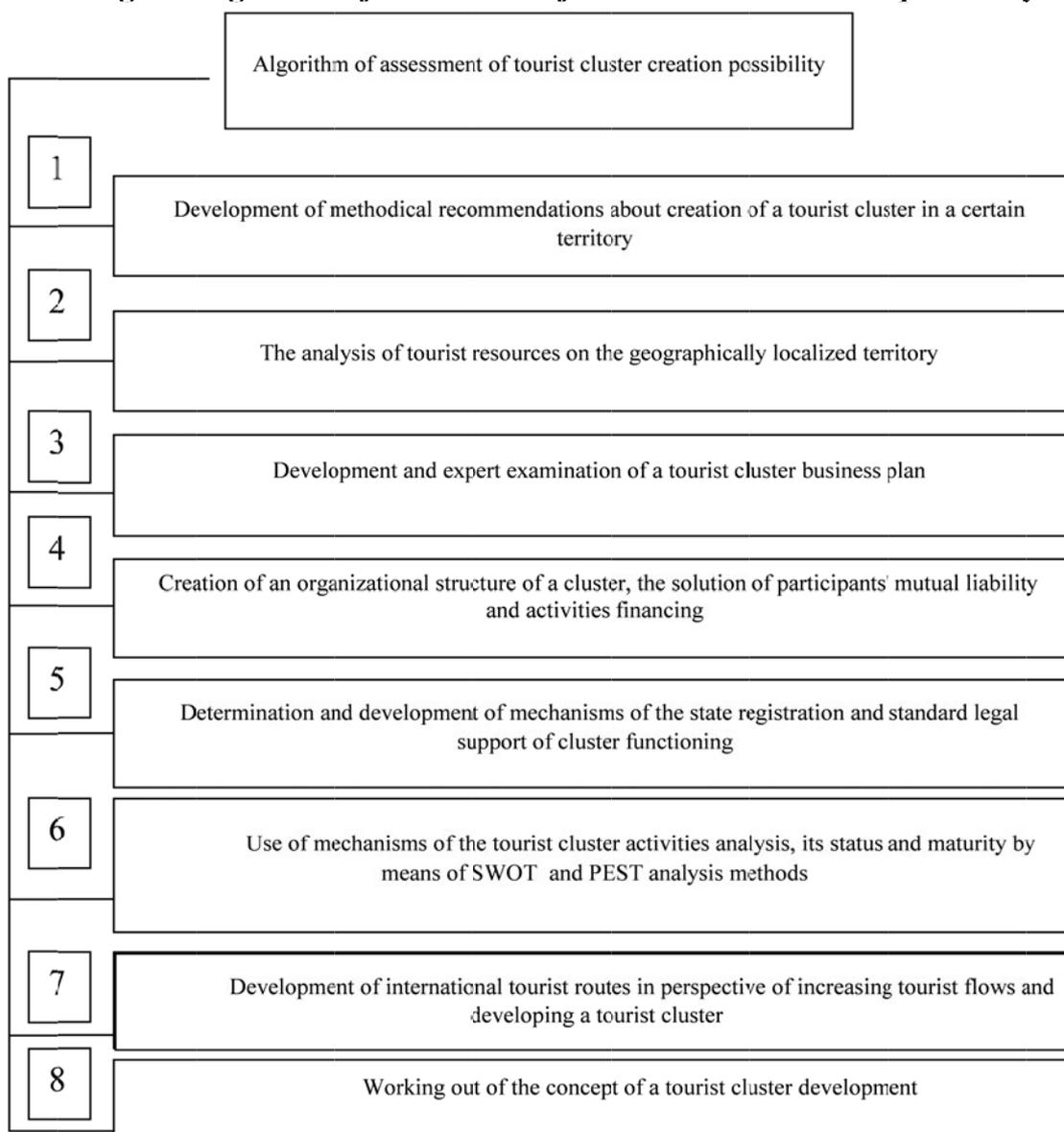
Considering the situation in Zaporizhzhya, it is possible to note the processes of partial clusterization. For example, the majority of travel companies have an opportunity to accept money of clients, to write out insurance policies, and also keep in contact with higher educational institutions, regarding search of a qualified personnel. Some historical complexes are already somewhat associated with restaurants, located in its territory. For example, the island Khortitsya with “Zaporizka Sich” and “Cossack Farmstead” restaurants. So the communication between business, financial institutions and universities, between historical complexes and restaurants has already showed the efficiency.

Signs of clusterization of participants are regarded in the vein of territorial, financial, marketing, technological, informational and resource communications and relations.

The tasks of tourist clusters economic research for domestic scientists are: identification of prerequisites of its creation, research of tourist territories potential, organizational bases and features of tourist clusters functioning, increase of their activities efficiency.

It's important to emphasize the following factors of tourist cluster creation: geographical closeness, presence of demand, formation of the general development strategy, hierarchical functional communications between participants. To decide if it is expedient to create a tourist cluster in a certain territory, we offer an algorithm of assessment of its creation possibility (fig. 3).

**Fig. 3: Algorithm of assessment of tourist cluster creation possibility.**



*Source: authors development*

Assessment of tourist cluster creation possibility in a certain territory provides the accomplishment of consecutive actions (fig. 3):

1. **Development of methodical recommendations about creation of a tourist cluster in a certain territory** assumes a formation and generalization of stages of tourist cluster creation- the characteristics and amendments of organizational, financial, personnel, marketing, information and technological matters of creation a unit; inter-consistency of its activity.
2. **The analysis of tourist resources on the geographically localized territory** assumes a research and the characteristic of the nature-climatic, healthcare, historical, cultural, cognitive and social resources localized in a certain territory.
3. **Development and expert examination of a tourist cluster business plan** assumes the technical and economic statement of tourist cluster activity and the program of its future activities. The business plan of a tourist cluster should have the description of future activities (reasons for tourist cluster creation, the connection of future

activities with social and ecological systems of a certain territory, the description of participants and characteristic benefits of future business activity "product"), a research of the tourist market of products and services (the characteristic of competitors and the characteristic of features and benefits of an own new "product", technological features of activities), the description of marketing actions (pricing system for participants of a cluster, presence of the "contractual" prices, application of different types of advertising, "public relation", the description of conditions of expansion in foreign economic activity and other measures of demand stimulation for services of a tourist cluster in particular), financial and economic reasons for activities (occupation of rooms during the seasons, calculation of a staff number, requirements to the staff, providing logistics, vehicles and food, type of a cooperation between suppliers and buyers, possibility of using national complementary products, the forecast of total costs, fixed assets, capital construction, control of tourist product quality and service), assessment and risks insurance.

4. **Creation of an organizational structure of a cluster, the solution of participants' mutual liability and activities financing** provides determination of the ways of cluster's management, responsibility (including material), calculations of personnel need . An obligatory element at this stage is determination of responsible personnel for formation and functioning of a tourist cluster, the description of horizontal and vertical communications. Financing of cluster creation can happen in the vein of investments attraction, the state assignments, crediting and means of legal and physical individuals.
5. **Determination and development of mechanisms of the state registration and standard legal support of cluster functioning.** Nowadays in Ukraine the cluster is registered through approval of the charter of its activity by bodies of regional council. In practical sense there weren't developed any mechanisms of cluster creation stimulation on the national level (for example, the mechanism of the preferential taxation, the state subsidizing, creating favorable conditions for investment, including foreign, standard legal support of activities with taking into account requirements of international law). Fixing of cluster policy of tourism development for a long-term outlook allowed to stimulate creation of the similar geographically localized cooperation of the entities of various industries united by a single purpose - production and sale of a joint product.
6. **Use of mechanisms of the tourist cluster activities analysis, its status and maturity by means of SWOT and PEST analysis methods.** Tourist cluster activities require periodic controlling and analysis to improve its activity. Since scientists consider the cluster management from the point of company's life cycle, the identification of cluster's life cycle stage, the description of threats and opportunities of its functioning are made by means of the analysis of its activities in the light of political, economic, social, technological, demographic, legal, ecological (natural),\_ethnic and cultural factors of the macroenvironment. The analysis of branch tendencies is connected with strategic control and prognostication, development of achievement plans, development of plans and methods of goals achievement. An important component of the macro - and the micro environments analysis is the analysis of competitors.
7. **Development of international tourist routes in perspective of increasing tourist flows and developing a tourist cluster.** Gain of the international tourism, increase of foreign citizens arrivals - are indicators of foreign economic activity and the

strengthening factors of a macroeconomic situation in the country (improvement of payments balance, increase in influx of foreign currency, increase in revenues of city and state budgets indirectly, through taxes). Switching on of a tourist cluster to an integrated tourist route through several countries - is an important perspective of its development and confirmation of a tourist product output into the international tourist market.

8. **Working out of the concept of a tourist cluster development.** The concept of activities of a tourist cluster is a generalizing program document, in which conditions and program points are specified. Along with the charter of a cluster, participants of a cluster shall have the standard document of the concept, which is approved and reasonable for the special geographical territory taking into account specific conditions of tourist activities. The concept shall define the purpose of the task of creation of a tourist cluster, the production strategy of a cluster development, reasons for scientific and technological and educational activities, the strategy of financing of development of a cluster, the marketing strategy and the analysis of project risks.

Let us give the example of the sixth stage of the algorithm, when the advantages and disadvantages of tourist clusters functioning can be determined using the SWOT-analysis (Table 1)

**Tab. 1: SWOT-analysis of shortcomings and advantages of a tourism cluster**

<b>Strengths</b>	<b>Weaknesses</b>
<p>Increased requirements to transparency of business</p> <p>Control of foreign investments (their size, influence on the economic situation, question of property and use of the regional resources)</p> <p>Interdependence of activities of participants</p> <p>The expenses necessary for creation and functioning of the coordinating body</p> <p>Absence of legislative and regulatory basis concerning creation and functioning of tourist clusters</p> <p>Need of availability of sufficient amount and quality of technologies of informational support of economic activity</p> <p>Need of considerable financial resources for creation of a tourist cluster</p> <p>Political and military "intensity" in the region</p> <p>Demographic situation in the region and the country (decrease in birth rate, increase in death rate of the population, "aging" of the population, activation of migration processes)</p> <p>Macroeconomic tendencies in the country (increase in inflation, depreciation of national currency compared to foreign currencies, increase in level of the country external debt)</p>	<p>Synergetic effects</p> <p>Interested initiative participants</p> <p>Tax benefits</p> <p>Foreign capital</p> <p>Discussion of effective business model</p> <p>Increase in level of living of the population</p> <p>Increase in education of the training program</p> <p>Creation of a brand of the territory</p> <p>Joint marketing technologies</p> <p>Increase of the competitive</p> <p>Use of innovative methods</p> <p>Improvement of the service quality connected with tourism</p> <p>Holding actions: festivals, fairs</p> <p>Factor of removal of the regional social tension</p>
<b>Threatens</b>	<b>Opportunities</b>
<p>Political and military risks of doing business</p> <p>Low payback on the early stages</p> <p>Difficulty in finding investors</p> <p>The devaluation of the national currency</p> <p>Organizational complexity</p> <p>Inaction bureaucracy and local authorities</p>	<p>Creating conditions for transparent business</p> <p>The introduction of tax incentives for businesses</p> <p>Information management activities</p> <p>Advertising cluster as a spur of the area, region, country</p> <p>Creating a network cluster transboundary</p>

<p>The high level of shadow economy The loss of tourism market due to low tourist service</p>	<p>Creating a legal framework that would regulate legal relations between the participants of a cluster in accordance with the international law The growth of local revenues and state budgets The re-imaging of the region as a tourist, economic and innovation developed center Increasing the "flow" of foreign currency Increased employment in the region Increasing of population density Improving and developing of area's infrastructure The expansion of foreign economic activity by increasing the number of tourist flows from abroad Building a hotel chain The use of European standards of environmental protection The development of specific types of tourism that are in a limited supply</p>
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*Source: authors development*

## 4 Discussion

Analyzing results, it is necessary to mention, that this project has both shortcomings and threats, which in most cases are connected with the economic situation that had emerged in the country. If absolute transparency in transactions between partners is carried to shortcomings in Ukraine, then the European community sees in it only benefits and opportunities of new investments attraction. The given analysis showed anyway a large number of the tourist clusters opportunities, that the regions can have in case of their creation.

## Conclusion

Thus, relying upon the results of the given research, it is established that functioning of tourist clusters in the region is possible only on condition of the coordinated work of a row of the interconnected systems and their subdivisions (systems of tourist appeal, transport, servicing, quality control, insurance and personal security of tourists, system of tourist indexes and the explaining languages, as very important, systems of tourist infrastructure). Object of activities of a tourist cluster are the tourist resources that are localized territorially and organizationally consolidated in a single management system with conditions of involvement of organizational and industrial structures and associations of different forms of property. The developed algorithm of assessment of a possibility to create a tourist cluster allows to carry out the assessment of tourist potential of the territory by means of instruments of business planning, the system analysis, the economic analysis, SWOT and PEST analysis. A final "key" of evaluation stage is working out of the concept of development of a tourist cluster in a certain territory. Thus, the innovative orientation of tourist clusters functioning is the key lever in forming of regional policy in the field of tourism.

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# DECISION-MAKING OF THE INVESTMENT PORTFOLIO APPLYING INTERMARKET ANALYSIS

**Diana Cibulskienė, Martynas Brazauskas**

***Abstract:** The paper deals with the application possibilities of the intermarket analysis for the investment portfolio formation. The aim of this paper is to analyze how to adapt various financial market relations in order to assess the attraction of the different asset classes and taking into account it to form the investment portfolio. In the paper three different investment portfolio construction strategies have been analyzed. The first investment portfolio is formed from the decreasing financial markets, the second - from the rising financial markets, and the third portfolio includes all the financial markets. The study results showed that investing in equal proportions into stocks, bonds and commodities is more effective solution than investing in the market or in the reverse market. Including the currency into the basic portfolio has reduced the risk, but due to the declined returns the efficiency also decreased. The study results showed that the 'permanent portfolio' formation of the three asset classes is sufficiently effective in order to reduce investment portfolio risk and to achieve a reasonable return.*

*The document can be downloaded at <http://hdl.handle.net/10195/67923>.*

***Keywords:** Intermarket analysis, Financial markets, Stocks, Bonds, Commodities, Currencies.*

***JEL Classification:** G11, G15.*

## **Introduction**

The modern world is characterized by free movement of capital and labor, large dissemination of information, data sharing and processing capabilities. New technologies allow transferring and processing large amounts of information. Large information and data dissemination helps investors learn and quickly respond to various global events. Such dissemination of information increases the efficiency of the market, where investors immediately respond to all available information. Market efficiency developed by the information technologies encourages the relation strengthening between the different financial markets.

Financial markets are closely interrelated: analyzing the stock market it is important to take into account the trade market, and analyzing the bond market it is necessary to take into account the stock market. Meanwhile, all these market analyses are impossible without the currency market analysis. In order to assess the market situation and the relations between the different financial markets, intermarket analysis must be performed (Murphy, 1991).

With the development of the financial markets, the offered derivative instruments were improving, too, which, together with the exchange traded funds provide opportunities to split investment between the different countries or asset classes, without having to invest directly in the metals, raw materials, commodities or other physical assets. The broad investment diversification possibilities encourage searching for the efficient methods to help exploit the different financial markets interrelations.

The aim of this study is to assess the application opportunities of the intermarket analysis in the investment portfolio formation.

## 1 Statement of a problem

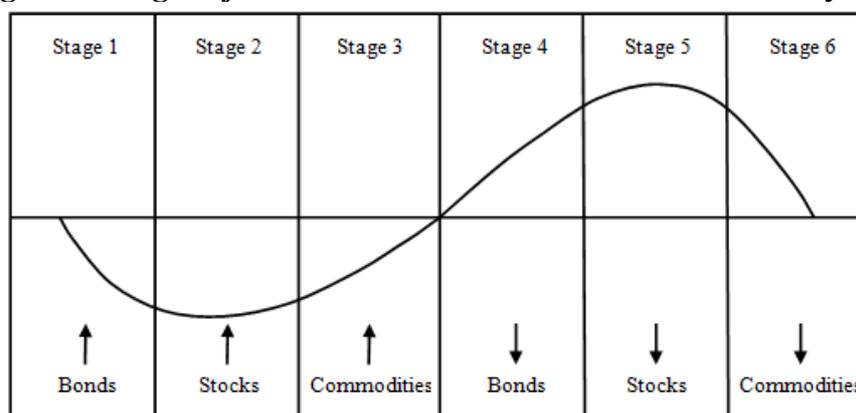
### 1.1 Intermarket analysis

Financial markets are characterized by the fact that the different phases of the business cycle reach the maximum return in the different asset classes. During the economic growth the largest return is generated by a risky asset class. During deflation the most profitable asset class is bonds. During recession the best asset class is money market instruments, while during inflation gold helps protect from the depreciation of money (Rowland, Lawson, 2012). In order to effectively manage the investment portfolio, according to the intermarket analysis, M. J. Pring(2016b) offered an ideal theoretical model of the business cycles, which was divided into six parts (see Fig. 1):

- Part 1 – bonds begin to rise (stocks and commodities are falling);
- Part 2 – stocks begin to rise (bonds continue to rise, commodities are falling);
- Part 3 – commodities begin to rise (all three markets are rising);
- Part 4 – bonds begin to fall (stocks and commodities continue to rise);
- Part 5 – stocks begin to fall (bonds continue to fall, commodities are rising);
- Part 6 – commodities begin to fall (all three markets are falling).

In each part the change in one of the three asset classes is taking place – in stocks, bonds or commodities.

**Fig. 1: Changes of the Financial Markets in the Business Cycles.**



Source: Pring (2016a)

During recession, interest rates and inflation reduce resulting the growth in bond prices. Bond prices rise and the business cycle reaches the bottom, then the attractiveness of shares increases. When economics begins to grow, it is necessary to protect from inflation and then it is invested in gold. Growing inflationary pressure increases the demand for various commodities, prices and interest rates. When the interest rates are increasing, it is important to reduce the bond part in the portfolio. When stock prices are approaching to the top, the whole value of the investments is advisable to be directed to the goods or other investment, protecting from inflation. When all the financial markets are falling, the safest investment is in money (Murphy, 1991).

The main intermarket analysis aspects are considered to be the business cycles and relations between the various financial markets. It will be discussed hereafter.

## **1.2 Financial markets relations**

The stock and bond markets are the largest in the world and attract the most attention from investors. These markets are also competing against each other. When the market is in an optimistic mood, investors prefer stocks. However, when pessimistic sentiment is dominated, more investment comes in bonds (Murphy, 2004). The stock and bond markets in economic recovery period are characterized by a negative correlation, though in the other stages of business cycle the stock and bond correlation is positive (Patoda, Jain, 2012). When uncertainty in the stock markets increases, the stock and bond markets have a very low or negative correlation, but lower uncertainty in the stock markets force the markets move in one direction. Considering this, the efficiency of asset allocation in the stock markets with uncertainty increases (Stivers, Sun, 2002).

Despite the fact that gold is recognized as an appropriate investment portfolio diversification tool, when the risk of recession in the financial markets increases, gold does not protect from the stock portfolio impairment (Chiang, Lin, Huang, 2013). Some commodities are characterized by the speculative phenomenon, when their correlation with the S&P 500 index increases with the growth in stock prices, while the bear market correlation decreases (Creti, Joëts, Mignon, 2012). Such correlation increase between the stock and commodity leads to greater volatility of the investment portfolio (Lombardi, Ravazzolo, 2013). In most cases in order to protect from inflation investors invest in gold or other commodities. However, on a positive long-term relationship between the stock market and commodity prices, it can be claimed that stocks are also a good asset class that helps protect against the inflation (Gregoriou, Kontonikas, 2010).

In order to reduce the portfolio impairment during the economic downturn and recession H. Browne proposed the 'Permanent Portfolio' strategy. This strategy diversifies the investment portfolio according to the four main phases of the economic cycle: prosperity, deflation, recession and inflation. The different asset classes bring the highest return in the different phases of the economic cycle. During prosperity the risky asset classes generate the largest return. During deflation the most profitable asset class is bonds. In recession the best asset class is money market instruments, while during inflation gold helps protect from the depreciation of money, so it is proposed to devote 25 percent of portfolio weight to all four asset classes (Rowland, Lawson, 2012).

The bond market is an important part of the intermarket analysis. The trend of the interest rates provides the information about inflation, stock market, current stage of the business cycle and the economic situation. The bond prices are the leading indicator that shows changes in the business cycle. However, the bond prices warn about the potential changes in the business cycle on average before 17 months (Murphy, 1991). It is important to emphasize that the bond return during recession is higher than during the growth period (Boyd, Mercer, 2010).

The dollar value changes impact on the US stock and bond markets. However, these markets are exposed by the US dollar through the commodity market. The US dollar has an impact on the commodity market, and the commodity market changes have an impact on the bond market, which in turn affects the stock market. Thus, the main link to the full range of the four financial markets is a relation between commodities and bonds (Murphy, 1991).

When the commodity prices are rising, the US dollar value is falling. However, along with the commodity prices the foreign currency values are rising, too (Murphy, 2004). In the developing countries the currency rates determine the crude oil prices, but gold is least affected by the currency rate fluctuation (Fahami, Haris, Mutalib, 2014). Oil prices in one-day period help forecast the currency exchange rate changes in the country in respect of the dollar value (Ferraro, Rogoff, Rossi, 2015). A negative correlation between gold and the US dollar results a positive correlation between gold and currencies, whose correlation with the US dollar is negative (Laïdi, 2009).

### 1.3 Business cycles and financial markets

Business cycles are closely related to the financial markets. The economic growth and contraction periods defined the limits, which explained the basis of the relations between stock, bond and commodity markets (Murphy, 2004). Also macroeconomic indicators are strongly related to a company's financial performance. Understanding the relations between these indicators can help predict how the companies' financial indicators will move when the economic situation in the country is changing (Stundžienė, Bliėkienė, 2012). Corporate stock prices are dependent on the financial indicators, market sentiments, investor attitudes and other factors. The relation between the macro-economic indicators and corporate financial indicators promotes to assess the impact of business cycles on stock prices before investing.

**Tab. 1: Financial market indicators in different stages of business cycle**

	Beginning of the cycle	Mid-cycle	End of the cycle	Recession
EPS ratios	Improving trend	Improving trend	Falling trend	Falling trend
Corporate margins	High	Peaking	Declining	Low
Credit spreads	Wide, contracting	Tight, stable	Tight, widening	Wide, unstable
M&A activity	Low	Moderate	High	No
Yield curve	Rates low, steep curve	Begin to rise, flat curve	Peaking, flat curve	Falling, steep curve
Volatility	High volatility, skew is falling	Low volatility, low skew	Volatility and skew are increasing	High volatility and high skew

*Source: Bilton et al. (2015)*

At the beginning of the business cycle there is a large and growing profitability of enterprises, the enterprises are valued relatively cheap in the market, the bond profitability is low, however, due to the higher corporate risk, the creditspreads between government bonds and non-government bonds is wide but tends to narrow down. In the middle of the business cycle corporate profitability and stock prices continue to grow, government bond interest rates start rising, resulting a small creditspreads, and the market is in peace, which is indicated by low volatility. At the end of the business cycle market volatility rises, corporate profitability and their value in the market start to decrease. Due to the increased risk the interest rates of corporate bonds start to increase, resulting the increasing credit spreads. At the end of the business cycle the activity in mergers and acquisitions reaches the maximum in the market. During recession the market volatility continues to increase, the corporate margins reach the minimum value, and stock prices continue to fall. Bond profitability begins to decline, and the creditspreads is increasing.

## 2 Methods

To carry out the intermarket analysis the relative correlations of different markets are applied. The relative graphs allow assessing the various financial market relations, their strengths and weaknesses, and the direction changes (Murphy, 2004). Table 2 provides the market relations and preliminary assessment according to J. J. Murphy (1991).

**Tab. 2: Intermarket bonds**

Relation	Assessment
Bonds / Stocks	When the ratio rises, bonds are purchased; when it falls, stocks are obtained.
Commodities / Stocks	When the ratio rises, commodities are purchased; when it falls, stocks are obtained.
Stocks / Currency	When the ratio rises, stocks are purchased; when it falls, currency is obtained.
Commodities / Bonds	When the ratio rises, commodities are purchased; when it falls, bonds are obtained.
Bonds / Currency	When the ratio rises, bonds are purchased; when it falls, currency is obtained.
Commodities / Currency	When the ratio rises, commodities are purchased; when it falls, currency is obtained.

*Source: created by the authors*

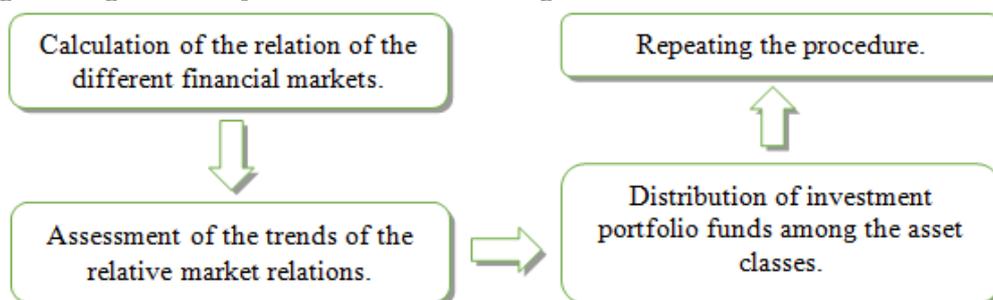
The movement of the securities prices is characterized by three trends: the rising direction, declining trend and consolidation. The market with direction provides the greatest opportunities to make profit. In order to exploit market movements a variety of strategies can be applied, but this study will seek to exploit the resulting market attractiveness and momentum. Momentum is assigned to the market trend indicator. The use of this methodology is quite simple, that is the investment is made in those securities, which prices tend to grow (Macijauskas, 2015). Falling stock prices increase their attractiveness. Undue decreased securities become more attractive, compared to the historical data and ratios. Such irrationality of the market and investment in relatively more attractive and cheaper assets help earn a higher return than the market's return (Brazauskas, 2014). Market movement direction  $I(t)$  is calculated by the following formula:

$$I(t) = \frac{P(t) - P_{(t-1)}}{P_{(t-1)}}$$

$P$  – ratio value at a given point of time.

Investment portfolios will be formed according to the following two strategies. To assess the market trend the ratios of the different markets are used.

**Fig. 2: Algorithm of the decision-making based on the intermarket analysis**



*Source: created by the authors*

The first step in the formation of the investment portfolio based on the intermarket analysis is calculation of the relation of the different financial markets. Relative financial market relations are calculated using two different markets rates.

The second step is to assess the trends of the relative market relations. The decision to include a particular class of assets in the portfolio is made considering the analyzed asset class relationships and trends with other asset classes (see Table 3).

**Tab. 3: Criteria of the assessment of the financial market attractiveness**

<b>Stocks</b>	<b>Bonds</b>	<b>Commodities</b>	<b>Currencies</b>
Bonds / Stocks	Bonds / Stocks	Commodities / Stocks	Stocks / Currencies
Commodities / Stocks	Commodities / Bonds	Commodities / Bonds	Bonds / Currencies
Stocks / Currencies	Bonds / Currencies	Commodities / Currencies	Commodities / Currencies

*Source: created by the authors*

According to the selected asset management strategy, within the stipulated time period, the procedure is repeated again (the fourth step). During the study, the composition of the investment portfolio is reviewed every year. During the period  $t$  the asset class weights are determined according to the ratio results of the  $t-1$  period.

The results of the investment portfolio are evaluated using a variety of quantitative methods: symmetric methods, tail risk assessing methods, downside risk assessing methods, downside risk assessing methods, risk-adjusted methods.

Annual investment growth rate is calculated by the following formula:

$$CAGR = \left( \frac{EV}{BV} \right)^{\frac{1}{n}} - 1 \quad (1)$$

$EV$  – investment value at the end of the period,  $BV$  – investment value at the beginning of the period,  $n$  – number of periods.

Standard deviation is calculated by the following formula:

$$\sigma_i = \sqrt{\frac{\sum_{i=1}^n (r_i - \mu)^2}{n}} \quad (2)$$

$r_i$  - return within a certain period of time,  $\mu$  - the average returns within a certain period of time.

Variation is calculated as the proportion of the standard deviation of the average return:

$$V = \frac{\sigma}{\mu} \quad (3)$$

Index tracking error is a statistical measure of risk, which shows the average dissemination of the investment portfolio return and the benchmark index return difference (Vardharaj, Fabozzi, Jones, 2004):

$$TE = \sigma_{(r_i - r_m)} \quad (4)$$

Index tracking error assesses the probability if the investment portfolio return is higher or lower than the market's return.

The data of the financial market is distributed outside the normal distribution, therefore to assess the tail risks the Cornish-Fisher value at risk improved methodology is applied,

where the VaR methodology calculation includes kurtosis and asymmetry assessment (Eling, Schuhmacher, 2006).

$$MVaR = \mu + z_{CF}\sigma \quad (5)$$

$$z_{CF} = z_c + \frac{(z_c^2 - 1)Skew}{6} + \frac{(z_c^3 - 3z_c)Kurt}{24} - \frac{(2z_c^3 - 5z_c)Skew^2}{36} \quad (6)$$

To evaluate the investment fund efficiency W. Sharpe (1966) proposed a ratio, which evaluates both return and risk. Sharpe ratio evaluates the additional return per risk per unit:

$$SR = \frac{\mu - r_f}{\sigma} \quad (7)$$

Sortino ratio is calculated by the following formula (Sortino, Van Der Meer, 1991):

$$S = \frac{\mu - \tau}{\sigma_n} \quad (8)$$

$\tau$  – the minimum acceptable return rate. In this study the minimum acceptable return rate corresponds to the risk-free interest rate.

Calmar ratio assesses the additional return per unit of maximum drawdown (Young, 1991):

$$CR = \frac{\mu - r_f}{D_{\max}} \quad (9)$$

$D_{\max}$  – the largest decline of the investment portfolio value over a certain period of time.

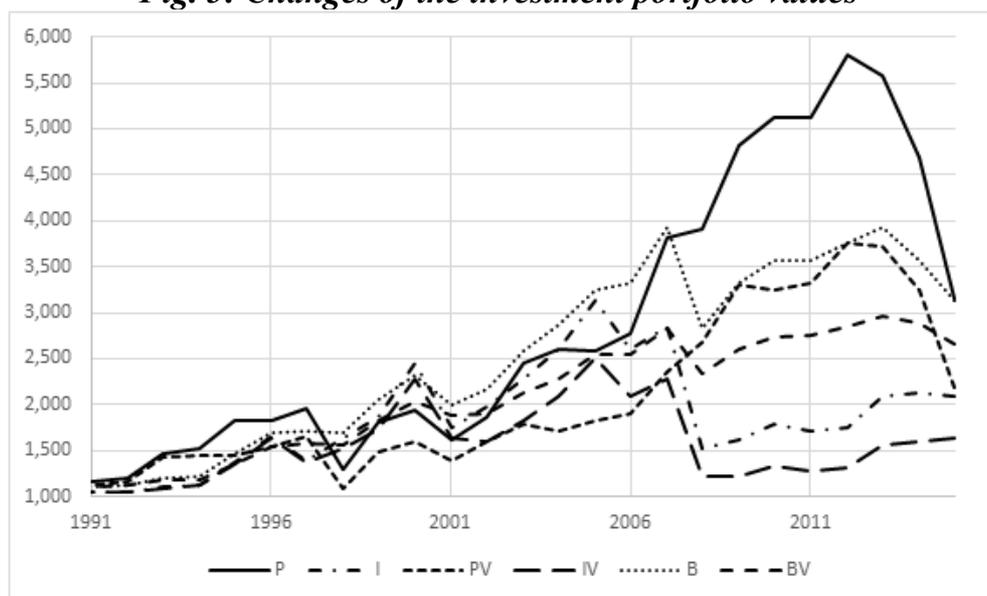
Information ratio expresses the average portfolio return above the benchmark return over a given period of time, divided from the differential return standard deviation (Dzikevičius, 2004):

$$IR_i = \frac{\mu - r_m}{\sigma_{(r_i - r_m)}} \quad (10)$$

### 3 Problem solving

The efficiency of the investment strategy is evaluated comparing the investment portfolios constructed according to the different strategies. In the study six different investment portfolios were made up. The momentum strategy was tested through the investment portfolio of the three major asset classes (I) and additionally including the US dollar index (IV). The investment portfolios based on the strategy of market attractiveness were made using three major asset classes (P), and additionally including the US dollar index (PV). For comparison, the basic investment portfolios were constructed with all markets with the same weights. B's investment portfolio consisted of the three main asset classes and BV's investment portfolio consisted of all four major asset classes. Considering the fact that the US dollar index reflects the cash value, it can be claimed that this portfolio was composed according to H. Browne's proposed 'Permanent Portfolio' strategy, where the investment is made into four asset classes in equal parts.

**Fig. 3: Changes of the investment portfolio values**



Source: made by the authors, MSCI, Bloomberg, Fusion Media Ltd.

At the beginning of the period (January 1st, 1991) the investment portfolio values were equivalent to 1. At the end of the period (December 31st, 2015) the highest value was found in the investment portfolio composed using the attractiveness strategy, but excluding the DXY index (P). The value of the investment portfolio rose to 3.152. A bit behind was the basic investment portfolio (B), which value increased to 3.126. The lowest return was obtained in the investment portfolios composed using the momentum strategy (I, IV), where the values increased to 2.086 and 1.627. Regardless of the chosen strategy, the involvement of the US dollar into the investment portfolio decreased the investment portfolio returns.

Figure3 shows that the results of the composed investment portfolios were different during the financial crisis period. All the formed portfolios suffered losses in 2001. The largest losses were found in the investment portfolios set up applying the momentum strategy. In 2002 recession in the stock market the most values of the investment portfolio were increasing, with the exception of the IV investment portfolio. The value of this portfolio was decreased by the falling US dollar. During the 2008 decline in the stock and commodity markets the investment portfolios based on the attractiveness strategy obtained positive returns, while all the other investment portfolios suffered losses. The largest losses were found in the investment portfolios formed using the momentum strategy. Their value fell to 46.70 per cent (see Table 5).

**Tab. 5: Assessment criteria of the investment portfolio efficiency**

	P	I	PV	IV	B	BV
CAGR (%)	4.70	2.98	3.17	1.97	4.66	3.99
Standard deviation (%)	18.31	17.11	16.00	16.87	11.84	8.08
Downside standard deviation (%)	14.989	16.259	13.578	15.373	9.858	6.065
VaR (%)	38.68	23.99	30.63	24.96	21.81	17.26
Maximum drawdown (%)	-34.02	-46.70	-34.02	-46.70	-27.93	-17.24
Coefficient of variation	2.88	3.70	3.58	4.75	2.21	1.88
Sharpe ratio	0.168	0.079	0.075	0.017	0.177	0.128
Sortinoratio	0.206	0.083	0.089	0.019	0.213	0.170
Calmar ratio	0.091	0.029	0.035	0.006	0.075	0.060
Information ratio	0.073	-0.069	0.013	-0.063		
Tracking error (%)	13.47	10.73	13.72	11.78		

Source: made by the authors, MSCI, Bloomberg, Fusion Media Ltd.

During the analyzed period the highest annual growth rate was found in a basic portfolio and the investment portfolio based on the market attractiveness, excluding the US dollar index. Depending on the assessment methodology, the risk of the other investment portfolios was different. The biggest symmetric risk and tail risk were distinguished in the investment portfolio based on the attractiveness strategy, excluding the currencies. The largest asymmetric risk was noted in the investment portfolio, which was formed according to the momentum strategy, excluding the currencies. In terms of risk and return ratio, the maximum efficiency was observed in the basic investment portfolios.

The investment portfolio performance was assessed using Sharpe, Sortino and Calmar ratios. According to these ratios the most efficient portfolios are basic and based on the market attractiveness, excluding the US dollar index. In terms of these relative criteria, the application of the momentum strategy was the least efficient. According to the information ratio and tracking error criterion the market attractiveness strategy is more effective than the momentum strategy, therefore, applying this strategy higher returns can be expected.

Summing up the results it can be claimed that the investment in equities, bonds and commodities in equal proportions is more effective solution than the investment in the market or in the reverse market. Including currency into the basic portfolio has reduced the risk, but due to the declined returns the efficiency also decreased. The results of the research show that the formation of the 'permanent portfolio' from the three asset classes is sufficiently effective in order to reduce the investment portfolio risk and to achieve a reasonable return.

#### **4 Discussion**

To perform the intermarket analysis financial market relations have been used. These relations are evaluated using the historical price fluctuations in the asset classes. Therefore, the technical analysis is most commonly applied together with the intermarket analysis (Murphy, 1991; Murphy 2004). The analysis of the financial market relations assesses the price divergence, convergence or other monitored indicators, which help to evaluate the potential price movement. Nevertheless, two strategies were selected to join the intermarket analysis with the strategies observing the market. A sufficient number of the empirical studies were carried on, what justifies that market trends help to achieve a higher return (Macijauskas, 2015). In the market there are the actives, which are unreasonably underestimated (Brazauskas, 2014), and this feature determines the application of the attraction strategy.

According to the survey results, it can be stated that none of the selected strategy were successful, and the results were worse than the results of the basal portfolio. This could be determined by an inappropriate choice of the portfolio formation period, because the study was carried out for one-year period of the investment portfolio formation. L. Macijauskas(2015) used monthly data in the application of the asset allocation and sliding averages, which helped him achieve higher returns than the comparable portfolios. Meanwhile, J. Murphy (1991; 2004) did not define the periods assessing the intermarket analysis, where he applied the indefinite periods. Thus, it can be stated that the usage of the annual data does not allow to assess the sudden and large market movements - changes, so does not have an effective use of the intermarket analysis options.

For the further development and analysis in this research field it is important to take into account the evident weaknesses. An improper selection of the analyzed period increases the

risk to miss the particular moment when the financial markets become relatively cheap compared to the other financial markets.

## Conclusion

Financial markets are closely related. When investing in stocks, it is important to take into account the commodity market, and investing in bonds, it is important to take into account the shares, while investing in any financial market is necessary to deal with the currency market analysis.

Financial markets are not only closely related, but due to the different relations, it is possible to achieve a positive return in the different economic cycle phases or to protect the investment portfolio from depreciation.

The results of the research have shown that investing in equities in equal proportions, bonds, commodities are more effective solution than investing in the market or in the reverse the market. The involvement of currency into the basic portfolio has reduced its risk, but due to the decreased returns the efficiency also fell down. 'Permanent portfolio' formation from the three asset classes is sufficiently effective in order to reduce the investment portfolio risk and to achieve a reasonable return. It is important to emphasize the fact that market tracking within the crisis periods resulted the greatest losses, and the formation of the investment portfolio in the 'reverse market' caused smaller losses or small profits. Investing in the cheaper financial markets allowed achieving the highest return, but due to the high volatility, this portfolio was not the most effective one.

The financial markets are linked with different strengths that depend on many factors. Therefore, it is important to continue analyzing the application possibilities of the financial markets relations in the investment portfolio formation and seeking for more effective solutions.

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# THE EFFECT OF M3 MONETARY AGGREGATES AND BANK LOANS ON THE ECONOMIC GROWTH OF COUNTRIES IN THE EUROZONE, THE USA AND JAPAN

Liběna Černohorská, Vojtěch Kula

**Abstract:** *This paper examines the influence of selected indicators of the banking sector (M3 monetary aggregates and bank loans provided to the non-financial private sector) on economic growth (GDP) in the Eurozone, the USA and Japan. Cointegration of these selected indicators of the banking sector has been demonstrated in relation to the development of GDP using the Engle - Granger cointegration test. These tests were applied to selected statistical data from the years 2000 to 2015. The first was to determine the optimum delay using Akaike criteria for all-time series analysed. Then the presence of a unit root was analysed using the Dickey - Fuller test. Based on the test results, time series were excluded which appear to be stationary. If the conditions were met, testing then continued with the Engle - Granger test to detect cointegration relations, which would determine a relationship between selected variables. Based on these tests, it was found that at a significance level of 0.05, no cointegration relationship exists between any of the time series in the countries surveyed.*

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**Keywords:** *Banking sector, Cointegration test, Economic growth, GDP, M3.*

**JEL Classification:** *E51, E47, C32.*

## Introduction

It is a well-known fact that there is a strong relationship between banking credit and economic activity. Hence, it is a reasonable question whether credit data can be used in nowcasting GDP growth. It is important for policymakers to make ontime decisions with the most available data and nowcasting is an important tool when policies in question are needed to be made based on current figures. (Akcelik et al., 2013). An increased interest in the impact of bank lending on the development of an economy has been particularly evident in recent years as a result of the global financial crisis. The original cause of this crisis was the situation in the USA which itself was caused by an inability of different economic entities, particularly households, to repay excessively large loans. Therefore various authors have begun to pay attention to the influence of the size of loans on GDP development. The development of an economy is influenced by the banking sector stability and development level, especially given the fact that the economy financing greatly depends on the crediting activity. The financial turbulence surfaced in 2007, generated by the crediting activity, with an excessive risk, towards the applicants with a precarious credit history, that could not have fulfilled the terms for the granting of a standard mortgage credit, and by the complex financial products, have convinced many economists to study the manner by which the economy may be put back on track. However, the trust of investors and banks within the economy did not return and we entered an actual crediting and economy growth vicious circle. The amplitude of this vicious circle depends on both the

causality relation established between the crediting activity and the economic growth, which may be unidirectional or mutual, as well as its intensity. (Armeanu et al., 2015)

Defining the monetary (currency) units, their structure and the dynamics of development provides valuable information necessary for implementing monetary policy. The central banks therefore monitor the links between monetary aggregates and inflation, monetary aggregates and interest rates, and monetary aggregates and GDP (Polouček, 2009). Central banks work with monetary aggregates and at the same time, define them as well. Using these aggregates, they influence the amount of money in the national economies. Monetary aggregates are funds which differ in their degree of liquidity. Monetary aggregates are generally indicated with a capital letter M and the numbers 1 to 3. The lower the number, the greater the liquidity of the monetary aggregate. A monetary aggregate of a higher level encompasses the entire previous monetary aggregate plus another asset which is less liquid. The European Central Bank (ECB) defines monetary aggregates as “narrow” (M1), “intermediate” (M2) and “broad” (M3). “Narrow” aggregates, M1, consist of the most liquid assets; i.e., including currency in circulation (banknotes and coins), as well as balances that can immediately be converted into cash or used for cashless payments (such as overnight deposits). “Intermediate” aggregates, M2, include “narrow” money (M1) plus deposits with an agreed maturity of up to 2 years, and deposits redeemable at notice of up to three months. “Broad” money, M3, comprises M2 along with marketable instruments issued by the Monetary Financial Institution sector. (European Central Bank, 2009). Due to exhaustion of the interest rate channel by central banks, attention of central banks shifted from the conventional monetary policy to unconventional monetary policy. Loose monetary policy, quantitative easing and other programs for purchase of assets were adopted by central banks under exceptional conditions. Central banks stimulated the economic growth, decreased unemployment, supported bank systems by adopting unconventional monetary loosening and increased investments of economic subjects by pumping money into the economy. (Černohorský and Kněžáčková, 2013)

The aim of this paper is to examine the influence of selected indicators of the banking sector (M3 and bank loans provided to the non-financial private sector) on economic growth (GDP) in the Eurozone, the USA and Japan. Among the selected indicators of the banking sector, a time series of bank loans provided to the non-financial private sector and the time series of the M3 monetary aggregate were chosen. Any cointegration of these economic variables has been demonstrated in relation to the development of GDP using the Engle - Granger cointegration test. These tests were applied to selected statistical data from the years 2000 to 2015. The input data are quarterly in nature and are adjusted for seasonal influences. The relationship sought with macroeconomic variables can be defined on the basis of the output of the test.

This paper consists of the following sections: In Section 1, the authors present a review of the literature related to economic growth and the impact of the banking sector on economic growth. Section 2 presents a theoretical basis for the implementation of the Engle - Granger cointegration test. Section 3 contains an analysis of selected indicators of the banking sector on economic growth in the Eurozone, the USA and Japan, using the Engle - Granger cointegration test. In Section 4, the authors present their findings.

## **1 Statement of a problem**

Many authors have devoted themselves to understanding how the banking sector (banks) can affect the economic growth of individual countries in their international research work.

Based on this research, it can be said that for the economic growth of individual countries (development of GDP), an important indicator from the banking sector appears to be the size of the loans provided. Based on research by Levine (1999) and Beck et al. (2000), or Levine et al. (2000), it may be further noted that only loans to the private sector will better explain economic growth.

Takats and Upper (2013) observed the effect of bank loans on economic growth in the period following the financial crisis. The analysis included data from 39 financial crises which preceded credit booms. During these crises, the progress of bank loans (either in real terms or in relation to GDP) did not correlate to economic growth over the period of several years after economic recovery.

Even in the past, models were analysed focusing on the relationship between monetary aggregates and GDP. At the beginning of the 1980s, the US Federal Reserve relied on the M1 aggregate in their estimates of GDP growth and inflation. However, the Federal Reserve later gravitated in their analyses towards the broader monetary aggregates M2 and M3 in predicting GDP and inflation. However, since the 1990s, these aggregates have also become less reliable, which has been associated with the deregulation of the financial system in the USA. Through the use of the VAR models, they estimated well the relationship of monetary aggregates and GDP, but also failed to predict inflation. (Jílek, 2013).

The study by Feldstein and Stock (1994) explored the possibility of using M2 in influencing the nominal GDP in the USA. A simple VAR optimisation model reduces the average standard ten-year deviation of annual GDP growth by more than 20 percent. These statistical tests show that the regulating the growth of M2 aggregates can result in a significant reduction in the volatility of GDP growth. Liang (2011) analysed the relationship between money supply (represented by the monetary aggregate M2) and economic growth (GDP) in the USA. He concluded that the time lag in the changes in GDP is caused by changes in the M2 aggregate and via simultaneous equations can predict the future change in GDP through corresponding changes in the M2 aggregate.

Among the first authors whose results did not confirm a positive relationship between money supply and real GDP include Fisher and Seater (1993). These authors used new econometric methods and concluded that the positive relation between the observed values in the case of the US fails. Over time, studies were formed where analyses were conducted for several countries simultaneously, attempting to generalise the results and thus confirm the relationship of the amount of money in the economy and GDP. Among the first to confirm a positive relationship was Weber (1994), who conducted an analysis of the G7 countries, while using various definitions of monetary aggregates for testing the robustness of the results. Conclusions in agreement with Weber (1994) were also provided by McCandless and Weber (1995), who of course did not find a statistically significant relationship between the rate of growth of the money supply and real output, even for any one of the three accepted definitions of money in 110 countries. Positive relationships can be found only for some of the 21 countries belonging to the OECD.

Based on this research, we can say that the volume of loans appears to be a significant indicator of the economic growth of individual countries (GDP development) from the banking sector. Based on research by Levine (1999) and Beck et al. (2000), or Levine et al. (2000), it may be further noted that economic growth can better be explained only through loans provided to the private sector. Based on a literature search, an appropriate relationship then appears to be that of M3 values (i.e., the main indicators of the volume of money in the

economy) and GDP. This relationship has also been previously analysed by such authors as Weber (1994) and King and Levine (1993). These authors have confirmed that using this indicator can explain economic growth in more than 80 countries.

## 2 Methods

The analysis of experimental data that have been observed at different points in time leads to new and unique problems in statistical modelling and inference. The impact of time series analysis on scientific applications can be partially documented by producing an abbreviated listing of the diverse fields in which important time series problems may arise (e.g. economics, stock markets, environmental sciences or medicine). (Shumway and Stoffer, 2010)

Granger and Engle (1991) recent developments in the field of cointegration, which links long run components of a pair or of a group of series. It can then be used to discuss some types of equilibrium and to introduce them into time-series models in a fairly uncontroversial way. The idea was introduced in the early 1980s and has generated much interest since then amongst econometricians and macroeconomists. In light of the paper's objective, the concept of cointegration – dealt with primarily by the authors Granger and Engle (1987) – is used to investigate the how the indicators of loans provided by banks to the private non-financial sector and M3 affect GDP in the eurozone countries.

In an attempt to achieve up-to-date output, individual tests are conducted on quarterly data from the years 2000-2015 that have been seasonally adjusted. The data are derived from the Research Division of the Federal Reserve Bank of St. Louis (FRED) – data on gross domestic product at constant prices and the M3 monetary aggregate – and from the Bank for International Settlements (BIS) – data on the amount of bank loans provided to the private non-financial sector.

First, the time series that have been presented here are always tested for optimal lag length. This is done using the Akaike information criterion (AIC), when the best lag (used later in the subsequent tests) is always taken to be the lowest AIC value. The time lag between when a macroeconomic shock or other adverse condition is recognized by central banks and the government, and when a corrective action is put into place. The response lag may be short or long, depending on whether policy makers have a definite course of action or must deliberate on the right action to take. (Mankiw, 2014)

$$(M) = \ln\sigma^2 + 2M/T \tag{1}$$

The tests are conducted on the basis of the relationship of the values in (1), where M expresses the number of parameters,  $\ln\sigma^2$  denotes residual variance, and T is the number of observations (Arlt and Arltová, 2007).

Distinguishing between types of time series as stationary and non-stationary is very important when examining their relations, as the use of non-stationary time series could result in a situation which is referred to as apparent or senseless regression.

There are several statistical tests to determine the order of integration, known as unit root tests. Here we have employed the probably most widely used of them, which is known by the name of its creators, the Dickey-Fuller test (hereinafter referred to as the ADF test). This test then is used to analyse whether the time series is of type I (0) - stationary or I (1) - non-stationary.

The analysis was conducted in the Gretl 1.9.4 program for econometric analysis; this program makes it possible to conduct an augmented Dickey-Fuller test (ADF test) for this case. For more details, see Dickey and Fuller (1979).

Three versions of the ADF test are commonly used for verifying hypotheses – one with a constant, one without a constant, and one with both a constant and a trend. When testing, we used the assumption that the process listed below (2), where we test that  $\phi=0$  (the variable contains a unit root), takes the following form (Arlt and Arltová, 2007):

$$\Delta X_t = (\phi - 1)X_{t-1} + \sum_{i=1}^p \alpha_i X_{t-i} + \epsilon_t \quad (2)$$

$X_t$  expresses the dependent variable,  $p$  lag, and  $\epsilon_t$  the residual term. Deciding on the stationarity – or the non-stationary – of a time series will be conducted by evaluating the  $p$  values (the level of significance is in this paper always set at 0.05), which thus establishes whether the null hypothesis is rejected or accepted with 95% probability. For this test, this is formulated as follows:

$H_0$ : the tested series are non-stationary (a unit root exists)

$H_1$ : the tested series are stationary (a unit root does not exist)

Since non-stationarity can be assumed for the series analysed, and the said apparent regression cannot arise when using a stationary time series (the type I (0) series), the option is offered here to remove it by differencing (stationing) individual analysed series. However, research carried out by authors such as Banerjee et al. (1993) have demonstrated that this path cannot proceed, because it will result in the loss of important information on long-term relationships between the properties of time series. For the analysis of unsteady relationships between series, the EG test (Engle and Granger, 1987), was therefore used, which is able to analyse cointegration of non-stationary time series according to the following hypotheses:

$H_0$ : Test series are not cointegrated

$H_1$ : Test series are cointegrated

Decisions on the relationship between time series are based on  $p$  values defined by the EG test. If the null hypothesis ( $p > 0.05$ ) is not rejected, the time series will be identified as non-cointegrated – thus, for series between which there is no long-term relationship, or for series which contain no common element and examining them as a system is irrelevant since they have developed over the long term independently. Otherwise (in cases where  $p < 0.05$ ) the time series will be identified as cointegrated; i.e., for series between which a long-term relationship can be demonstrated at a level of significance.

### **3 Influence of selected indicators of the banking sector on the economic growth of countries in the Eurozone, Japan**

The Engle-Granger cointegration test is used to test the causal relationship between the overall amount of loans provided by banks to the private non-financial sector and GDP and between the M3 monetary aggregate and GDP. Both the absolute values and year-to-year changes are tested for these values. If the deviation of the time series trends is only short-term (and disappear over time), then there is a limit beyond which the deviation cannot continue - it can then be stated that the time series are in equilibrium. The statistical expression of this condition is called a “cointegrated time series”. If there is no such limit, then it cannot be said that they are in equilibrium; thus statistically speaking, such a time

series cannot be said to be cointegrated. It is natural that when examining relationships between economic time series, mainly cointegrated series are of any interest, as only for these series can the nature of their relation be analysed. If the time series are not cointegrated, then for a long time they will not contain any common element and their investigation as a system can be regarded as irrelevant, as they have developed over the long term independently (Artl, 1997).

The time series used are listed for the period of all four quarters of the year 2000 up to all four quarters of the year 2015. The absolute values of GDP, seasonally adjusted, are listed in constant prices either for the year 2009 or 2010. Table 1 shows a description of the variables used.

**Tab. 1: Description of the variables used for bank loans and M3 in the selected banking sectors**

<b>Variable abbreviation</b>	<b>Description of variable</b>
GDPUSA	Time series of seasonally adjusted gross domestic product in the USA
$\Delta$ GDPUSA	Annual change in the time series of seasonally adjusted gross domestic product of the USA
BCUSA	Time series of total bank loans to the private non-financial sector of the USA
$\Delta$ BCUSA	Annual change in the time series of total bank loans to the private non-financial sector of the USA
GDPJAP	Time series of seasonally adjusted gross domestic product in Japan
$\Delta$ GDPJAP	The annual change in the time series of seasonally adjusted gross domestic product of Japan
BCJAP	Time series of total bank loans to the private non-financial sector of Japan
$\Delta$ BCJAP	Annual change in the time series of total bank loans to the private non-financial sector of Japan
GDPEUR	Time series seasonally adjusted gross domestic product of the Eurozone
$\Delta$ GDPEUR	The annual change in the time series of seasonally adjusted gross domestic product of the Eurozone
BCEUR	Time series of total bank loans to the private non-financial sector of the Eurozone
$\Delta$ BCEUR	Annual change in the time series of seasonally adjusted gross domestic product of the Eurozone
MUSA	Time series for M3 for the USA
$\Delta$ MUSA	Annual change in M3 for the USA
MJAP	Time series for M3 for Japan
$\Delta$ MJAP	Annual change in M3 for Japan
MEUR	Time series for M3 for the Eurozone
$\Delta$ MEUR	Annual change in M3 for the Eurozone

*Source: (Author's own work)*

### **3.1 Test for the Optimum Delay Series Using Akaike Criteria**

Before using the EG test, it is necessary to test the time series for optimal lag, where the dependent variable is the value of GDP, i.e.,  $\Delta$ GDP. Tables 2 and 3 list the values of the AIC criterion for 4 lag lengths (the lowest value is always shown in bold type). The optimal lag results determined that, according to the Akaike criterion's lowest values, a lag length of 2 always appears to be optimal for the absolute values of the dependent variable of GDP. The lag length is also 2 for the year-to-year changes of the listed values. This optimum delay corresponds to the economic theory. (Mankiw, 2014)

Furthermore, it is possible to state that the lowest AIC was achieved for absolute values in the Eurozone countries while including the constant. In the case of year-to-year changes, the lowest AIC value was likewise achieved when including the constant. Nonetheless, the length of the optimal lag is always the same in each test, even when the constants or trends of various AIC values are included.

In absolute values, the lowest were AIC were found in the USA with the inclusion of the trend; in Japan with the inclusion of a constant with the trend; and in the Eurozone with the inclusion of a constant (Table 2). In the event of annual changes, the lowest AIC values achieved were consistent for all countries with the inclusion of constants. However, although each test achieved the possible inclusion of constants or trends of different values of AIC, the optimum level of series delays has always been the same. Those results will be reflected in subsequent tests.

**Tab. 2: Results of optimum delay in the USA, Japan and the Eurozone for bank loans**

Order of delay	AIC for GDPUSA	AIC for $\Delta$ GDPUSA	AIC for GDPJAP	AIC for $\Delta$ GDPJAP	AIC for GDPEUR	AIC for $\Delta$ GDPEUR
-	Test with trend	Test with constant	Test with constant and trend	Test with constant	Test with constant	Test with constant
1	53.329719	2.592379	59.015445	4.003271	49.984407	2.822197
2	<b>53.291988</b>	<b>2.271509</b>	<b>58.897321</b>	3.713388	<b>49.688352</b>	<b>2.057152</b>
3	53.319015	2.293977	58.933717	<b>3.711705</b>	49.723992	2.086916
4	53.346715	2.324482	58.971440	3.732284	49.731454	2.114469

Source: (Author's own work based on the results of Gretl 1.9.4.)

The first test will be for the optimum delay of the time series. For absolute values of the selected variables, a second order delay again seems to be optimum. The same delay, except for Japan, seems best for variables in terms of annual changes. For Japan, the optimum delay seems to be a delay of the third series. In these tests, the lowest values were always achieved in tests involving a constant (Table 3). The results of this analysis will be reflected in further calculations.

**Tab. 3: Results of optimum delay the USA, Japan and the Eurozone for M3**

Order of delay	AIC for GDPUSA	AIC for $\Delta$ GDPUSA	AIC for GDPJAP	AIC for $\Delta$ GDPJAP	AIC for GDPEUR	AIC for $\Delta$ GDPEUR
-	Test with constant	Test with constant	Test with constant	Test with constant	Test with constant	Test with constant
1	53.474906	2.536159	58.987111	3.990218	49.862320	2.721023
2	<b>53.338622</b>	<b>2.268613</b>	<b>58.896527</b>	3.713008	<b>49.329968</b>	<b>2.132477</b>
3	53.339520	2.297858	58.934843	<b>3.711844</b>	49.369137	2.168949
4	53.376893	2.323283	58.967915	3.732458	49.403809	2.203680

Source: (Author's own work based on the results of Gretl 1.9.4.)

### 3.2 Verifying the Stationarity of the Time Series

Possible non-stationarity of data can lead to apparent regression; the difficulty with this lies mainly in the fact that using the least squares method would make it possible to obtain statistically significant parameter estimates of the regression function – even though the time series analysed do not relate to each other. For this reason, it is necessary to test the time series used here with the help of an augmented Dickey-Fuller test. The results of the ADF test for a unit root, in this case in the model with the constant, are shown in Table 4. The results of the ADF unit root test, in this case using a model with a constant and a trend

are shown in Table 4 (where all p values for each parameter of the variables analysed are displayed successively).

**Tab. 4: ADF test results for total loans provided by banks**

Variable abbreviation	Value of $p$ parameter	Evaluation of ADF test results	$H_0$ :
GDPUSA	0.928	Time series non-stationary	Not refused
BCUSA	0.504	Time series non-stationary	Not refused
GDPJAP	0.208	Time series non-stationary	Not refused
BCJAP	0.385	Time series non-stationary	Not refused
GDPEUR	0.451	Time series non-stationary	Not refused
BCEUR	0.333	Time series non-stationary	Not refused
$\Delta$ GDPUSA	<b>0.004</b>	<b>Time series stationary</b>	<b>Refused</b>
$\Delta$ BCUSA	0,630	Time series non-stationary	Not refused
$\Delta$ GDPJAP	0,142	Time series non-stationary	Not refused
$\Delta$ BCJAP	0,733	Time series non-stationary	Not refused
$\Delta$ GDPEUR	<b>0,002</b>	<b>Time series stationary</b>	<b>Refused</b>
$\Delta$ BCEUR	0,799	Time series non-stationary	Not refused

*Source: (Author's own work based on the results of Gretl 1.9.4.)*

As can be seen here, for time series with absolute values, all time series at a significance level of 0.05 were marked as non-stationary. For time series based on annual changes, only data coming from Japan were identified as non-stationarity. Time series of annual changes of GDP from the USA and the Eurozone indicate a significance level of stationarity.

In the subsequent ADF test (Table 5) including testing with a constant, again some series seem stationary. This is the time series of  $\Delta$ GDPUSA and  $\Delta$ GDPEUR. These series will again be excluded from the following cointegration analyses. Other series showed existence of a unit root at a significance level of 0.05.

**Tab. 5: Results of the ADF test for M3**

Variable abbreviation	Value of $p$ parameter	Evaluation of ADF test results	$H_0$ :
GDPUSA	0.904	Time series is non-stationary	Not refused
MUSA	0.999	Time series is non-stationary	Not refused
GDPJAP	0.430	Time series is non-stationary	Not refused
MJAP	0.999	Time series is non-stationary	Not refused
GDPEUR	0.451	Time series is non-stationary	Not refused
MEUR	0.364	Time series is non-stationary	Not refused
$\Delta$ GDPUSA	<b>0.004</b>	<b>Time series is stationary</b>	<b>Refused</b>
$\Delta$ MUSA	0.116	Time series is non-stationary	Not refused
$\Delta$ GDPJAP	0.142	Time series is non-stationary	Not refused
$\Delta$ MJAP	0.929	Time series is non-stationary	Not refused
$\Delta$ GDPEUR	<b>0.002</b>	<b>Time series is stationary</b>	<b>Refused</b>
$\Delta$ MEUR	0.734	Time series is non-stationary	Not refused

*Source: (Author's own work based on the results of Gretl 1.9.4.)*

### 3.3 Cointegration Analysis

The results of the cointegration analysis for the remaining time series of bank loans are shown in Tables 6 and 7. As can be seen, the  $p$  value of the parameter identified all pairs

of time series as non-integrated at a significance level of 0.05, thus for the series which have no relationship between them.

**Tab. 6: Results of the Engel - Granger cointegration test and ADF test for bank loans**

Variable abbreviation	P value	Length of delay	H <sub>0</sub> :	Conclusion
GDPUSA-BCUSA	0.512	2	Not refused	No cointegration
GDPJAP-BCJAP	0.352	2	Not refused	No cointegration
GDPEUR-BCEUR	0.274	2	Not refused	No cointegration
ΔGDPUSA-ΔBCUSA	Basic requirements for cointegration not met			
ΔGDPJAP-ΔBCJAP	0.3185	3	Not refused	No cointegration
ΔGDPEUR-ΔBCEUR	Basic requirements for cointegration not met			

*Source: (Author's own work based on the results of the data processed by Gretl 1.9.4.)*

On the basis of the Engel - Granger cointegration analysis, the same conclusions can be drawn for M3 as for the previous analysis, as testing all relationships showed non-cointegration at a significance level of 0.05 among the remaining pairs of time series.

**Tab. 7: Results of the Engel – Granger cointegration test and ADF test for M3**

Variable abbreviation	P value	Length of delay	H <sub>0</sub> :	Conclusion
GDPUSA-MUSA	0.724	2	Not refused	No cointegration
GDPJAP-MJAP	0.341	2	Not refused	No cointegration
GDPEUR-MEUR	0.382	2	Not refused	No cointegration
ΔGDPUSA-ΔMUSA	Basic requirements for cointegration not met			
ΔGDPJAP-ΔMJAP	0.3192	3	Not refused	No cointegration
ΔGDPEUR-ΔMEUR	Basic requirements for cointegration not met			

*Source: (Author's own work based on the results of the data processed by Gretl 1.9.4.)*

The time series monitored covers the period from 2000 to 2015. In this period, the global financial crisis gradated and unconventional monetary and fiscal policy tools were applied, in the Eurozone countries as well as others. The unconventional set of monetary policies was inspired from the experience of Japan's deflationary period. (Albu et al., 2014) ECB, Bank of Japan and the US Federal Reserve have applied quantitative easing as an unconventional tool of the central banks. The main essence of quantitative easing is the purchase of financial assets by the central bank from commercial banks or other private institutions. This step seeks to expand the monetary base. It can be noted that in this period no mutual long term relationship of these variables has been demonstrated. The reasons for the rejection of the hypothesis are specific conditions in selected banking systems – financial crisis and unconventional monetary policy, which is applied in case of non-standard development of economies.

#### 4 Discussion

The results of the analyses show that all tested time series are, according to the ADF test, non-stationary and it was necessary to adjust the time series by differentiation. Based on the Engle-Granger cointegration test, it may be noted that the time series are not cointegrated and there was no positive dependence of GDP development on the basis of developments in M3 and bank loans to the non-financial private sector. These findings are consistent with economic theory and the conclusions of Fisher and Seater (1993) and McCandless and Weber (1995). The Engle-Granger cointegration test does not confirm a statistically significant relationship between GDP and M3, or GDP and bank loans to the non-financial

private sector. Yet the relationship between the volume of bank loans to the non-financial private sector and GDP corresponds with the conclusions of the authors Takats and Upper (2013), who concluded that the development of bank loans has no effect on economic growth over several years after economic recovery.

In further research, it would be possible to focus on models that allow for the endogeneity of a variable. Such studies already exist, but they mostly deal with data from the USA (e.g., Liang, 2011 and Feldstein and Stock, 1994). It would be interesting to apply the same model to the Eurozone. Using these methods however requires a greater amount of observation and longer time series. This is difficult for the European Union, as the Eurozone was only established in 1999. As well, during this time, fundamental changes occurred, which the Eurozone was forced to confront. In the period under review, a global financial crisis occurred and in reaction to it, the European Central Bank had to accede to an unconventional monetary policy. This monetary policy included quantitative easing of money and setting negative interest rates. Both of these factors affected the M3 aggregate as well as the development of bank loans to the private non-financial sector.

## **Conclusion**

The relationship between the amount of bank loans to the non-financial private sector and GDP and the M3 aggregates to GDP should be emphasised that in the time period analysed, between 2000 and 2015. The course of the global financial crisis occupies fully one third of the time period in question. This may be the reason why a positive impact of the banking sector on the economic development of countries in the Eurozone, Japan and the USA could not be statistically confirmed. Data input into the analysis show strong growth in bank loans to the non-financial private sector and the M3 aggregates. Although there is obvious strong growth in the monitored data, GDP is almost unresponsive. After the global financial crisis the European Central Bank, the Bank of Japan and the US Federal Reserve were forced to cut their interest rates very close to zero; the financial systems did not stabilise and the economic situation in the Eurozone countries began to deteriorate sharply. Therefore, the ECB, the Bank of Japan and the Federal Reserve were forced to adopt this unconventional monetary policy in the form of quantitative easing of money for the purpose of monetary expansion (and thus growth of the M3 aggregates). The growth of loans in this period was aided by the low interest rates in the financial market set by the ECB, Bank of Japan and the Federal Reserve.

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# RISK ANALYSIS USING EXTENDED SAFMEA METHODOLOGY ON EXAMPLE OF INCUBATED COMPANIES

Petr Čížek

**Abstract:** *The paper examines the use of the Failure Modes and Effect Analysis (FMEA) methodology – in variant of statistical FMEA (SAFMEA) on the risk factors of incubated technological companies. Each risk factor were evaluated by mentors / management of chosen business incubators by using the Severity, Likelihood, Detection (conventional) and Influence of mentor (enhanced) parameters. The results are shown in different perspective – by using risk priority number (RPN) indexes, risk matrix and risk map. As the most significant risk factor was identified Funding issues - cash flow (followed by Customer acquisition issues and Funding issues – capital). However the results also show very high level of variance within the answers of the respondents. The paper also examines the impact of the enhanced nonconventional parameter (Influence of mentor) on the RPN index results where it was identified that some risk factors (such as Issues with business model) can be substantially reduced by the influence of the mentor / consultant.*

*The document can be downloaded at <http://hdl.handle.net/10195/67944>.*

**Keywords:** *FMEA, SAFMEA, Incubated companies, Business incubator, Risk analysis, Risk management.*

**JEL Classification:** *D81, M13.*

## Introduction

Risk management deals with identification, assessment and prioritization of risks and its main role is to minimize impact of the negative scenarios. The paper is trying to apply the SAFMEA risk analysis on the risk factors identified within business incubators. Firstly the FMEA (in variant of SAFMEA) methodology is described along with the explanation of business incubation process where risk analysis is performed. In the next part, the methodology of the research is showed followed by the results of the SAFMEA methodology. In the final part, the discussion and conclusions are settled.

## 1 Theoretical background

### 1.1 Failure Modes and Effect Analysis (FMEA)

Failure Modes and Effect Analysis (FMEA) is widely used for detection of accidents and risk analysis – like similar methods such as HAZOP (Hazard and operability of Study) or What if method (Kubičková, 2009). It is applied to discover and to eliminate potential failures (Hu-Chen, 2013). FMEA is used for summarization of risk information which is presented to the management (Stamatis, 2013). The conventional FMEA methodology uses three main parameters – Severity (*S*), Occurrence (*O*), and Detection (*D*). (Mohsen, 2016). Some authors such as Tichy uses different naming for parameters – Severity (*S<sub>v</sub>*), Likelihood (*L<sub>k</sub>*) and Detection (*D<sub>t</sub>*), however the meaning is the same. The parameters are used for calculation a risk priority number (*RPN*) as it is shown in the formula (1) (Tichy, 2006). All parameters are described on a scale from 0 to 10 where 10 is the

highest. That makes  $RPN_{\min} = 1$  and  $RPN_{\max} = 1000$  (Lipol, 2011). It is common that  $RPN = 125$  is considered as a limit for the calculated risk as high (Tichy, 2006).

$$RPN = Sv * Lk * Dt \quad (1)$$

The significant advantage of FMEA methodology is in its variability. Three former parameters can be extended with other parameters – frequently by parameters such as Fear ( $Fr$ ) or vulnerability ( $Vr$ ). The reason of parameter enrichment is that FMEA methodology would more reflect specific conditions where risk analysis is performed. Formula for calculation  $RPN_{ex}$  is as shown in (2), nevertheless the FMEA enrichment is possible due to its results are relative number (ie. not absolute) (Tichy, 2006).

$$RPN_{EX} = Sv * Lk * Dt * NewParam \quad (2)$$

The usability of FMEA methodology is broad – from the original use in industry quality risk analysis, over project management, to investment risk assessment and the outcome of the analysis could be in different forms – from simple table to risk maps (Januska, 2015) using only some of the parameters (ie. to identify level of importance of the risk there are only used parameters  $Lk$  and  $Sv$ ). (Korecky, Trnkovsky, 2011)

FMEA methodology also have its drawbacks in real-world situations (Liu et al., 2012). Mostly recognized limitations are that different combinations of  $Sv$ ,  $Lk$ ,  $Dt$  can produce the same RPN therefore some risk significance can be lost (Mohamed & Robinson, 2010). Moreover, some authors argue that formula for calculation RPN is questionable, mathematical number RPN is not continuous and it is sensitive to variations in risk factor evaluation (Geum et al., 2011; Liu et al., 2011; Mohsen, 2016).

Another major weakness is that FMEA is based on prerequisite that values of parameters are set by experts in consensus. However, this is mostly impracticable in the team of experts. Therefore, the methodology called Statistical FMEA (SAFMEA) was developed to find statistical evaluation of the multiple responses (Tichy, 2006). The process of gathering source data is similar to FMEA methodology and it consists of filling SAFMEA-E form by all participating experts.

The procedure for calculation of SAFMEA results is as follows. Firstly, in every row  $j$  (ie. For every risk factor) for every expert  $k$ , values  $RPN_{jk}^E$  are calculated as it is shown in (3).

$$RPN_{jk}^E = SV_{jk}^E * Lk_{jk}^E * Dt_{jk}^E \quad (3)$$

Therefore, for every row  $j$  it will be calculated  $n_e$  expert values. Then for every row  $j$  it is calculated mean values of index  $RPN^E$  as shown at (4).

$$mRPN_j^E = \frac{\sum_k RPN_{jk}^E}{n_e} \quad (4)$$

If  $n_e \geq 5$  it is calculated standard deviation of variance.

$$sRPN_j^E = \left( \frac{1}{n_e - 1} \sum_k (RPN_{jk}^E - mRPN_j^E)^2 \right)^{\frac{1}{2}}, s > 0 \quad (5)$$

If  $n_e \geq 5$  it is recommended to calculate estimated distribution quantile.

$$qRPN_j^E = mRPN_j^E + sRPN_j^E \quad (6)$$

Finally, the results (risk factors) is filled table where all risk factors have their  $qRPN_j^E, mRPN_j^E, sRPN_j^E$  identified. Moreover, the results can be divided into three tables:

- Sorted by  $mRPN_j^E$
- Sorted by  $\max SV_{jk}^E$
- Sorted by  $qRPN_j^E$

## 1.2 Business incubators and incubation process

Business incubator is defined as “an organization managed by specialized professionals, whose main aim is to increase the wealth of its community by promoting the culture of innovation and the competitiveness of its associated businesses and knowledge-based institutions”. (IASP, 2014)

The purpose of business incubator is to provide facility, finance consultancy, advices from experts, comprehensive information and business development. (Carter and Jones-Evans, 2006) The main roles of business incubator are “play an incubator role, nurturing the development and growth of new, small, high-tech firms, facilitating the transfer of university know-how to tenant companies, encouraging the development of faculty-based spinoffs and stimulating the development of innovative products and processes.” (Koh, et al., 2003) The role of the business incubator can be more useful as the small and medium enterprises are facing higher risk intensity (Belás, 2015) despite of the fact that small and medium enterprises are skeptical towards risk management in general (Mikusova, 2015)

The incubation process is divided into three main stages:

- **Pre-incubation phase** represents activities such as supporting entrepreneur with developing business idea, business model and business plan. Typically, it is followed by first assessment of the idea and initial coaching.
- **Incubation phase** is characterized by support to incubated company in order to help it transform from start-up to expansion stage. The incubation program is set for fixed time (usually 3 years) and it includes activities such as mentoring, direct coaching, facility rent for reduced fees and providing access to
- **Post-incubation phase** are activities for company which successfully completed incubation program – such as coaching with first issues the company have to face after leaving the incubator.

(European Commission, 2010)

## 2 Methods

The first aim of the contribution is to identify significance of major risk factors (issues) of incubated companies by using extended FMEA methodology.

The risk factors which incubated companies may face were set firstly. The aim of the paper is not to examine nor dispute risk factors (issues) of incubated companies, therefore the risk factors were taken over from existing literature. According to Wang there were 20 risk factors identified (such as cash flow issues, new customer acquiring issues, regulation issues etc.) (Wang, 2016). These factors were used to create SAFMEA-E form where respondents are asked to set level of Severity ( $Sv$ ), Likelihood ( $Lk$ ), Detection ( $Dt$ ) and enhanced parameter Influence rate of mentor ( $Me$ )– on the scale from 1 to 10.

The second aim of the paper is to compare traditional SAFMEA to the situation where conventional parameters are extended of the fourth parameter Influence rate of mentor. The new parameter is introduced to the conventional parameters because of the significant role of the mentor on risk management in incubated companies. For this case the calculation of  $mRPN_j^E$  has to be modified as shown in (7) by including the Influence rate of mentor parameter ( $Me$ ) to the formula. The rest of the SAFMEA methodology remains identical. All calculation made by extended SAFMEA is marked by index <sup>EX</sup>.

$$RPN_{jk}^{EX} = SV_{jk}^E * Lk_{jk}^E * Dt_{jk}^E * Me_{jk}^{EX} \quad (7)$$

The web-based questionnaire was sent to the business incubators' mentors who are in direct mentoring relationship with incubated companies. The questionnaire contained matrix of set risk factors and SAFMEA parameters to fill by respondents. The expected result is a set of filled SAFMEA-E forms and then by using the SAFMEA methodology, the output in form of SAMFEA-T table is generated.

The questionnaire was sent to 30 selected mentors by email. However due to time consuming nature of the SAFMEA form, only 10 respondents filled the questionnaire. That makes the return rate 33%, which can still be considered as high. The respondents are consisted from management of business incubators (20%) and mentors/consultants working in the business incubators (80%).

## 3 Problem solving

The results from the filled SAFMEA-E forms are shown in the Table 1. The results show interesting outcomes. In the situation when conventional SAFMEA is used (ie. values of  $mRPN_j^E$ ), the most significant perceived risk is 4. Funding issues – cash flow, followed by 15. Leadership and product alignment. The lowest significance is perceived 17. Legislation and regulation issues (the ranking is shown in the column Rank<sup>E</sup>). On the other hand when enhanced SAFMEA is calculated (ie. by adding parameter of Influence rate of mentor) the results (and risk factor's significance) change. The risk factor 16. Partnership issues becomes the most significant risk. It is due to mentor's limited impact on this risk factor. It is followed by 4. Funding issues – cash flow. This shows that mentor can have positive impact on managing this risk factor. Like before, even in the case of expanded SAFMEA the 17. Legislation and regulation issues are perceived as risk factor with lowest significance (the ranking of extended FMEA is shown in the column Rank<sup>EX</sup>).

Another beneficial view is which risk factors changed their position the most. The most positive influence of mentor is in the risk factor 6. Issues with business model from the

position 7 to the position 14. The second most significant change was observed in the risk factor 19. Issues with hiring and keeping employees. In this case the rank changed from position 15 to 9. It is due to low possibility of positive influence by mentor.

**Tab. 1: SAFMEA-T table made from responses in SAFMEA-E forms**

<b>Risk factor</b>	$mRPN_j^E$	$mRPN_j^{EX}$	<b>Rank<sup>E</sup></b>	<b>Rank<sup>EX</sup></b>
<b>1. Building product issues</b>	237	905	4	7
<b>2. Customer acquisition issues</b>	148	591	13	17
<b>3. Funding issues - capital</b>	167	824	11	8
<b>4. Funding issues - cash flow</b>	346	1870	1	2
<b>5. Issues with building the team</b>	230	1302	5	3
<b>6. Issues with business model</b>	212	688	7	14
<b>7. Over capacity (Too much to do)</b>	123	486	17	18
<b>8. Revenue issues</b>	187	1137	9	5
<b>9. Minimum viable product issues</b>	118	634	18	15
<b>10. Staying focused and disciplined</b>	153	719	12	11
<b>11. Product market fit issues</b>	222	742	6	10
<b>12. Critical mass issues</b>	198	983	8	6
<b>13. Business scaling issues</b>	145	701	14	12
<b>14. Problem solution fit</b>	128	473	16	19
<b>15. Leadership and product alignment</b>	295	1141	2	4
<b>16. Partnership issues</b>	281	1949	3	1
<b>17. Legislation and regulation issues</b>	79	254	20	20
<b>18. Propagation product issues</b>	182	699	10	13
<b>19. Issues with hiring and keeping employees</b>	139	818	15	9
<b>20. Technology issues</b>	86	610	19	16

*Source: Author*

Other important part of SAFMEA methodology is to calculate estimated distribution quantile which gives view on index randomness (it applies when  $n_e \geq 5$ ). The results are shown in the Table 2. For better understanding, for every risk factor, the coefficient of variation is calculated. As it is possible to see in the results the responses vary significantly across experts. As mentioned in the theoretical review, the main prerequisite for FMEA methodology is based on the consensus amongst experts. However, the results show that responses can vary distinctively. In comparison between conventional SAFMEA and expanded SAFMEA – 30% of risk factors show lower variability in case of conventional SAFMEA.

**Tab. 2: SAFMEA-T table with variance calculations**

Risk factor	$mRPN_j^E$	$sRPN_j^E$	$qRPN_j^E$	$mRPN_j^{EX}$	$sRPN_j^{EX}$	$qRPN_j^{EX}$	$V^E$	$V^{EX}$
<b>1. Building product issues</b>	237	129	366	905	448	1353	54%	49%
<b>2. Customer acquisition issues</b>	148	58	206	591	258	849	39%	44%
<b>3. Funding issues - capital</b>	167	76	243	824	445	1269	46%	54%
<b>4. Funding issues - cash flow</b>	346	122	468	1870	1068	2938	35%	57%
<b>5. Issues with building the team</b>	230	160	390	1302	1026	2328	70%	79%
<b>6. Issues with business model</b>	212	130	342	688	415	1102	61%	60%
<b>7. Over capacity (Too much to do)</b>	123	56	179	486	329	815	45%	68%
<b>8. Revenue issues</b>	187	90	277	1137	690	1827	48%	61%
<b>9. Minimum viable product issues</b>	118	47	164	634	283	917	40%	45%
<b>10. Staying focused and disciplined</b>	153	98	251	719	416	1135	64%	58%
<b>11. Product market fit issues</b>	222	130	352	742	258	1000	58%	35%
<b>12. Critical mass issues</b>	198	75	273	983	238	1221	38%	24%
<b>13. Business scaling issues</b>	145	36	181	701	217	919	25%	31%
<b>14. Problem solution fit</b>	128	157	285	473	295	768	123%	62%
<b>15. Leadership and product alignment</b>	295	140	435	1141	577	1718	48%	51%
<b>16. Partnership issues</b>	281	104	385	1949	1401	3350	37%	72%
<b>17. Legislation and regulation issues</b>	79	35	114	254	88	342	45%	35%
<b>18. Propagation product issues</b>	182	58	240	699	363	1062	32%	52%
<b>19. Issues with hiring and keeping employees</b>	139	40	178	818	417	1235	29%	51%
<b>20. Technology issues</b>	86	42	128	610	352	962	49%	58%

Source: Author

FMEA methodology has major drawback in RPN index. It is because the RPN index cumulates three (or in case of extended version - four) parameters together. Therefore, there could occur combination of parameters where significant information is lost.

The solution of this drawback can be eliminated by using risk matrix or risk map diagram. Risk matrix is showing the risk factors in context of mean value of Severity ( $S_v$ ) and mean value of Likelihood ( $L_k$ ). The risk matrix ignores parameters Detection ( $D_t$ ) and Influence rate of mentor ( $Me$ ). (Hnilica, 2009) Risk matrix in Table 3 identifies the most significant risk as 2. Customer acquisition issues, 3. Funding issues – capital and 4. Funding issues - cash flow. The lowest significance (ie. in white area) is risk factor Problem solution fit.

**Tab. 3: Risk matrix**

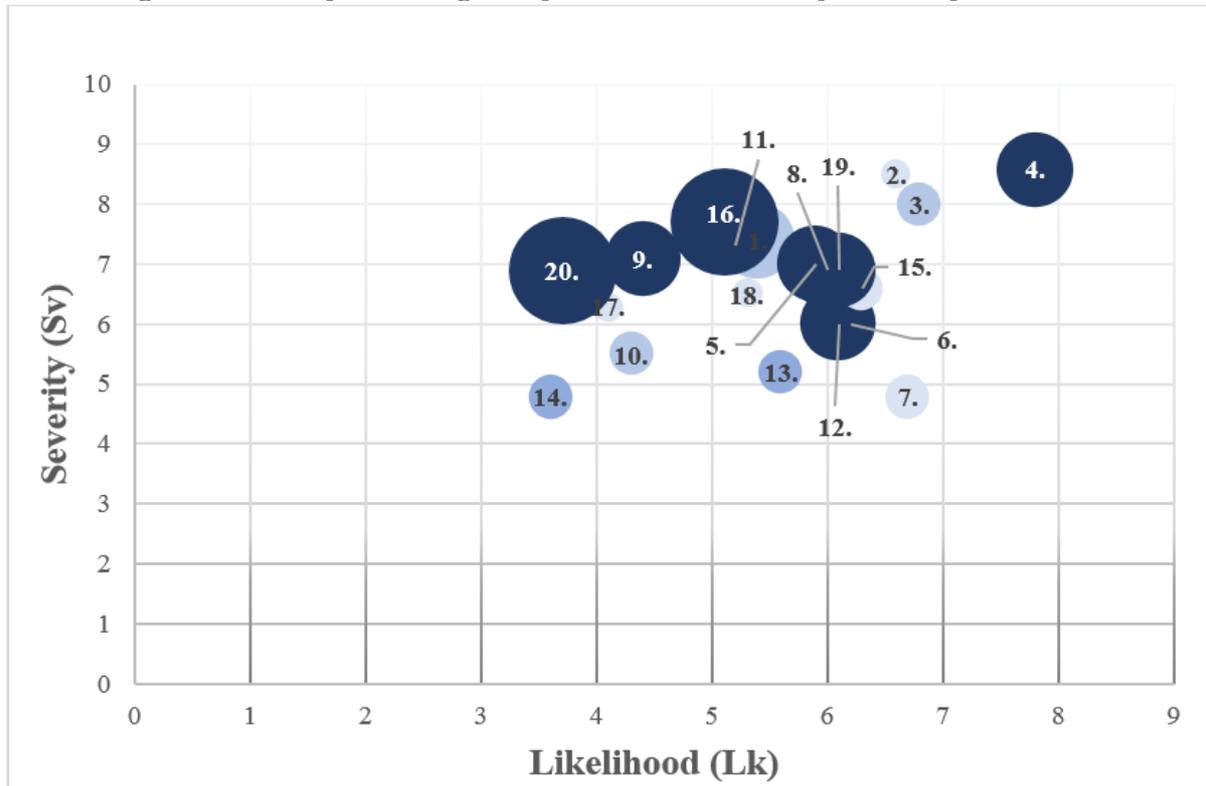
Likelihood ( $L_k$ )	Severity ( $S_v$ )				
	0-1,99	2-3,99	4-5,99	6-7,99	8-10
8-10					
6-7,99			(7);	(6); (8); (12); (15); (19);	(2); (3); (4);
4-5,99			(10); (13);	(1); (5); (9); (11); (16); (17); (18);	
2-3,99			(14);	(20);	
0-1,99					

Source: Author

As it is evident from the risk matrix, the impact of some parameters are ignored. Risk map diagram has mean value of Likelihood ( $L_k$ ) of every risk factor is placed on one axis and mean value of Severity ( $S_v$ ) on the other. Moreover, the size of circle of risk factor is represented by mean value of Detection ( $D_t$ ). (Fotr, 2012) To get the size of the circle the values of  $\min SV_{jk}^E$  and  $\max SV_{jk}^E$  was identified and the interval between them was divided into four sizes of the circle. In the case of the four parameters, the different color was used to distinguish between different levels of the Influence rate of mentor ( $Me$ ) parameter. The risk map diagram was formed from the responses of the SAFMEA-E forms. The result is shown in Figure 1.

Risk map shows that the risk factor with highest significance is 4. Funding issues - cash flow. The second most significant are 2. Customer acquisition issues, 3. Funding issues – capital and 4. Funding issues - cash flow. It is very interesting to observe that risk matrix shows these three risk factors with the same significance, but risk map provides more comprehensive results. It is possible to see, that risk factor 4. Funding issues - cash flow is has also high risk in detection and low ability of influencing of mentor. On the other hand, two rest risk factors (2. and 3.) are identified with lower detection risk and with better influence by mentor – therefore their overall risk significance is lower. This information can be vital for risk analysis and further steps made by management.

**Fig. 1: Risk map showing risk factors in context of FMEA parameters**



*Source: Author*

#### 4 Discussion

The paper shows the possibility of using SAFMEA methodology in risk analysis of incubated firms in the business incubator. Moreover it compares two possible outcomes of the analysis – risk matrix and risk map. When compared to the study where risk factors were gathered (Wang, 2016) where the author used simple three level ranking system (ie. identifying 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> most significant challenge) SAFMEA methodology brings more comprehensive and objective outputs for management than said study.

It was interesting to discover, that there is no simple and free for use software solution for calculating SAFMEA methodology therefore all calculations had to be made manually in MS Excel. Moreover it creates the possible space (gap) for further development.

#### Conclusion

FMEA methodology is easy to use and well established methodology for identification and evaluation in risk management. The recent use of FMEA methodology is from industrial field to project / strategic management. The paper examines the 20 different risk factors of incubated companies in business incubators by using FMEA methodology (in variant of SAFMEA methodology) by calculating responses from mentors.

Firstly the paper compares the RPN indexes of risk factors in the conventional SAFMEA methodology and enhanced SAFMEA (by adding parameter influence by mentor). It clearly shows that some risk factors (6. Issues with business model and 19. Issues with hiring and keeping employees) shifted significantly in the overall ladder of risk factors’ RPN indexes. It is explained by the fact that mentor of business incubator can considerably change risk importance by careful coaching.

The results using risk matrix shows that the most significant risk factors are 2. Customer acquisition issues, 3. Funding issues – capital and 4. Funding issues - cash flow. The results using risk map shows that risk factor 4. Funding issues - cash flow has higher significance by adding to the analysis the parameters Detection (*Di*) and Influence by mentor (*Me*).

Overall it is possible to state that SAFMEA methodology is producing comprehensive results which could be displayed in the form of table, risk matrix or risk map. The methodology (and results) gives to management/mentors complex tool for risk analysis of the incubated companies.

Downside of the SAFMEA methodology that all calculations were made by using the MS Excel as there are no free and easy to use software solution for calculation all necessary formulas. However, it makes space for further improvement and development.

There could be long discussion on the topic of which method to use for risk analysis however FMEA is well known for its adaptability, reusability and spread amongst management. As it was shown in risk matrix and risk map, the practical advantages of FMEA is also in rich possibilities of results presentation. These are practical reasons why business incubators in the role of primary investor should consider SAFMEA as their primary tool for risk analysis and management. Moreover, SAFMEA is already used in comprehensive risk studies around different field, such as traffic risk analysis, automotive or project management where different opinions of the experts are demanded. Due to incredible adaptability of SAFMEA methodology the application is very wide and almost limitless.

## Acknowledgement

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# LOCAL GOVERNMENTS IN EU COUNTRIES: COMPETENCES AND FINANCING OF PUBLIC SERVICES

**Renáta Halásková, Martina Halásková**

**Abstract:** *Local governments in the EU play a major role in the development of local public policies. Local governments provide public services in the public interest, funding them for public resources. The paper deals with the role of the local public sector and the comparison of competences of sub-national governments (local, intermediate, regional) in EU countries and the financial dimension of local and regional governments for development of services. The areas assessed include spending capabilities of local governments in 28 EU countries, with a particular focus on total expenditures of local and regional governments, fiscal decentralisation of expenditures, and local government expenditures by selected function (social protection, health, education, culture and recreation), including the rate of their decentralisation of expenditures. The empirical research renders a comparison of spending capabilities of local and regional governments by selected function in EU countries, making use of cluster analysis and the evaluation of similarities and differences in the individual countries. The most marked differences in EU countries were observed in expenditures of the local public sector on health. Conversely, the least marked differences in all countries are seen in the expenditures of the local public sector on recreation and culture.*

*The document can be downloaded at <http://hdl.handle.net/10195/67924>.*

**Keywords:** *Local governments, Local public services, Local government expenditure, Fiscal decentralisation, Cluster analysis, EU countries.*

**JEL Classification:** *H75, H76, H83.*

## Introduction

The local public sector plays an important role in the implementation of local public policies in European countries. Each reform of public administration should lead to an increased efficiency of public resources, quality of provided services and performance of the public sector. The range of public expenditures is closely associated with financing of public needs and the public sector. Budgetary expenditures of local governments are allocated to the needs of the local and regional sector. The type and nature of a local public service defines the structure and volume of territorial budgetary expenditures. Nevertheless, the volume of territorial budgetary expenditures is constantly increasing, which is a reflection of increased autonomy and responsibility of local governments for securing and financing the public sector within their area, but also the growth of the public sector as a whole (Ahmad, et al., 2008; Aristovnik, 2012; Provazníková, 2015).

This paper aims to evaluate the local public sector and the competence of local and regional governments in EU countries, with particular focus on their spending potential for the development of public services. It attempts to provide a view of local and regional governments and local public expenditures in four key areas of the local public sector, fundamental for the development of human-potential services. The paper concentrates on the expenditures of the local public sector by COFOG functions (social protection,

health, education, recreation and culture) and the extent of their decentralisation of expenditures in the individual countries in 2014. Using cluster analysis and box plot, similarities and differences in expenditures of the local public sector in EU countries are compared by means of clusters.

## **1 Statement of a problem**

The local public sector can be characterised as a non-profit public sector financed from public funding, managed and administered by the local government (municipalities, regions), reaching decisions through public vote and subject to public checks (Bosse, et al., 2013; Kuhlmann, Bouckaert, 2016). Another definition of the local public sector is provided in the ESA methodology (European System of Accounts), where public administration is considered a sector (S 13) comprising four sub-sectors (Central Government, State Government, Local Government, Social Security Funds). Local Government sector is one part of the public administration sector and it includes the sorts of public administration authorities whose competence reach local part of economic area (Neubauerová et al.; 2003; Eurostat, 2013). As stated by Dexia-Cemr (2012) local public sector (classified S1313 by the ESA), it comprises local authorities with general competencies (local and regional governments) and bodies with more specialised competencies (responsibilities vary from one country to the next). The structure of local and regional government in European countries varies markedly with respect to their constitutions, historical development and size. As argued Matei, Matei (2011); Ccre-Cemr (2016), for instance, in EU countries are far from having a unified structure of territorial organisation, making their own decision about the system of local arrangement, including levels of governments. The range of competencies of local and regional governments creates potential for the development and financing of local public services.

The local public sector provides public services in the public interest, financing these from public resources (the budget of local governments). The significance of the local public sector consists mainly in areas where those public services are provided which are not (e.g. financially) attractive for private-sector subjects (Beblavý, Sičáková-Beblavá, 2007; Mikušova Meričkova, Nemeč, 2013). Municipalities and regions procure public services not only from the viewpoint of their, i.e. local, needs, but frequently also public services defined by the range of delegated power and responsibility for their procurement in terms of the decentralisation of the public sector (Provazníková, 2015).

In connection with ensuring public services, most advanced countries delegate expenditure competences to the individual levels of local governments: public administration is decentralised. A successful decentralisation joins public finances and fiscal power with responsibility for providing services with functions of local governments (Alexandru, 2016). The scope of decentralisation of public administration is mostly expressed by the share of expenditures of central, regional and local administration on total expenditures of public administration or GDP. Fiscal decentralisation plays a significant role for the development of local public services, expressing that lower levels of public budgets decide about the provision and financing of services of the public sector on the basis of generally valid rules of local specificities as well as specificities of a given local unit (Oates, 1993; Rodríguez-Pose, Krøijer, 2009; Aristovnik, 2012; Finžgar, Oplotnik, 2013; Tamošiūnas, Stanytė, 2015). According to these authors, fiscal decentralisation contributes to an efficient provision of services, mainly because expenditures are more in line with local priorities and preferences, which motivates local governments to improve

mobilisation of resources, thus resulting in a better transparency and responsibility for allocated expenditures.

Local public sector is dealt with in numerous papers, such as Žarska (1996); Bosse, et al. (2013); Mikušova Meričkova, Nemeč (2013); Halásková, Halásková (2015); Provozníková (2015); Ccre-Cemr (2016); Kuhlmann, Bouckaert (2016) in connection with its scope, trends and reform tendencies, procuring and financing public services. Local governments in the EU are dealt with by, for instance, Moreno (2012); Parana, Varney (2013). These authors analyse not only the structure, competence of local and regional governments and legislative conditions in the selected EU countries, but also emphasise the specificities of territorial and administrative structures in these countries and their financial capabilities for the development of public services. The structure of local and regional governments and the comparison of the financial dimension of local public sector in EU countries (structure of local government expenditure by function or investment potential of local governments) are dealt with in studies by CEMR (Dexia-Cemr, 2012). In Kuhlmann, Bouckaert (2016), attention is paid to the comparison of effects of local reforms of public sector in Europe, mainly to financial austerity measures, territorial reforms, democratic innovations and measures in New Public Management, but also other aspects of management.

## 2 Methods

Eurostat data have been used (Eurostat, 2016). The set comprises 28 EU countries (Belgium-BE, Bulgaria-BG, Czech Republic-CZ, Denmark-DK, Germany-DE, Estonia-EE, Ireland-IE, Greece-EL, Spain-ES, France-FR, Croatia-HR, Italy-IT, Cyprus-CY, Latvia-LV, Lithuania-LT, Luxembourg-LU, Hungary-HU, Malta-MT, Netherlands-NL, Austria-AT, Poland-PL, Portugal-PT, Romania-RO, Slovenia-SI, Slovakia-SK, Finland-FI, Sweden-SE, United Kingdom-UK). The paper provides a comparison of total expenditures of local public sector allocated by local governments in EU countries, including selected areas of local public services by COFOG classification (education, social protection, health, recreation and culture, as % of GDP) and the extent of decentralisation in 2014 (the latest available data on local public expenditures by COFOG). By use of cluster analysis, similarities and differences in the allocated local public expenditures by function in EU countries by clusters have been compared (Denmark has been excluded from the set as it shows extremely high expenditures of local public sector on social protection when compared to other countries). Cluster analysis is a multi-dimensional statistical method used to classify objects. It enables sorting observed units into several groups so that similar units occurred in the same group, and, in turn, so that units from other groups differed fundamentally. In the present study, these were EU countries excluding Denmark. In the processing stage, hierarchical cluster analysis was used, and the resulting distances between the individual objects (EU countries) were visualised by means of a diagram called dendrogram (Everitt, et al., 2011). Further, EU countries were compared using Box-plot, which is a form of graphic visualisation of numerical data through their quartiles, dividing the statistical set into quarters, when 25 % of items are below the values of the lower quartile  $Q0.25$  and 75% below the upper quartile  $Q0.75$ . The middle "box" of the diagram is delineated by the third quartile from the top, the first quartile from the bottom, and between those the line defining the *mean value* is found. The height of the box represents an *interquartile range*. The lower vertical line (lower whisker) corresponds with values found beneath the box in the distance not more than the factor of 1.5 of the size of the box. The end of the whisker corresponds with the lowest such value from the set. Similarly, the upper whisker corresponds with the highest value from the set. Apart from whiskers

(below and above them) are seen points which correspond with the so-called outliers (Everitt, et al., 2011).

### **3 Problem solving**

#### **3.1 Local and regional governments in EU countries and development of public services**

EU countries use neither a common structure of territorial administrative structure nor a system of local arrangement, associated with constitutional arrangement and historical development. It is characteristic for EU countries to use a single-, two- or three-level structure of sub-national governments. Local levels governments in EU countries include cities, municipalities, urban municipalities, towns, local authorities, communities in rural areas, rural municipalities, counties, municipal districts, local councils, parishes, city districts. Intermediate levels of government is typical of Poland, France, Germany, Hungary, etc., as a higher level above local governments and they include, for instance, regions, provinces, counties, departments and overseas departments, metropolitan cities, municipalities with special status. The structure of regional levels of governments is characterised in EU countries by the second or third levels of sub-national governments (regions, overseas regions, self-governing regions, planning regions, autonomous communities, cities, provinces and regions, regional councils, county councils, provinces and counties) (Ccre-Cemr, 2016).

The first level of sub-national government in EU countries is associated with the procurement of services in local communications, water management, garbage collection, public transport, health and social services, and education (pre-school facilities, elementary schools). The second level of sub-national governments in EU countries is active in, for instance, education (high schools), territorial planning, local communications, and administration of the environment. The third level of sub-national government is in charge of regional transportation, regional public administration services, territorial development, education, health-care services, social housing, or services associated with culture. The comparison of the competence of sub-national levels of government (local, intermediate, regional) in EU countries connected with the development of human-potential services is shown in Tab. 1.

The task is to secure social protection (social and welfare services, social assistance, affairs, action, aid, social housing), health (primary health care, health services, hospital provision, health insurance), education (pre-primary, primary, secondary, tertiary, building and maintenance of schools). In terms of recreational and sporting services, the range of sporting services, sporting facilities and leisure was analysed, whilst in terms of culture, cultural services and infrastructures, libraries, museums, local arts and other activities. Table 1 shows the most extensive competences of local governments in EU countries in services of social protection, education and culture.

**Tab. 1: Competences local and regional levels of governments in EU countries by selected function**

Levels	Social protection			Health			Education			Sport			Culture		
	LL	IL	RL	LL	IL	RL	LL	IL	RL	LL	IL	RL	LL	IL	RL
BE	*		*			*	*		*	*		*	*	*	*
BG	*						*			*			*		
CZ	*		*			*	*		*						
DK	*		*	*		*	*		*	*		*	*		*
DE	*	*			*		*		*	*	*		*	*	*
EE	*			*			*			*			*		
IE															
EL	*			*			*								
ES	*		*			*			*	*			*		*
FR	*	*			*		*	*	*	*		*	*	*	*
HR	*			*		*	*		*	*			*		
IT	*					*		*					*		
CY															
LV	*			*			*						*		
LT	*			*			*			*			*		
LU	*						*			*			*		
HU	*				*			*					*	*	
MT	*			*			*			*			*		
NL	*			*			*			*			*		*
AT	*			*		*	*					*	*		
PL	*		*		*		*	*	*				*		
PT	*			*			*			*			*		
RO			*	*		*	*		*						
SI	*			*			*			*			*		
SK	*		*	*		*	*		*	*			*		*
FI	*		*	*		*	*		*	*			*		*
SE	*			*		*	*						*		*
UK	*						*						*		

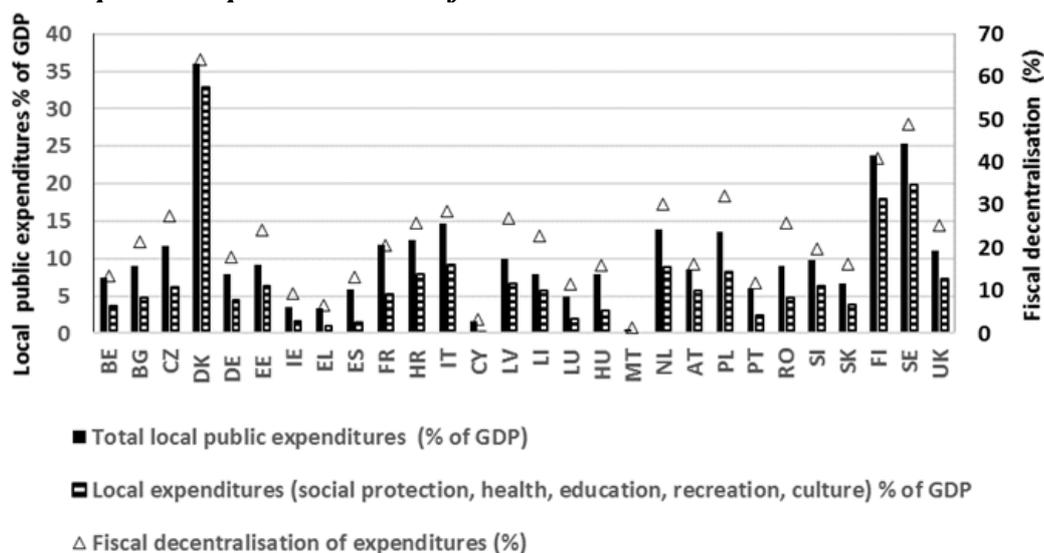
Note: Local level (LL), Intermediate level (IL), Regional level (RL)

Source: Author's according to Ccre-Cemr (2016).

### 3.2 Public expenditures of local governments for the development of services in EU countries

Local and regional government expenditures account for approximately 17% GDP and approximately 34% of general government expenditures of the public sector (only local public sector 11.8% of expenditures as % GDP a 24% of general expenditures of the public sector) (Dexia-Cemr, 2012). The main areas of local- and regional-government expenditures in EU countries are allocated to general public services, education (pre-primary, primary, secondary, tertiary), social services, healthcare, economics affairs, housing and community amenities (water distribution network, public lighting, building of housing), recreation and culture (sporting services, equipment and other sporting activities, libraries, museums and theatres), environmental expenditure (waste collection and treatment, parks, environmental protection) and public order and safety (regional and municipal police, fire brigades and emergency responders). The present research provides a detailed analysis of the selected expenditures of the local public sector in EU countries in areas of the development of human potential (social protection, health, education, recreation and culture) (see Fig. 1, vertical left axis).

**Fig. 1: Local public expenditures and fiscal decentralisation in EU countries in 2014**



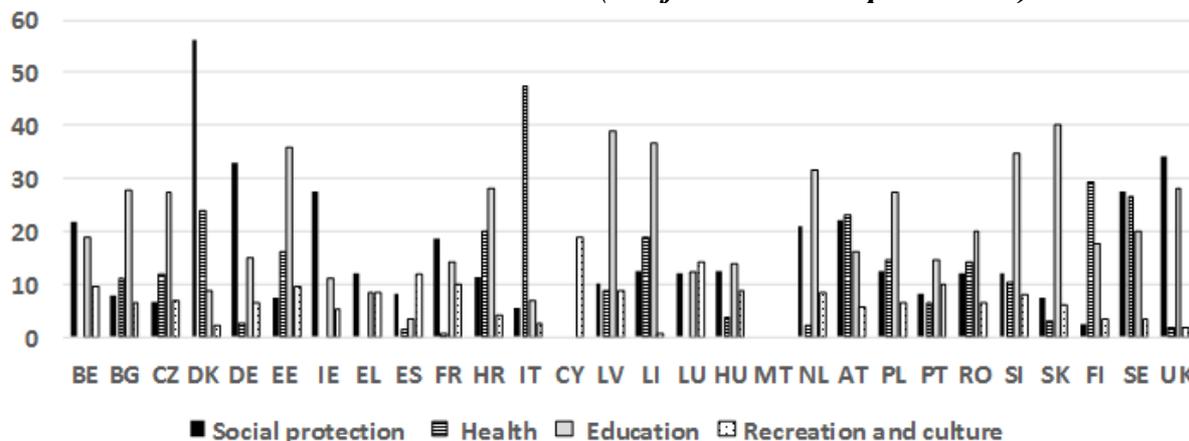
Source: Author's according to Eurostat (2016).

The size of the local public sector as a whole and in selected areas of local public services in EU countries expressed as a share of local public expenditures on GDP in % is seen in Fig. 1. Strong expenditure preferences of the local public sector as a whole as well as by selected functions including services of human development can be observed in Scandinavian countries. The role of local public sector is connected with a huge volume of territorial budgets, possibilities of own local resources, mainly tax resources, and a high autonomy of territorial budgets. The lowest expenditures of local public sector, including expenditures by function, is seen in Malta and Cyprus. Very low expenditures of local public sector by functions are also observed in Ireland, Greece and Spain. These countries demonstrate centralisation of expenditures in the observed public services, resulting from a strong dependence on resources from the government budget and low autonomy of territorial budgets. Evaluating fiscal decentralisation of expenditures (in %) in EU countries (Fig. 1, vertical right axis), the result is that the highest rate of fiscal decentralisation of expenditures is seen in Scandinavian countries, and a high rate of decentralisation is also observed in Poland and the Netherlands, accounting for above 30%. Countries with a moderate rate of decentralisation, between 20-30%, is seen in France, Bulgaria, Lithuania, United Kingdom, Croatia, Latvia, Czech Republic, Estonia, and Romania. Other countries show a low level of fiscal decentralisation, below 20%, with the lowest rate seen in Malta (1.4%), Cyprus (3.2%), and Greece (6.6%)

Fig. 2 shows the extent of decentralisation of expenditures of the local public sector (as % of total local expenditures) in EU countries. The strongest extent of decentralisation of expenditures in social-protection services is observed in Denmark, the UK and Germany. In Italy, Finland and Sweden, the strongest decentralisation of expenditures is seen in health services, and a strong decentralisation of expenditures in education is observed in Slovakia, Lithuania, Latvia, Estonia, Slovenia and the Netherlands. By contrast, a low extent of decentralisation of expenditures can be observed in cultural, recreational and sport services (except for Cyprus). Cyprus and Malta are characterised by a strong decentralisation in other local public services. As there is no single system and structure of local administration in EU countries, there are also differences in the extent of decentralisation and centralisation of expenditures in public services, which are influenced by numerous other factors, external as well as internal, in the individual

countries (system of taxation, cultural, social, political, demographic, historical or economic influence).

**Fig. 2: Decentralisation of expenditures in the local public sector by public services in the EU countries in 2014 (% of total local expenditures)**



Source: Author's according to Eurostat (2016).

### 3.3 Comparison of public expenditures of local public sector by functions in EU countries using cluster analysis

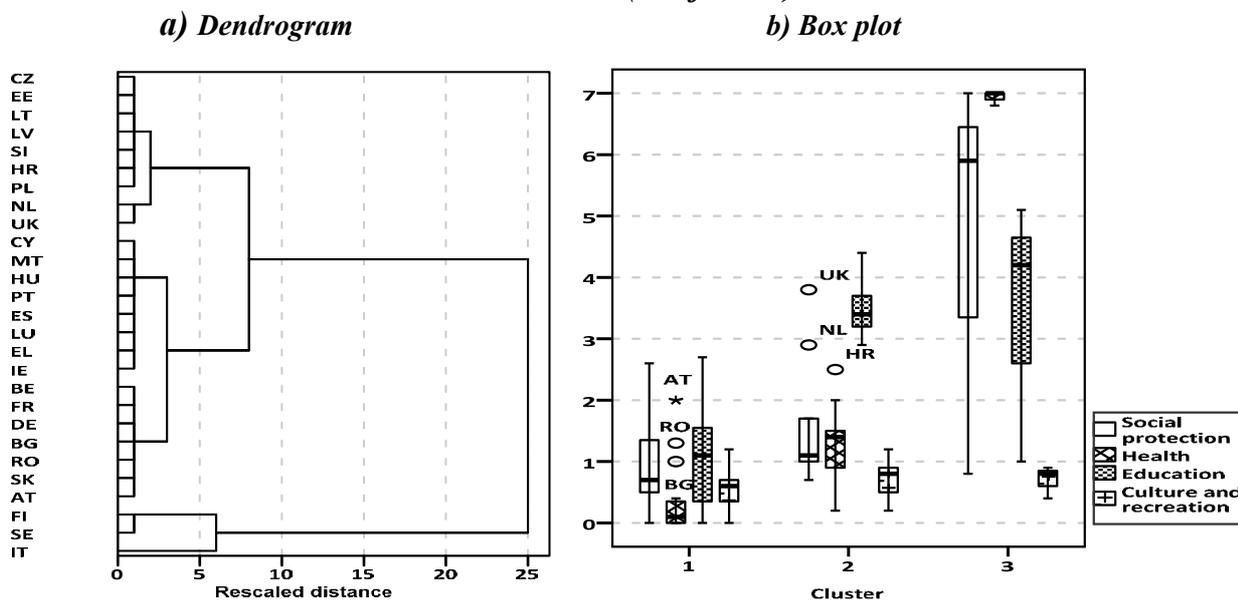
The comparison of expenditures of local public sector by COFOG functions (education, health, social protection and recreation and culture) in EU countries, excluding Denmark in 2014 was generated through the method of cluster analysis. Results of the cluster analysis enabled division of EU countries (without Denmark) into three clusters based on internal similarity. The first cluster comprises Belgium, Bulgaria, Malta, Germany, Ireland, Greece, Spain, France, Cyprus, Luxembourg, Hungary, Austria, Portugal, Romania, and Slovakia. The second cluster consists of the Czech Republic, Estonia, Croatia, Lithuania, Latvia, the Netherlands, Poland, Slovenia, and the United Kingdom. The third cluster is composed of Italy, Finland, and Sweden.

In the first cluster, seven countries: Cyprus, Malta, Hungary, Portugal, Spain, Luxembourg, Greece, and Ireland; demonstrate the highest internal similarity in allocated local public expenditures on public services. Another internal similarity in the first cluster is seen in six countries: Belgium, France, Germany, Bulgaria, Romania, Slovakia, and Austria. In the second cluster, the highest similarity in the structure of local public expenditures in services is seen in the Netherlands and the United Kingdom. Another internal similarity of local public expenditures in the second cluster is seen in seven countries: in the Czech Republic, Estonia, Lithuania, Latvia, Slovenia, Croatia, and Poland. The third cluster is composed of three countries (Sweden, Finland, and Italy), where the highest similarity in expenditures of local public sector by functions is seen in Finland and Sweden (see dendrogram, Fig. 3).

Fig. 3 (box plot) further describes the form of graphic visualisation of local public expenditures as % of GDP in EU countries in clusters. **The first cluster** is composed of countries with lowest expenditures of local public sector on health, culture and recreation. These countries also have relatively low expenditures on social protection (with a mean value of approximately 0.8%) and expenditures on education (with a mean value of approximately 1.1%). The highest value in local expenditures on social protection is seen in Germany, 2.6% GDP, as opposed to nil local public expenditures on social protection in Malta and Cyprus. The dispersion of value is apparent in expenditures on education,

with highest expenditures in Slovakia (2.7%), as opposed to nil expenditures in Malta and Cyprus again. Outliers can be observed in expenditures of local public sector on health in Austria (2%), Romania (1.3%) and Bulgaria (1%) with significantly higher local expenditures compared to other countries in the first cluster.

**Fig. 3: Evaluation of expenditures of local public sector by selected functions in EU countries (% of GDP)**



Source: Authors

**The second cluster** shows countries with the highest expenditures of the local public sector on education (with a mean value of approximately 3.3%, with the highest local public expenditures seen in the Netherlands, 4.4%, as opposed to Lithuania, 2.9%) and low local public expenditures on other observed public services. Outliers are represented by the United Kingdom (3.8%) and the Netherlands (2.9%) in expenditures of local public sector on social protection, in comparison with the mean value, approximately 1.1%. In Croatia, an outlier can be observed in local expenditures on health (2.5%, against the mean value of 1.5%). **The third cluster** comprises three countries (Italy, Sweden and Finland) with the highest local public expenditures on health (with the mean value of approximately 7%) and low local expenditures on recreation and culture (with a mean value of approximately 0.8%). The widest dispersion of value in terms of the inter-quartile range is seen in expenditures of local public sector on social protection and education. Apart from Italy (0.4%), Finland and Sweden also have the highest expenditures of the local public sector on social protection (mean value of approximately 6%), compared to other EU countries excluding Denmark. In expenditures of the local public sector on education (mean value of 4.2%), the lowest value of local expenditures is observed in Italy (1.0%), as opposed to Sweden (5.1%) with the highest value.

The most marked differences between EU countries found through cluster analysis were observed in expenditures of the local public sector on health. Conversely, the smallest differences between the clusters are seen in expenditures of the local public sector on recreation and culture. The widest dispersion of values was observed in expenditures of local governments on education and social protection. The results showed a varied extent of fiscal decentralisation of expenditures by function in EU countries.

## 4 Discussion

Local public sector plays a significant role in procuring and financing public services. Differences in local and regional governments in EU countries for the development and financing of public services are influenced by not only the structure of sub-national governments and the scope of their competence, but also constitutional arrangement, economic, cultural and other internal conditions of the given country. Recommendations of some authors can be summarised as regards the local public sector, associated with procuring public services (Oates, 1993; Brown, Potoski, 2003; Ahmad et al., 2008; Finžgar, Oplotnik, 2013; Halásková, Halásková, 2015; Provazníková, 2015). With respect to allocation, most services should be procured at the local level in case they serve a local purpose. Those products and services should be procured at the central level whose purpose goes beyond the local area. Services leading to market failure, but still wanted by the society, should be provided at the central level in case of a low government failure. Subsidies from a higher level of the budget should be provided only on the services whose benefit overlaps local boundaries and to ensure balancing of income in municipalities. Based on the results, it can be argued that the higher the engagement of local public sector is, the higher the volume and variety of structure of public expenditures, and vice versa. According to some authors, Oates (1993); Žarska (1996); Rodríguez-Pose, Krøijer (2009); Aristovnik (2012); Halásková, Halásková (2015); Alexandru (2016), decentralisation of public administration (fiscal decentralisation) can be considered the pillar for the development of local public sector. These authors based their opinion on the assumption that provision of public services at the local level is more efficient and economical, mainly because local expenditures conform more to local priorities and preferences, which motivates local governments to improve on exploiting their resources, resulting in higher transparency and responsibility for allocated expenditures. As the present as well as other results from EU countries show, e.g. Finžgar, Oplotnik (2013); Halásková, Halásková (2015), the higher number of lower administrative levels of sub-national government in most countries fails to have any impact on the higher level of fiscal decentralisation.

The extent of decentralisation or centralisation of expenditures varies in the observed services in the countries, which was also confirmed by the present research. Many factors come into play, mainly the economic level of the country, political and demographic factor, local specificities, the size of the local public sector and the local governments' willingness to procure, provide and finance the respective public services. As argues Beblavý, Sičáková-Beblavá (2007:245), “local governments deal with whether it is more beneficial for the public sector to provide a given service in terms of its direct authority or to delegate the provision of the service to other subjects for a particular fee (either explicit - regular payments from public budgets, or implicit - authorisation for the collection of particular fees from the public)”. As the present results, as well as other pieces of research or studies, such as Dexia-Cemr (2012) or Halásková, Halásková (2015), show, Cyprus and Malta demonstrate a strong centralisation of expenditures in most observed public services (social protection, health, education), Malta also in recreation and culture. This fact can be explained by their small size, comparable to the size of a municipality, where the role of local public sector is quite limited or none. By contrast, these countries demonstrate the impact of the public sector and a strong decentralisation in general public services. It is therefore more economical and efficient to provide most public services in a centralised manner.

The results are difficult to define and the efficiency of resources impossible to measure directly in the public sector. It is therefore necessary to consider various approaches to measuring and evaluation of allocated public expenditures in the individual areas of local public sector. In analysing the efficiency of the public sector and for the sake of an objective system of public expenditures, specific methods and processes are applied, mainly comparative methods (temporal, spatial), performance, norms or standards. Also, a comprehensive audit or a system of public control of the given country can be considered a significant method contributing to the evaluation of public-expenditure efficiency.

## **Conclusion**

The structure of local and regional governments in EU countries is characterised by three levels. The widest scope of competence of local public sector associated with securing public services is seen in local governments (municipalities, local authorities, cities, towns, etc.) in EU countries with a single level of sub-national government. Increased responsibility of local governments in advanced countries in procuring and financing of the public sector in their area reflects increased autonomy and volume of territorial budgets. Nevertheless, a particular fiscal system is always a compromise in the given country, based on historical, political and other aspects. Different preferences of local expenditures by function have been proved in EU countries, as well as their extent of decentralisation. The results show that the highest expenditures of local public sector as a whole as well as by selected functions that include services of human development are seen in Scandinavian countries, and the lowest expenditures of local public sector, including local expenditures by function are seen in Malta and Cyprus. The comparison of expenditures of local public sector by use of cluster analysis revealed rather significant differences in preferences of expenditures of local public sector in the individual countries, which are reflected to various degrees in centralisation or decentralisation of public services, but also in financial capabilities of their development. The largest differences in EU countries were found in expenditures of local public sector on health; conversely, the least differences in all countries were found in expenditures of local public sector on recreation and culture. The highest volume from the observed expenditures of local public sector in EU countries was proved in education and social protection. Also, the widest dispersion of values of local public expenditures was also found in these services in the given countries. There are numerous unanswered questions connected with the role of local public sector and financing of local public services in the EU, such as the evaluation of efficiency of allocated expenditures and the quality of public services, which may serve as a theme for further research.

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# APPLICATION OF CORPORATE CONTROLLING IN THE CZECH REPUBLIC

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**Abstract:** *In order to secure corporate control continuity, the management utilises instruments of controlling that begin to be applied even in the environment of small and medium firms. The goal of the report is to find the reasons and the scope of controlling application in companies operating in the Czech Republic. In order to fulfil the objectives of the article, an analysis of expert literature and studies dealing with the issues in question has been performed. The data obtained during the electronic questionnaire investigation in the firms of the Czech Republic was used as primary data. The application of controlling in firms has been examined based on the number of employees in the company and their economic focus. For the presumption in question, hypotheses had been expressed where the statistical importance and correlation relationship have been examined. The results ascertain the growth of controlling in the enterprises and the lowering discrepancy between the application of controlling activities from the standpoint of the number of employees and economic focus. The article is concluded with a discussion of the ascertained results of the actual investigation complemented with the expert knowledge of other researchers.*

*The document can be downloaded at <http://hdl.handle.net/10195/67926>.*

**Keywords:** *Controlling, Control management, Application of controlling, Number of employees, Economic sector, Economic importance.*

**JEL Classification:** *M21.*

## Introduction

The firm is exposed to constant changes, therefore it is necessary to permanently adjust its production programme to the market's requirements. In order to succeed in the enterprise field in question, it is no longer sufficient to consider the relationships with the competition, the effect of the consumers and the suppliers, the creation of substitute products, etc., but it is necessary to work on the development of new procedures and applications of new manners of solution seeking. In this sense, controlling enters corporate activity as an innovation tool that participates in the problem solution process and the need for introducing and developing new instruments that should help company managers when solving corporate problems (Horvath, 2003, 2008; Eschenbach, 2004, 2011). Controlling in the European concept is perceived as a tool of "management control" and "relationship control" in accordance with the new development and concept of management (Terry & Franklin, 1994; Anthony & Govindarajan, 2007).

## 1 Statement of problem

The growing pressure on market development leads managers to the improvement of the analysis, planning, and controlling, the innovation of the organisational structure and information systems (Kilger, Pampel, and Vikas, 2012). Controlling is becoming essential for improving the performances of enterprise and maintaining a competitive advantage because it supports top management in strategic and operative decision-making.

The managerial controlling system of the company in question should be flexible and dynamic, adaptive and developing according to the needs of innovation, but it should be sufficiently stable at the same time (Davila, 2005). Authors Cardinal, et al. (2004) and Wijewardena et al., (2004) confirm that controlling has crucial importance for fulfilling the organisation's objectives.

According to author Singl (2009), there are five basic policies for fulfilling an effective controlling system; these are the performance standard set-up, actual performance measurement, current performance to standard comparison, deviation analyses, and deviation removal proposal. Authors Simons (2000), Janakiran & Rao (2010), Govindarajan & Natarajan (2012), and Chaturverdi (2013) add that performance evaluation is important with controlling. If necessary, apply corrective measures so that the fulfilment takes place according to the company's plans. Defining the standards for measuring a certain performance is immensely important for controlling. The standards are then related to all business functions including production, sales, finances, and research (Bragg, 2004). The corporate tools are then especially focused on quantitative business modifications of corporate activities, continuous analyses of corporate results at the operating and financial level, the use of scatter analysis as the main approach to assess business results, etc. (Gaonkar, 2007).

## **2 Methods**

Controlling should be a tool for the companies that helps prepare an adequate environment for their decision mainly through obtaining quality information with high predictive capability. Application of controlling is then a certain consequence of the need for orientation during information control from their accounting information system that helps provide better coordination of corporate goals and plans and for the overall future orientation of the company.

The goal of the article has been to find out the reasons and the actual scope of controlling application in the firms acting in the Czech Republic. In order to fulfil the goal in question, information from secondary and primary sources has been utilised. The secondary information has been mainly drawn from expert literature and from foreign studies by many researchers. In order to determine the rate of application of controlling in the companies in the Czech Republic, primary data collection via electronic querying has been used.

From April to June 2016, financial managers of 188 companies acting in all regions of the Czech Republic were addressed. During data evaluation, the firms were classified according to size [number of employees] and the economic sector structure.

Within the countrywide research among firms, information has been ascertained concerning the possibilities of controlling application, the reasons for executing controlling activities, and their specific tasks and functions in the corporate environment. The obtained answers of the respondents have been classified based on analytic sorting that allowed for examining the mutual relationships and dependencies among the ascertained information via determining relative frequencies, correlations, and hypothesis tests. For data analysis, two programs have been used – the Microsoft Excel spreadsheet and the statistical data analysis program IBM SPSS STATISTICS 23.

For the ascertaining of controlling application in the corporate environment, it is presumed that the fact in question will be affected by the company's size and its economic focus. Based on this presumption, these hypotheses have been expressed:

H1: It is presumed that the execution of controlling activities does not depend on the number of employees in the firm in question and on the economic classification of companies into sectors.

H2: It is presumed that the reasons for the possible execution of controlling do not differ from the standpoint of the companies' size and their economic classification.

H3: It is presumed that there is a statistically significant difference in the number of performed controlling activities in the companies according to their size and economic focus.

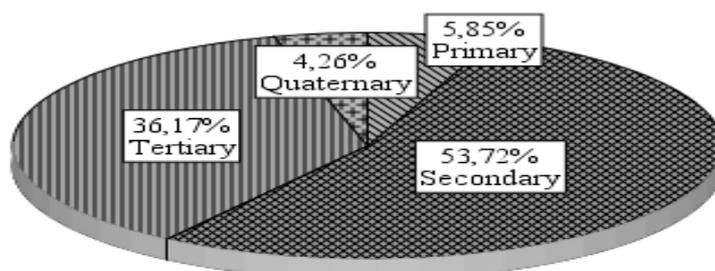
The presumptions in question have been confirmed based on the use of the chi-squared test of independence for the nominal values and the non-parametric Kruskal-Wallis test has been used for the ordinal values. If the p-value (Asymp. Sig.) is higher than the chosen significance level  $\alpha = 5\%$ , then the hypothesis will be accepted.

Furthermore, the goal was to find out whether there is some relationship between the reasons for applying corporate controlling via the correlation analysis. The correlation coefficients have been calculated in the SPSS Statistics program using the Spearman's coefficient. The rate of correlation will range in the interval from -1 to +1; the closer the value to one or -1, the stronger the relationship between the variables.

### 3 Problem solving

The sector structure of the addressed firms, shown in Figure 1, basically corresponds to the composition of the companies acting in the Czech Republic (CSU, 2014). The segmentation of the addressed firms according to the number of employees has been based on the methodology of the European Union, according to which 7% of the addressed firms employ fewer than 50 employees, three quarters 51-250, and more nearly 19% (Ordinance of the European Commission, 2008).

**Fig. 1: Sector structure of the addressed firms**



Source: Author

Nearly three quarters (136) of the addressed firms apply the controlling system: nearly all companies with more than 251 employees, almost a third of medium enterprises, and nearly a half of small enterprises [see Tab. 1]. More than a third of the addressed firms in the primary sector, nearly three quarters in the secondary, more than a half in the tertiary, and 63% of organisations in the quaternary sector use controlling. Using the chi-squared test of independence, it has been ascertained whether the application of controlling in the companies depends on the number of employees and the sector focus of the company. At the significance level of 5%, it has been found that the execution of controlling activities in the firms based on the number of employees ( $p = 0.010$ ) and according to economic sectors ( $p = 0.026$ ) differs statistically.

**Tab. 1: Execution of controlling in companies**

		Number of employees			Total
		Up to 50	51-250	Over 250	
Do you execute controlling in your company?	yes	6	99	31	136
	no	7	41	4	52
Total		13	140	35	188

*Source: Author*

Of the firms in which controlling activities are implemented, 32 have their own department the workload of which is the implementation of the controlling system. In 104 firms, they have created a position of a separate controller. Of that in all small companies, in 84% of medium size companies, and nearly a half of companies with more than 251 employees. On average, three employees work in separate departments, 2.3 employees in medium size organisations, and 4.5 in large organisations. Half of the companies acting mostly in the primary sector, a quarter in the secondary, and a fifth in the tertiary have a controlling department, while organisations in the quaternary sector only utilise a separate position of a controller.

### **3.1 Reasons for Introducing Corporate Controlling**

Organisations (regardless to the size and sector in which they mostly operate) that apply controlling do so mostly in order to secure their goals and to satisfy the requirements of owners and investors. Nearly all the largest companies (94%), four fifths of the medium sized companies, and two thirds of the small ones also apply controlling with regard to the market situation and competition. Other organisations consider these factors rather unimportant.

The utilisation of controlling for securing a functional information system is considered significant by all small and the largest companies and 80% of the medium sized companies. The market situation is considered a less important factor of implementing the controlling system except for the companies in the primary sector (80%). Controlling is most connected with the flexibility of the information system by the organisations in the secondary sector (90%), in the tertiary – 85%. The reasons that lead the companies to the utilisation of the controlling system are summarily shown in Table 2.

**Tab. 2: Factors affecting the application of the controlling system in %**

Factors	Significance		
	Definitely important	Rather important	Rather unimportant
Securing the firm's objectives	73	25	2
Market situation	38	47	15
Owners' requirements	59	35	6
Competition	33	46	21
Necessity of a flexible informs system	45	40	10

*Source: Author*

Furthermore, the statistical dependency of the reasons of controlling implementation on the number of employees in the company or their economic focus. At the significance level of 5%, a statistically significant dependency has not been found with the factors “company goals” and “owners’ requirements” due to the number of employees in specific firms. Unlike with the reasons of the “market situation, the need for a flexible information

system, and company's competition", where statistical significance has been found, which presumes that the effect of these factors on the application of controlling will differ with the enterprises according to their size [see Tab. 3].

**Tab. 3: Statistical significance of the reasons for executing controlling activity due to the number of employees**

	Test Statistics <sup>a,b</sup>				
	Company goals	Market situation	Owners' requirements	Company's competition	Need for a flexible information system
Chi-Square	0.382	6.451	1.143	12.569	6.467
df	2	2	2	2	2
Asymp. Sig.	0.826	0.040	0.565	0.002	0.039

a. Kruskal Wallis Test

b. Grouping Variable: Number of employees

Source: Author

When examining the statistical dependency of the reasons for executing controlling from the standpoint of implementation of the economic activity of the enterprises, the presumption that the reasons for every sector do not differ statistically at the significance level of 5% has been confirmed [see Tab. 4]. This means that the economic classification of enterprises into individual sectors will not have an effect on the reason for executing controlling activity.

**Tab. 4: Statistical significance of the reasons for executing controlling activity due to the sector classification of companies**

	Test Statistics <sup>a,b</sup>				
	Company goals	Market situation	Owners' requirements	Company's competition	Need for a flexible information system
Chi-Square	2.286	1.212	4.798	2.262	1.702
df	3	3	3	3	3
Asymp. Sig.	.515	0.750	0.187	0.520	0.636

a. Kruskal Wallis Test

b. Grouping Variable: Economic sector

Source: Author

However, nearly 30% of the addressed companies that do not apply controlling expect its implementation in the future: three fifths within one year, a quarter within two years, others later. The reasons for which the introduction of controlling is needed consist mainly in their management being motivated for its introduction especially in order to secure the corporate goals and by competition pressures.

Furthermore, it has been examined using the correlation coefficient whether there is a statistically significant relationship between the reasons for executing controlling activity. The value of the correlation coefficient is the highest between the reason "securing enterprise goals" for executing controlling and the company owners' requirement and competition. These values are already relatively high and statistically significantly differ from zero at the significance level of 1% [see Tab. 5]. Here the tendency that for the companies that state securing the enterprise goals as the reason for implementing controlling activity, implementation of controlling is important for the reason of competition and investors' or owners' requirements, shows from the factual standpoint. On the contrary, the correlation relationship between the reason "owners' or investors' requirements" and the company's competition and the need for having a flexible information system for reason of controlling implementation in the company is low. This means that for the companies that stated the company's competition as an important reason for controlling implementation, a flexible information system will no longer be such an important reason.

**Tab. 5: Correlation relationships between the reasons for executing controlling activity**

			Securing the enterprise goals	Inevitability resulting from the market situation	Owners' or investors' requirements	Company's competition	Need for a flexible information system
Spearman's rho	Securing the enterprise goals	Correlation Coefficient	1,000	0,248**	0,016	-,005	0,158
		Sig. (2-tailed)	.	0,004	0,857	0,950	0,066
		N	136	136	136	136	136
	Inevitability resulting from the market situation	Correlation Coefficient	0,248**	1,000	0,054	0,439**	0,193*
		Sig. (2-tailed)	0,004	.	0,536	0,000	0,024
		N	136	136	136	136	136
	Owners' or investors' requirements	Correlation Coefficient	0,016	0,054	1,000	0,182*	0,233**
		Sig. (2-tailed)	0,857	0,536	.	0,034	0,006
		N	136	136	136	136	136
	Company's competition	Correlation Coefficient	-,005	0,439**	0,182*	1,000	0,241**
		Sig. (2-tailed)	0,950	0,000	0,034	.	0,005
		N	136	136	136	136	136
Need for a flexible information system	Correlation Coefficient	0,158	0,193*	0,233**	0,241**	1,000	
	Sig. (2-tailed)	0,066	0,024	0,006	0,005	.	
	N	136	136	136	136	136	

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

Source: Author

### 3.2 Controlling Utilisation in Enterprise Activities

A quarter of the organisations applying controlling utilise it especially when processing reports for the management's and owners' needs as a support of planning and determining their goals and for continuous obtaining and processing of information for supporting decision making. A fifth utilise it as a reinforcement of control with an emphasis on the deviation analysis. A mere 5% of companies apply controlling in the selection and preparation of the control employees. A summary overview of the relative frequency of the controlling tasks with regard to the organisation type is stated in Table 6.

**Tab. 6: Relative frequency of controlling utilisation in corporate activities in %**

Segment	Relative frequency of corporate activities within controlling					
	Support of enterprise goal determination planning	Continuous obtaining and processing of information for the support of decision making	Control support with an emphasis on deviation analysis	Information processing into the reports for the management and the owners	Participation in the selection and preparation of managing employees	Other activities
Up to 50	33	17	11	28	11	0
51–250	24	24	21	26	5	0
251 and more	23	26	22	25	2	2
Primary sector	30	20	10	40	0	0
Secondary sector	25	23	21	25	6	0
Tertiary sector	24	26	21	26	3	1
Quaternary sector	30	20	10	40	0	0

Source: Author

When companies already execute controlling, then mostly it involves several corporate activities at once; most frequently, the firms implement three to four controlling tasks. Concerning the number of executed controlling activities at the same time in the firms in

question, statistical significance between the frequency of controlling utilisation from the standpoint of the number of employees ( $p = 0.010$ ) or from the standpoint of economic activities ( $p = 0.036$ ) has not been proved at the 5% level. Based on this fact, we presume that the number of executed controlling activities in the corporate functions (their scope) will not depend on the firm's size and its economic focus [see Tab. 7].

**Tab. 7: Statistical significance of controlling utilisation in corporate activities due to the number of employees and economic classification of the companies**

Test Statistics <sup>a</sup>		
	Number of employees	Economic sector
Chi-Square	9.199	8.566
df	2	3
Asymp. Sig.	0,010	0,036

a. Kruskal Wallis Test

Source: Author

## 4 Discussion

The addressed firms in the CR utilise controlling to a significant extent (136 respondents from 188). Based on the statistical examination, hypothesis 1 has been rejected, and so therefore it is presumed that the implementation of controlling activities will be affected by the number of employees in the company and its sector classification. The significance of controlling always grows with the size of the company (Becker, et al., 2011) but the research confirms the significance of the application of controlling instruments even in small and medium enterprises (Davila, et al, 2005; Sandino, 2007; Kral, Duspiva, 2015; Songini, et al., 2015; Berek, 2015).

The companies that utilise controlling see the main benefits in the improvement of their economic situations. According to the study by author Lisi (2015), controlling may positively affect the economic significance. Even the studies by authors Henri & Journeault (2010), Urban & Govender (2012), Crutzen et al. (2013), and Maas & Reniers (2014) show the high degree of controlling application in planning processes that may be dependent on the corresponding sector, organisational factors applied by the firm's management, but also the securing of sustainable development.

Controlling is performed in the firms mostly via a separate controlling department. The second hypothesis was proven only partially. In terms of economic focus the hypothesis was fully proven, differences were not proven. In terms of company size differences were not proven in these factors: Company targets and Owners' requirements, however they were proven in factors of Market things, Company competition and Need of flexible operational system. If the controlling activities are applied, then it is mainly for the purpose of securing the corporate goals and the owners' or investors' requirements. Therefore, it is possible to state that between these two reasons for introducing controlling and the number of employees, there is no statistically significant difference; unlike with further reasons that depend on the size of the individual firms. The sector articulation has no statistical effect on controlling introduction.

A significant correlation dependency of the controlling activity implementation on the market situation and competition can be seen. This means that when the firms state the market situation as a significant factor, then there is a higher probability that they will

consider competition an important factor. The implementation of controlling for reasons of the “need for a flexible information system” is significant in comparison with the aforementioned factors, even though the correlation between them is low.

Firms applying controlling utilise it mainly when processing reports for the needs of the management and the owners, as a support of planning and determining their goals, and for continuous obtaining and processing of information for the support of decision making. Also, the frequency of the performed controlling activities from the standpoint of the effect of the number of employees and classification into economic sectors has been examined. Here, the presumption of the effect of nominal values on the controlling activities has not been confirmed when using a non-parametric test. Thus hypothesis 3 can be rejected.

According to the expert literary research of authors Lue & Radlach (2015), utilisation of the so-called cybernetic control is popular, which especially presumes the utilisation of reports, accounting, and auditing. Nevertheless, the expert research studies warn that the application of only these tools is not enough when applying the control management (Ball, & Milne, 2005).

## **Conclusion**

The demands of the owners towards the managers have been increasing very rapidly, practically in every sector. The implementation of controlling on the part of top management of the company plays a key role in the organisation control (Davila, et al. 2009). The basic function of controlling is to increase the managers’ comfort during decision making. From the foreign literature but also from our research that has taken place in the Czech Republic it is apparent that the companies have already been realising this fact. However, it depends on the type of the company in which controlling is operating from the standpoint of the number of employees and their economic focus. The research shows that controlling activities are beginning to be applied more even in medium and small firms, even though it rather fulfils a supporting function. It participates in the control especially in the passive manner by providing information for managerial decisions. In large companies, where finances play a stronger role, controlling also participates in the control in a more active manner, and it can even be used to make decisions, besides the supporting function.

The managerial information has another structure than the data that can be read from the accounting, and it is adapted specifically for decision making. This is especially the information of non-monetary nature that the accounting does not provide. The controller must know the company strategy in detail and provide such information that shows how well or poorly the company is doing on the path to fulfilling its strategic goals. Other information either distracts the managers or is not utilised at all. The controlling must be the management’s partner, save its time, decrease the surprise element, and increase the comfort of decision making.

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# REGIONAL ABSORPTIVE CAPACITY AND REGIONAL DISPARITIES IN LITHUANIA: LINKAGES, EVIDENCES AND INSIGHTS

Vita Juknevičienė

***Abstract:** Regions face contemporary challenges of global economy and modern society and act differently. Therefore, regional disparities occur in various fields: social welfare, economic growth, infrastructure developments, etc. Sometimes the regional retardation (as a reflection of regional disparities) inhibits the progress and brings losses; sometimes otherwise, it encourages the flexibility and the implementation of new ideas. Especially retarding regions, seeking for socio-economic welfare, must search for new (specific, adapted to the context and circumstances) ways of acting. Indisputably innovations become the core of a socio-economic progress in all regions. And the development of absorptive capacity (individual, organizational, regional) as a main precondition for any innovative activity, leading to innovations, could create favorable preconditions to gain the competitive advantage. Therefore, this article draws linkages between levels of regional absorptive capacity and regional welfare by giving some evidences from Lithuania (a small European country). It argues that regional absorptive capacity can be understood as a cause and a consequence of the regional development process and be reflected by regional disparities. Results of the research illustrate the mutual connection: region with better socio-economic results has more possibilities to develop its absorptive capacity and to reach its higher level, needed for future development.*

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***Keywords:** Regional absorptive capacity, Innovation, Regional development.*

***JEL Classification:** O31, R11.*

## Introduction

Recently the previous research works have investigated absorptive capacity in various contexts. Scholars and researchers, working in the field of innovation management, management of innovation systems and innovation policy, analyzed this phenomenon and agreed that “the concept of absorptive capacity, whose foundations were originally designed in the context of firm theory, can be extended to complex institutions, such as countries and regions” (Mason, Bishop, Robinson, 2009, p. 1363). Therefore, many studies are made in the development of innovations in particular organization, innovation system or region (Gray, 2006; Mahroum, Huggins, Clayton, Pain, Taylor, 2008; Mahroum, Alsaleh, 2012; González, Muiña, 2014, etc.), but only few of them look for linkages between absorptive capacity and socio-economic situation and their development (Narula, 2004; Autant-Bernard, Fadaïro, Massard, 2013; Juknevičienė, 2015; Moutinho, 2016, etc.). The absorptive capacity can be taken as the core capacity needed for any innovative activity and tightly connected to the development of all organizations and sectors in a region. The higher level of absorptive capacity of organizations (or sectors) leads to more successful, smart and/or developed exploitation of opportunities in the environment (González, Muiña, 2014; Ali, Seny Kan, Sarstedt, 2016). And otherwise, if the region goes

through the stagnation or retardation process, regional organizations experience more challenges and problems to become equally competitive or even leading because of the lack of regional capacities, resources and support.

There emerges a **scientific problem**: how the absorptive capacity is coherent to the socio-economic situation of a region? **The aim** of the article is to present linkages between the regional absorptive capacity and regional development situation (disparities). For the implementation of the research idea, following **objectives** were used: 1) to present the concept of the development of regional absorptive capacity; 2) to identify the linkages between the regional absorptive capacity and regional disparities (the development of absorptive capacity and the regional development); 3) to present some empirical evidences of the regional disparities' reflection on regional absorptive capacity from Lithuanian regions and give some future insights. The literature analysis, theoretical systematization, statistical analysis and interpretation were used as **methods** for this scientific research.

## **1 Linkages between the development of regional absorptive capacity and the regional development**

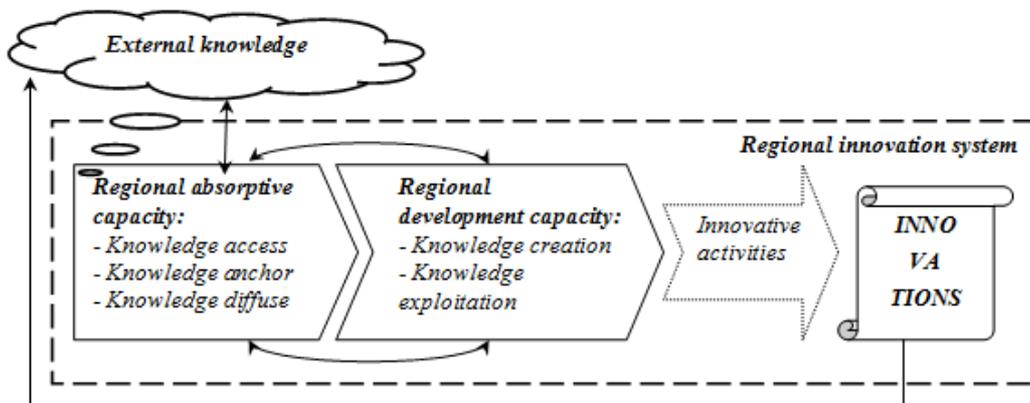
### **1.1 The conception of the development of regional absorptive capacity**

Regional absorptive capacity (hereinafter RAC) is the phenomenon and main precondition for innovative activities, and it must be supported and maintained in a regional innovation system (hereinafter RIS). It must be understandable for all participants of a RIS (academy, business, government and business, innovation support organizations) and it should be focused on the essential task – the development of the regional socio-economic welfare.

The approach of knowledge-based view gives the emphasis for the role of knowledge (especially external one) as the main source for creation of strategic (including development) opportunities (Foss, Lyngsie, Zahra, 2013). Extracting new ideas from elsewhere (external knowledge) and combining them with existing knowledge (internal knowledge) is one of the major processes of innovation activities, and it is absolutely imperative that organizations (participants of the RIS) protect their valuable knowledge and the outcomes of processes (Seo, Chung, Woo, Chun, Jang, 2016). Despite of the protection of original ideas, knowledge becomes more and more global value, accessible from different points and for different organizations and individuals (participants of innovation systems in various levels). It is important to be able to attract good ideas from elsewhere (regional absorptive capacity RAC) and exploit them to develop new products or services (regional development capacity). These are main conditions for the enabling and enhancing the efficiency of innovative activities in a region. Scientific discussions and the analysis of scientific literature indicate several versions of the concept of the absorptive capacity and its dimensions. But the author of this research follow the modern conception of **absorptive capacity** declaring three main components (elements needed for the enabling of knowledge absorption): the capacity to access knowledge (in international networks of knowledge and innovation); the capacity to anchor external knowledge (from people, institutions and firms); the capacity to diffuse new innovation and knowledge (in the RIS as well as wider economy) (Fig. 1) (Mahroum et al., 2008; Mahroum, Alsaleh, 2012; Juknevičienė, 2015). This phenomenon comprehended two levels of absorptive capacity (individual and organizational) in early studies, but later the

third level (the regional one) was highlighted by various researches, explaining the connection between innovativeness of a region and its absorptive capacity.

**Fig. 1: Regional absorptive capacity in a regional innovation system**



Source: Author's own work.

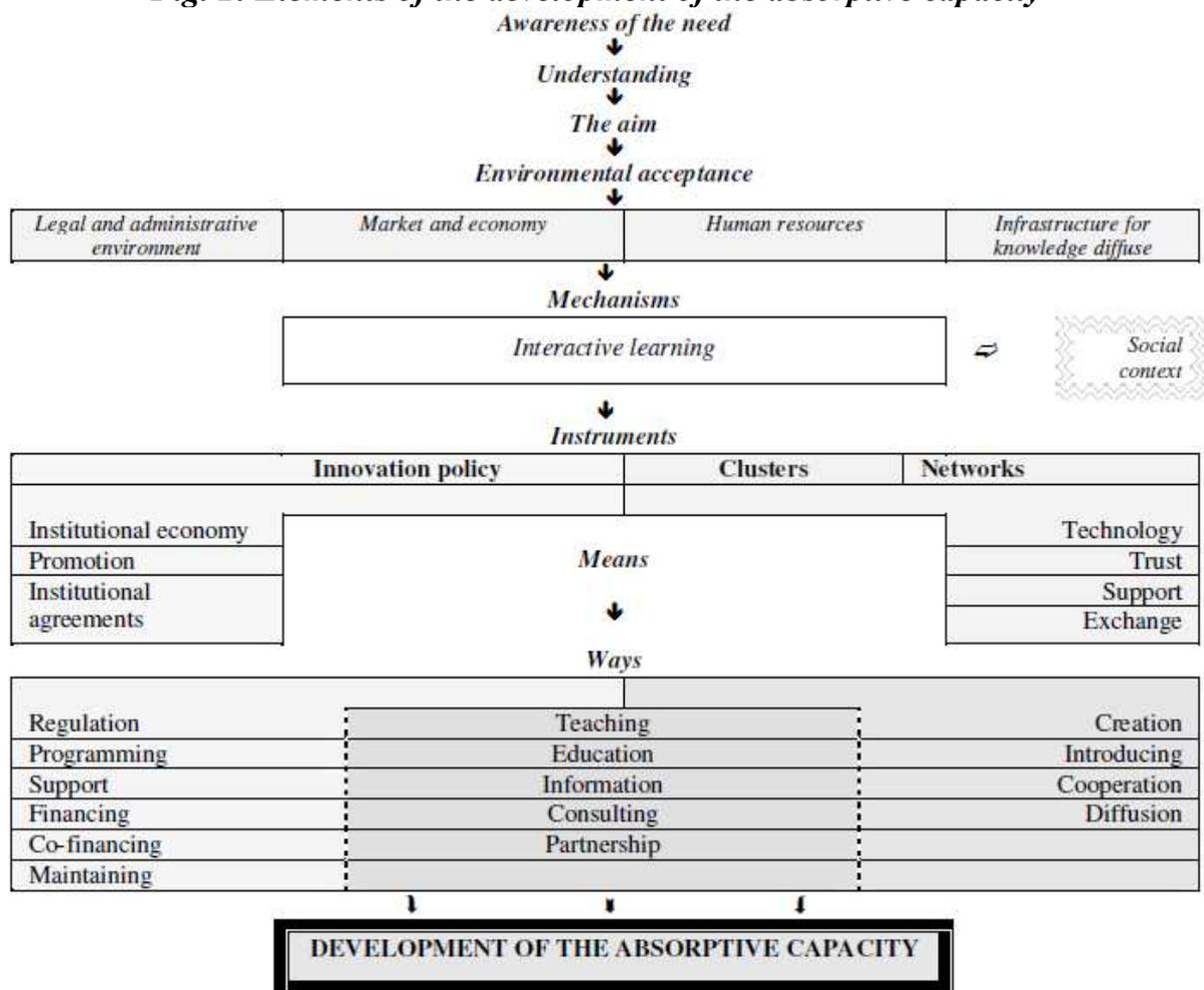
Each regional innovation system is unique; therefore, different RISs can be characterized by different scale, intensity, speed and empowerment options of the regional absorptive capacity. But all of them share a common goal – innovations. Innovations as the result of innovative activities in a RIS require for the empowerment of all its actors. The basis for the research was the Triple Helix Model (Etzkowitz, 2003; Juknevičienė, 2015), where three main elements are presented (university, industry, government). According to many insights of scientific discussions and the critique, this model was adapted to the context of a RIS in a small country and elements were renamed as academy (including universities and colleges), business (industry and service sector), government (national, because there is no regional administrative level in Lithuania), and support institutions (representing organizations, providing material as well as non-material support for business development, business-university partnership, innovation creation and development). Institutions presenting academy and business elements mainly participate in the process of the creation, exploitation and the transfer of innovations. Their ability to innovate depends on internal (regional) and external (supra-regional) knowledge sources, complementing each other. Partnership between all actors in a RIS should lead to the innovative activities. Innovations as a result of those activities can only be achieved by ensuring the continuous dynamic process – the development, which nourishes and maintains innovative activities in a RIS.

The “development” is determined as a process, enabling all actors of a RIS for many activities leading to innovations: to identify changes in the environment, to improve the organizational or sectorial situation, to contribute to the growth and/or positive changes in a particular sector, sphere or industry etc. Therefore, **the development of a regional absorptive capacity** is perceived as an acquisition, building, consolidation and enhancement of capacities of knowledge access, anchoring and diffusion liberating the potential of existing knowledge (internal and absorbed external), realise potential opportunities, integrate the learning into the behaviour (individual and organizational). In other words, the development of the RAC enables better exploitation of the potential of existing implicit and explicit knowledge, and creates needed preconditions for the generation and realization of innovative ideas.

The development of the particular RAC is possible just with the maintenance of a particular RIS environment, which consists of: a) appropriate basic infrastructure (transport lines, communication channels; basic qualified human resources; networks

of schools and hospitals, etc.); b) developed advanced infrastructure (universities, research institutes; advanced qualified human resources; banks, insurance companies, ect.); c) enterprises (local companies with appropriate material and human capital; branches of multinational companies); d) appropriate activities of formal and informal institutions (regime of intellectual property; incentives and subsidies, promoting the creation and adoption of new technologies; taxes, competition policy; schemes for the promotion and targeting of investments; promotion of economic collaboration between domestic and foreign actors, etc.) (Narula, 2004). All mentioned elements of the RIS environment (their existence and/or the level of their development) strengthens or interrupts the process of the development of the RAC. This explains the need of understanding, how the multidimensional process of the development of the RAC is composed (Fig. 2).

**Fig. 2: Elements of the development of the absorptive capacity**



Source: (Juknevičienė, 2015, p. 70)

First of all, the awareness of the need for the development must exist in all levels in a particular RIS. This awareness leads to the intensification of the understanding (to know who, why and how) and the clarification of the goal of this process (the final achievement of the development). Furthermore, all steps (positive changes) of the development must proceed and be maintained in a favourable environment, supported by legislation and administration (legal basis, decisions, made by public policy makers and public administration institutions), market and economy (system of taxes, stability of a market, trade policy, etc.), human resources (scientific and educational activity, number of high qualified specialists in a region, retention of high qualified specialists in a region,

the system for training, etc.), and infrastructure for knowledge diffusion (access to the Internet, networks and bridges of telecommunications, etc.). Besides, all actors of a RIS must choose appropriate instruments, means and ways for making positive changes (not only organizational, but regional as well) and going forward toward the goal of economic growth of the organization and regional socio-economic welfare. It should be emphasized, that the development must be organized in all three levels (individual, organizational and regional). Moreover, the public policy (objectives, programs, instruments, projects, etc. of the national innovation policy and regional policy) plays the crucial role in the development process at the regional level. The goal of the development could be reached only with the support of (national and local) governmental institutions. At the same time it should be emphasized that homogenous national innovation policy do not ensure a harmonious development of all regions in a country. Therefore, it is necessary to identify factors, determining the capacity to access, anchor and diffuse the knowledge, specific for a particular RIS.

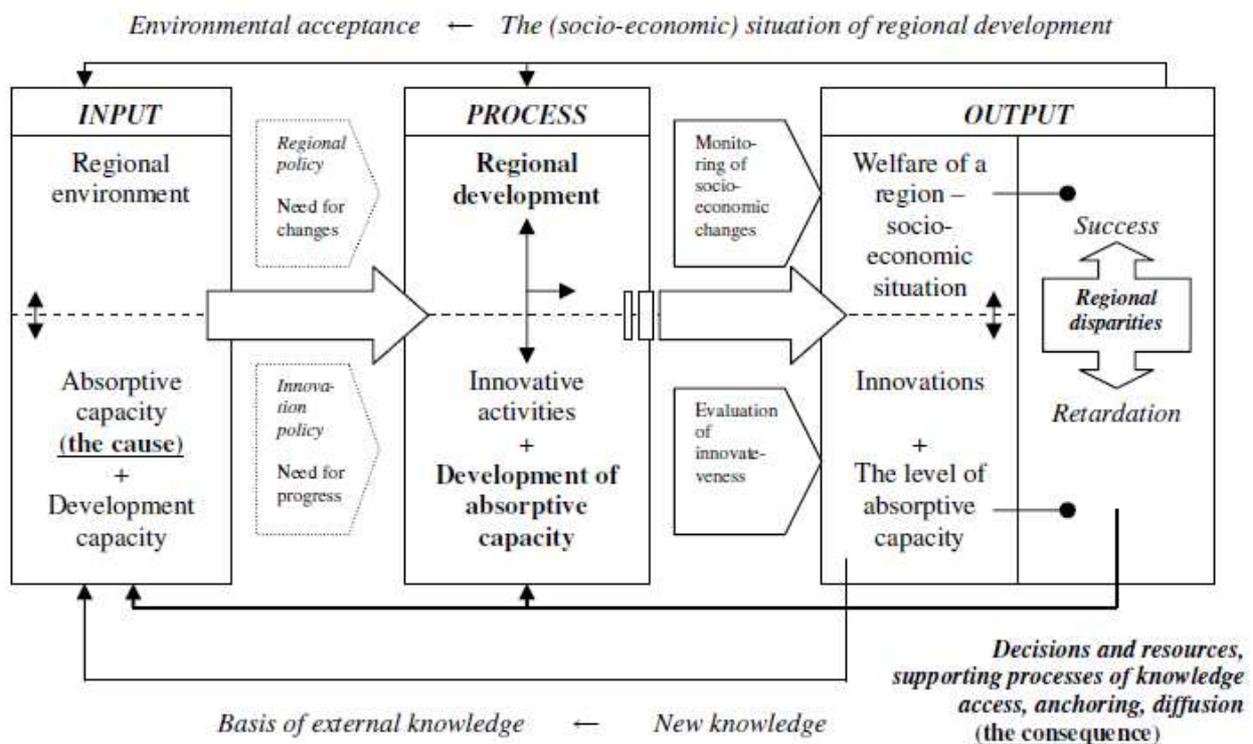
## **1.2 Linkages between the regional absorptive capacity and regional disparities**

**Regional disparities** are determined as the divergence or inequality of characters, phenomena or processes, having specific territorial allocations and occurring in three types of spheres: social (relates to population, quality of life, incomes, social facilities, etc.), economic (the economic and development potential, regional outputs, employment level, etc.) and territorial (geographical, natural and technical conditions, such as natural environment, availability of markets, education, services, infrastructure, etc.) (Kutscherauer, Fachinelli, Hučka, Skokan, Sucháček, Tománek, Tuleja, 2010, p. 17). The welfare of the society and the quality of its life are depended on those spheres; therefore, the regional development is connected with regional disparities. And elimination of those disparities usually is main aim of the regional policy.

Among causes leading to regional economic disparities it can be found: the structure of economy dominated by economic sectors with a low productivity of the production factors; the low share of population having a higher education; the low research-innovation potential due to the insufficiency of the financial resources and the poor implication of the private sector in funding R&D activities; the insufficient, weakly motivated human resources; and finally, the migration of the highly qualified specialists (Talmaciu, Mioara, 2011). Even it was proved that inflows of innovators, inventors (active participants of the RIS) are “critical for wealthier regions, while it has more nuanced effects for less developed areas” (Miguélez, Moreno, 2015, p. 833), at the same time it was argued, that thriving (leading, creative, innovative) businesses are vital to the economic recovery (Mason, Bishop, Robinson, 2009), which is essential important for less developed regions after some crisis or regional stagnation period.

Absorptive capacity contributes to regional development, because it allows actors of a RIS to internalize knowledge that exists elsewhere (either within the regional economy or externally), make it available directly or indirectly to them (Narula, 2004, p. 7); therefore, it creates preconditions for the strengthening of a regional competitive advantage and for the creation of favourable environment of the socio-economic progress. But sometimes the real result of the innovativeness is far from the expected one even with a lot of resources and strong efforts of actors in a RIS. This happens because of regional differences and the multidimensionality and the complexity of the development process (Fig. 3).

**Fig. 3: The model of linkages between the regional absorptive capacity and regional disparities in the context of the development process**



Source: Author's own work.

The RAC is the beginning of innovative activities, leading to innovations as a reflection of the success in innovations of the region and its development. Regional policy is the targeted activities of governmental institutions influencing the socio-economic development, trying to eliminate disparities between leading and lagging behind regions and within regions as well as to promote balanced and sustainable development in the country (Burbulytė-Tsiskarishvili, 2014). This is the main branch of the public policy targeted to eliminate socio-economic gaps and to engage all resources and instruments in the process of regional development. The National Innovation Policy is more complicated, because it is not a process of long-term planning but rather one of continuous experimentation – the aim of innovation policy “is to foster the development of technologies that don’t yet exist and whose business models and markets are unknowable. Organizations capable of inventing these technologies must be attracted or built, and the result of their labours must be channelled into economic growth” (Breznitz, 2014). Nevertheless, the RAC participates in the process of socio-economical growth as the stimulus (the cause) for catching up other regions (eliminating regional disparities). The final result of the process of socio-economic development (success or retardation) determines environmental acceptance, decisions and resources as well as the level of the RAC – the potential for the future knowledge absorption (the consequence). However, processes of the development of the RAC and the regional development are influenced by specifics of a RIS in a particular country.

## 2 Methods

The research of linkages between the RAC and regional disparities was based on the case study approach. This methodological approach enabled the researcher to combine the existing theoretical knowledge with new empirical insights (Vissak, 2010), especially when this topic in the context of small country’s regions was not analysed before.

The list of indicators, presenting the situation of the RAC, is based on the scientific research, accomplished by the author (Juknevičienė, 2015), which substantiated the methodology of the assessment of the development of the RAC. Indicators, introduced in this article, were selected in accordance with the need to reflect linkages between the RAC and regional disparities. All those indicators were connected to components of the RAC: knowledge access, anchoring and diffusion. Indicators are presented in two groups of input and output (causes and consequences) of the development process.

This research included sub-national regions – counties (in accordance with NUTS classification) of Lithuania. There was a goal for sampling to select two regions similar in some environmental conditions, but different in results of innovativeness. The method of criterial selection was used to make a sample of the research. It was used 22 criteria, reflecting groups of factors: geographical (situation in a country, number of municipal areas, etc.), infrastructural (containing transport hubs – airport, seaport, etc.), social (population, education), economical (productivity, investments) and institutional (containing governmental, public institutions, formulating /implementing the innovation policy). Two regions were selected for the research: one – successfully carrying out, and the other – insufficiently successfully carrying out innovative activities (respectively Kaunas and Šiauliai regions), which differently seek for economic growth, competitive advantage and development of absorptive capacity. The comparison of the general situation and indicators' values per 1000 inhabitants in Lithuania, Kaunas and Šiauliai regions gave the opportunity to reflect regional disparities.

Due to limits of access to the regional statistics and the lack of newest data, the most recent statistical data (presenting 2012) is introduced in this research. All data was obtained from databases of two institutions: Statistics Lithuania and The State Patent Bureau of the Republic of Lithuania (Official Statistics Portal. Statistics Lithuania, 2016; State Patent Bureau of the Republic of Lithuania, 2013). After presenting some evidences from Lithuania (as a small country), the method of interpretation was used to identify main perspectives of the development of the RAC in mentioned regions.

### **3 Problem solving**

The situation of the RAC (values of indicators in 2012) (Tab. 1) reflects some regional (socio-economic and infrastructural) disparities of Lithuanian (successful and insufficiently successful) regions.

It can be noticed, that total values of indicators show that Kaunas region exceeds the level of Šiauliai region in all areas (except the net international migration). But comparing values per 1000 inhabitants this situation differs.

Infrastructural (institutional) maintenance is needed for the region as a main source for new knowledge, innovative activities and the environment for possible exploitation. Analysing infrastructural disparities, it is mentioned that Kaunas region has 11 institutions (5 universities) of high education, Šiauliai region - only 3 (only 1 university among them). According to the value of those institutional indicators per 1000 inhabitants, Kaunas region exceeds the national level. Even the traditional industry takes the main part of Lithuanian business market; there are some evidences, that small and medium enterprises (especially, start-ups, spin-offs, etc.) could be the main power of innovative activities' progress in regions. Number of enterprises introducing innovations in Kaunas region exceeds the same number in Šiauliai region 2.7 times. But in comparison of this indicator's value

per 1000 inhabitants both regions do not seek the national level (Kaunas region still lags by 20.3 percent, Šiauliai region - 41.2 percent). Mentioned gaps show that institutional indicators reflect the tendency of regional differences and even their situation in the national level.

Socio-economic growth of the region is impossible without high qualified human resources. Number of specialists graduated from regional universities (it's a social indicator) in Kaunas region 4.6 times exceeds the number in Šiauliai region. Comparing this indicator's values per 1000 inhabitants, Kaunas region shows the high position as well (it is 60 percent higher than in Lithuania and 128 percent higher than in Šiauliai region). Similar situation is with the number of specialists, graduated from regional colleges – respectively 25 and 66.7 percent. Interesting fact is that the share of employees, involved to R&D in higher education and governmental sectors, in both regions is higher than the national level – respectively 8.5 and 2.4 times. The link between high qualified graduates and their employment in activities, requiring special knowledge in R&D, can be seen here.

Unfortunately, net international emigration is huge problem for all the country and its regions. Country lost more than twenty thousands of inhabitants only during 2012. Despite of the success/non-success in innovative activities, the net international emigration per 1000 inhabitants in both regions was higher than the national level: in Kaunas region - by 19.5 percent, in Šiauliai region - by 16 percent.

Analyzing economic indicators per 1000 inhabitants it can be seen different positions for both regions: Kaunas region (successful region) lags behind just in FDI and the share of regional GDP in the national GDP (respectively – 38.5 and 1.8 percent), when Šiauliai region (insufficiently successful region) lags behind in majority of economic indicators, except ratio of regional R&D expenditures in higher education and governmental sectors and the region's GDP, and the share of employees involved to R&D, when values 1.5 and 2.4 times exceed the national level.

**Tab. 1: The situation of the regional absorptive capacity (values of indicators) of Lithuanian regions in 2012**

		INPUT		OUTPUT				
		Region*	Value	Region*	Value			
ACCESS	Number of universities in a region (units)	Lithuania R	23	Number of organizations, engaged in vocational, scientific and technical activities (excluding R&D) in a region (units)	Lithuania R	7782		
		Kaunas R	5		Kaunas R	1162		
		Šiauliai R	1		Šiauliai R	281		
		Lithuania I	0.00766		Lithuania I	2.59086		
		Kaunas I	0.00834		Kaunas I	1.93784		
	Šiauliai I	0.00338	Šiauliai I	0.98312				
	Number of colleges in a region (units)	Lithuania R	24	Share of Regional Gross Domestic Product in a structure of national GDP (percent)	Lithuania R	100		
		Kaunas R	6		Kaunas R	19.6		
		Šiauliai R	2		Šiauliai R	7.6		
		Lithuania I	0.00799		Lithuania I	0.03329		
Kaunas I		0.01001	Kaunas I		0.03269			
Šiauliai I	0.00676	Šiauliai I	0.02569					
ANCHORING	Number of specialists graduated from regional universities (units)	Lithuania R	30333	Net international migration of a region (units)	Lithuania R	-21257		
		Kaunas R	9517		Kaunas R	-5076		
		Šiauliai R	2034		Šiauliai R	-2460		
		Lithuania I	10		Lithuania I	-7.08		
		Kaunas I	16		Kaunas I	-8.46		
	Šiauliai I	7	Šiauliai I	-8.21				
	Number of specialists graduated from regional colleges (units)	Lithuania R	13044	Share of employees, involved to R&D in higher education and governmental sectors of a region, in the structure of total labour force (percent)	Lithuania R	1.33		
		Kaunas R	2672		Kaunas R	2.51		
		Šiauliai R	897		Šiauliai R	0.44		
		Lithuania I	4		Lithuania I	0.00044		
		Kaunas I	5		Kaunas I	0.00419		
	Šiauliai I	3	Šiauliai I	0.00149				
	Number of citizens at the age of 25-64 having at least the higher education (ISCED 5-6) in a region	Lithuania R	549666	Foreign direct investments in a region (million EUR)	Lithuania R	12230.126		
		Kaunas R	123525		Kaunas R	1502.568		
		Šiauliai R	41120		Šiauliai R	177.350		
		Lithuania I	183		Lithuania I	4.07177		
		Kaunas I	206		Kaunas I	2.50579		
	Šiauliai I	139	Šiauliai I	0.55951				
	State and municipal budgets for students of region's higher education institutions (universities and colleges) (million EUR)	Lithuania R	303.793	Number of issued patents in a region (units)	Lithuania R	83		
		Kaunas R	86.808		Kaunas R	24		
Šiauliai R		21.282	Šiauliai R		5			
Lithuania I		0.10114	Lithuania I		0.02763			
Kaunas I		0.14477	Kaunas I		0.04002			
Šiauliai I	0.07194	Šiauliai I	0.00845					
Ratio of regional R&D expenditure in higher education and governmental sectors and the region's GDP (percent)	Lithuania R	0.661	Number of registered designs in a region (units)	Lithuania R	53			
	Kaunas R	1.195		Kaunas R	13			
	Šiauliai R	0.163		Šiauliai R	1			
	Lithuania I	0.00022		Lithuania I	0.01765			
	Kaunas I	0.00199		Kaunas I	0.02168			
Šiauliai I	0.00055	Šiauliai I	0.00338					
				Number of enterprises, introducing innovations in a region (units)	Lithuania R	25354		
					Kaunas R	4033	Kaunas R	4033
					Šiauliai R	1468	Šiauliai R	1468
					Lithuania I	8.441	Lithuania I	8.441
					Kaunas I	6.726	Kaunas I	6.726
Šiauliai I	4.961	Šiauliai I	4.961					
				Added value, created in a region in prices of production (million EUR)	Lithuania R	12560.322		
					Kaunas R	3203.574	Kaunas R	3203.574
					Šiauliai R	1116.346	Šiauliai R	1116.346
					Lithuania I	4.18170	Lithuania I	4.18170
					Kaunas I	5.34251	Kaunas I	5.34251
Šiauliai I	3.77368	Šiauliai I	3.77368					

CAUSES	↳	CONSEQUENCES
<p><b>*Means of "Regions":</b>  Lithuania_R – the real value of indicator of Lithuania  Lithuania_I – the value of Lithuanian regional indicator per 1.000 inhabitants</p>		<p>Kaunas_R – the real value of indicator of Kaunas region – the successful region.  Kaunas_I – the value of indicator of Kaunas region per 1.000 inhabitants</p>

Additional information about population in 2012: Lithuania – 3 003 641; Kaunas region – 599 638; Šiauliai region – 295 824 inhabitants.	Šiauliai_R – the real value of indicator of Šiauliai region – the insufficiently successful region Šiauliai_I – the value of indicator of Šiauliai region per 1.000 inhabitants
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*Source: concluded by the author, on the basis of (Official Statistics Portal. Statistics Lithuania, 2016; State Patent Bureau of the Republic of Lithuania, 2013)*

The statistical analysis showed that Kaunas region is more successful region, when Šiauliai region lags behind almost in all areas, even in comparing values per 1000 inhabitants.

#### **4 Discussion**

All indicators of knowledge absorption reflect disparities between regions. They can be taken as the contribution as well as the final result of the development process.

Firstly, the regional institutional (infrastructural) disparities can be noticeable. The process of knowledge access, anchoring and diffusion is maintained by different number of actors of both RISs. Especially it is important, because of directly linkages between the development of the RAC and the existence and vitality of RIS actors, involved to activities, enquiring innovative behaviour (universities, colleges and enterprises, introducing innovations). Secondly, regions differ obviously according to efforts and results of the development of human resources and its involvement to innovative activities. Kaunas region has the higher potential of high qualified specialists, even with high number of emigration from the region. This fact testifies about “brain-drain” phenomena in a region, sufficiently carrying out innovative activities, which becomes a threat for future regional development. It could be stated that Lithuanian regions become more and more “regions-donors” preparing needed specialist for other regions (the region of capital – Vilnius) or even other countries. Emigration from a region can be stated both – as a cause (“brain drain” phenomenon) and the consequence of the regional retardation as well as for lower level of absorptive capacity development. Even having quite high educated population, region can not be developed without business contribution – the individual absorptive capacity can not get the explicit form because of no possibilities to enable competencies in a particular job position (no vacancies for specialists available in the regional labour market). Thirdly, the regional economic situation (Value added) reflects the tendency of disparities (leading and lagging behind) of regions. Region, successfully carrying out innovative activities, create almost one fifth of the Lithuanian GDP (it holds the national level per 1000 inhabitants). Graduates and high qualified specialists are more motivated to remain in this region, business organizations (having increased choice in specialists supply as well as better economical welfare in the region) have the interest to develop, expand their activities in the region, thereby creating more favourable environment for future development of absorptive capacity.

All those indicators and their analysis proclaim about the connection between the RAC in a particular RIS and regional (socio-economic) disparities (as causes and consequences).

The analysis of the situation in two Lithuanian regions gives some insights on future issues. The level of RAC and regional socio-economic welfare (with regional disparities) can be stated as “two sides of the same mirror”. First of all, RAC can be developed only in favourable environment, when regional development process is the main instrument to create needed environment. Regional disparities reflect the socio-economic leadership and retardation, speaking about unequal preparation for innovative activities and enabling of implicit competencies. Insufficient conditions (no workplaces, especially for young

creative generation of specialists, low level of wages, low standard of living) lead to the negative regional consequences, such as huge wave of emigration (especially professionals), business relocation, unsatisfaction of regional community's needs, aging society, non-motivated personnel, etc.). Almost all regions in Lithuania experience this negative impact (both successful and non-successful). Secondly, RAC remains implicit till it gains favourable conditions to become explicit. Therefore, the potential of regional human resources must be recruited and exploited. One organization or even sector is disable to achieve such a goal, therefore, all actors of the RIS must be the part of developing the RAC and to contribute to the implementation of innovation policy.

## Conclusion

Particular elements of knowledge access, anchoring and diffusion contribute to the development process (input) as well as emerge as the final result (output). The duplex connection between the RAC and the socio-economic situation in a region is identified as the theoretical and empirical approach. The smaller scale of innovative activities, determined by weaker absorptive capacity, leads to the retardation of a region (in innovations as well as economy of the insufficient successful region), what causes fewer possibilities (in terms of the acquisition of resources and the potential's empowerment) for the development of the RAC. And vice versa, the successful region with the higher level of the RAC can create the favourable environment for efficient innovative activities, giving satisfying results of regional socio-economic development, leading to the forthcoming knowledge absorption. In summary, linkages between the RAC and regional disparities in Lithuanian regions are evident. Therefore, RAC can be stated as a cause and consequence of the regional development.

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# A STUDY OF GENERATION Z FROM THE COMMUNICATION PERSPECTIVE OF UNIVERSITIES

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***Abstract:** This paper deals with the examination of high school and college students' preferences for choosing the university who were born in the period of mid 1990s. The goal of the paper is to conduct more detailed analysis of the most common means of communication from the perspective of potential and existing customers (in this case, students). We approach how members of this generation make decisions when they choose a university to study and what content of the information affects their final decisions. Research conducted for this article include at most 900 respondents from among high school students and first year university students. It is evident that students are affected more by information concerning their future than those that make life in the study. A big influence on the decisions of the university have information that students gained from their friends or family who the studied similar schools in the past. We found that within a generation Z the older generation does not have such an influence on their decisions. Our findings also show a degree of decision-making dynamics of two students subgroups comparison - students who doesn't study the university and those who already are studying. The valuable information for business sphere about the way how examined groups of student gather information is presented in the paper. This information can significantly help to understand and better targeting that groups.*

*The document can be downloaded at <http://hdl.handle.net/10195/67927>.*

**Keywords:** *University, Questionnaire, Generation Z, Media, Marketing.*

**JEL Classification:** *M31, I23.*

## **Introduction**

This paper deals with the problem of targeting the generation that has been termed Generation Z. Businesses and organizations offering their products on the consumer goods market or in the government or non-profit sectors to people born in the second half of the 1990's or after the turn of the century are discovering that this generation shows distinctly different behaviour than previous generations. Currently, the children of Generation Z are already studying at university. Some studies have dealt with the problem of educating this generation within academia. However, there are not many studies that have mapped how this generation makes decisions when selecting an institute of higher education. This paper deals with that issue.

Generation Z also demonstrates specific traits, because there was a significant decrease in the number of children born. If up to now we have been dealing with a market that has been termed saturated, the market will have an even greater problem acquiring and maintaining customers with the ascent of a generation that is distinctly smaller demographically. This now reveals the problems facing institutes of higher education (IHE). However, this problem will increase via a domino effect to all other markets and will intensify with the demise of demographically larger generations. This paper focuses on investigating Generation Z – the way they make decisions when opting to study

at an IHE. It also deals with how this generation uses new technology and how they allow the previous generations advise them (whether parental influence is significant). The paper investigates two groups of students. One group is comprised of students in their last year of secondary school (SS) and the second includes students in their first year at an IHE; these are located in various regions across the Czech Republic. The research can help reveal important information for organizations and businesses that are starting to learn how to target Generation Z and to use or confront their specific traits. The research sample contained nearly 900 respondents. This expands on previous research, which was conducted at only one university in the preceding years.

## **1 Objectives and Research Questions**

The paper focuses on communication by organizations offering higher education. The goal is to conduct more detailed analysis of the most common means of communication from the perspective of potential and existing customers (in this case, students). An important factor for each generation is the means they use to find out information. An individual makes decisions concerning their future and contemplates their behaviour on the basis of information with a specific predilection. We determined how the participants (Generation Z) try to find out information and communicate with organizations using various communication channels. The paper presents new information on students' decision-making methods concerning their future, i.e., higher education.

Another objective was to find factors helping describe Generation Z, which is currently entering productive age and is becoming active – by becoming a paying constituent of the market.

The research questions:

- 1) How do different factors influence Generation Z's decision making (how far the school is from home, the quality of accommodation, opportunities for employment, etc.)?
- 2) It is beneficial for universities to divide students into groups and target these individually?
- 3) Is the choice of university dependent on the type of secondary school where the students study?
- 4) In what way are students able to be influenced by media, promotional events, or friends' recommendations?
- 5) Can the previous generations (parent recommendations, parents' field of education, school counsellors) influence Generation Z students' decision making?

## **2 Literature review**

Scientific papers primarily focus on the reasons for choosing higher education, and there are a great many papers that deal with the option of whether or not to continue with education. The process of how American students select universities is presented by Hoxby (2004) as well as Cabrera and La Nasa (2000), for example. The primary focus of these studies is the personal role of a student's character, such as family background, socioeconomic status, etc. In this paper, we opted to focus on how the individuals who do decide to continue their studies select institutions.

If we are to discuss the state of data availability, then most papers use data at the institutional level, which are available and applicable when selecting a university as part of the university application. (Bezmen and Depken, 1998) have compared the applications of 722 American universities and tried to find a correlation between the quality of the students, the degree that studies are completed, costs per student, and the student to faculty ratio. (Monks and Ehrenberg, 1999) investigate the influence that a university's standing in various rankings has on making the decision of whether or not to study at the given university and also whether the ranking influences the amount that it costs to study at the given school. As is evident, when the position in the rankings is higher, the educational costs (including tuition fees, etc.) are also higher, and the costs decrease along with the rankings.

(Manski and Wise, 1983) use microdata to determine how individuals make decisions when selecting a particular school. In their study, they use an approach that incorporates the logit statistical method; computational limitations prevented them from using multinomial logit regression analysis, which uses individual characteristics as a variable instead of attributes based on choice. (Montgomery, 2002) presents a model for selection among trade school graduates; he finds that the combination of costs, university location, and school quality has a significant effect. (Long, 2004) presents a conditional logit model for selecting which institutions to visit using data from 1972, 1982, and 1992. For those who are deciding which school to visit, the aspect of costs and distance is important, and the role of school quality and costs per student play a greater role in 1992 than in 1972. (Avery and Hoxby, 2004) bring the conditional logit model to data derived from original questionnaires given to talented secondary school graduates and find the expected effect that net costs and the institution's quality are influential. It is interesting to note that their results show that distance does not influence decision making on the choice of an IHE. As state,

Society has changed significantly between the period of 1972 to 1992 and 2016. Certain factors influencing the choice of an IHE remain. This paper is focuses on investigating these factors. In a globalized market economy, it is necessary for companies to deal with the factors influencing consumer purchasing behaviour. One of the advantages this brings to companies is faster, more reliable, and skilful managerial decision making as part of commercial policy that is based on using the selected factors as stated in (Novotný and Duspiva, 2014).

An important issue that is necessary to consider is the nature of Generation Z (Behan, 2016), which is currently applying to university. As of the second half of the 20th century, the individual generations have shown increasingly stronger and clearer demarcation. Differences between generations (Stanciu and Stefan, 2016) are becoming deeper, so it cannot be assumed that the current applicants for higher education make decisions using the same criteria as those preceding them. Not only is this intensification of differences the subject of studies between academics, but the "usefulness" of these differences is also being increasingly noticed by politicians, employers, and marketing professionals. Many of today's problems are derived from unclear differences in the expectations of the participating parties. Having the option to at least roughly guess what the other party uses as a basis for decision making can help improve communication and sharing.

Labelling generations using the letters X, Y, and Z (McCrindle and Wolfinger, 2009) is purely a matter of marketing. Each generation has its specific traits, which should be taking into consideration when reaching out to them.

The term Generation Z is used for people that were born during the 1990's and at the beginning of the new millennium (Shatto and Erwin, 2016). Generation Z is so far the most fragmented and varied generation. It is defined by the internet, globalization and the multiculturalism associated with this, terrorism, the financial crisis, the breakdown of the family, and essentially a complete loss of security. Their priorities are education and developing their capabilities. They have entirely different expectations of their access to education than the previous generations. This is a generation surrounded by new technologies and interactivity. Above all, they believe in their own ability to solve all problems in their own way. There are many studies on term of Generation Z or differences between previous generations, e.g. (Mladkova, 2016) or (Panus and Jonasova, 2014).

One of this group's basic features is nearly permanent online presence, which pervades both interpersonal communication as well as customer behaviour and expectations. They quickly familiarize themselves with information and do not want to spend time studying confusing offers. It is a generation that is "used to advertising" and simultaneously exhibits media behaviour distinguished by a preference for moving away from traditional in favour of online media. All this must be taken into consideration when planning marketing activities and communication.

### **3 Research Methods**

The concept for the questionnaire was developed using current theoretical and practical findings relating to the factors influencing applicants when selecting an IHE. The questionnaire's basic structure is derived from a previous questionnaire that was conducted at the University of Pardubice's Faculty of Economics and Administration in 2014 and 2015 (Panus and Jonasova, 2014). A pre-test was conducted before initiating the research; the method of brainstorming was used in connection with this for choosing significant factors affecting applicant behaviour when choosing an institute of higher education. On the basis of the participants' reaction, the questionnaire was improved and expanded to include questions determining the ties between parents' field of study and the choice of IHE specialization, for example. Conversely, some of the questions were eliminated on account of the current questionnaire's objectives. We took into consideration for specific criteria used in (Schüller and Rašticová, 2014).

The questionnaire's criteria were reviewed as part of the pre-test, which was given to students as part of the subject of Marketing Management. Spearman's correlation coefficient was also calculated for determining the amount of dependence between individual questions. With two exceptions, the coefficients were not found to be significant at a 5% level of significance.

The questionnaire itself was conducted from April 26 to May 26, 2016. The questionnaire was prepared electronically as a form on Google site<sup>1</sup>. Students in their first year of further education at the University of Pardubice's Faculty of Economics and Administration were involved in data collection training. Each questioner approached between 5 and 10 respondents directly and also used the services offered by Google directly to approach respondents via email or Facebook. The main condition for further processing was that the respondent must be a current student in the first year of higher education or the fourth year of secondary school. Furthermore, on account of feedback and in order to make

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<sup>1</sup> <https://docs.google.com/forms/d/1vb3Bi5Nx84MIGk6vWOUg7gAWHAlsTzrZB2d7wahYE/edit#>

sure that the questionnaire was actually filled in by the respondent, each interviewer needed to list the contact information for at least three of their respondents.

The research was not very extensive in order to try to achieve a high rate of return. The questionnaire contained 18 questions. Of these, 6 concerned identities (gender, type of secondary school, home address, parents' education, etc.), 5 questions concerned preferences for their studies (department, city, type of education, etc.), and 7 questions concerned criteria when choosing a school and the use of communication channels.

The research criteria were defined so that the students must be in their first year of higher education or their fourth year of a secondary school with leaving examinations and they must be interested in studying at an IHE. After establishing these criteria, the respondent sample was determined according to the equation 1,

$$n = z^2 * \frac{d * (1 - d)}{(d - r)^2} \quad (1)$$

where

*z* is the required level of certainty (confidence),  
*d* is the acceptable margin of error, and  
*r* is the expected margin of error.

After establishing the criteria, the number of respondents in the sample was determined according to the equation for an unknown sample ( $d=50\%$ ). For calculating the minimum sample size, the confidence level was set at 95%, and we expected the margin of error to be 4%. From the results, it can be seen that it is necessary for a minimum of 600 respondents to participate in the survey in order for the study to be representative according to the criteria we have established.

There were 552 secondary school students who responded and planned to apply to the IHE of their choice. There were 339 students who responded that they were studying their first year of Bachelor's studies, and 45 that either did not list a school or stated they had already finished their first year. These were eliminated from the processing. This means that 891 questionnaires were processed. Next, the questionnaires were checked to see if they were complete. The number of completed questionnaires was sufficiently representative, because there were more than the required 600.

The principles of logic and logical thinking were used during the research and while evaluating the results. They were primarily used when applying methods that are mutually interconnected. There are many potential view on this issue on of this is in (Schüller and Rašticová, 2014) brings general outline of this problem, we used different methods in our paper (Cabrera and La Nasa, 2000). Regarding the previous research, cluster analysis conducted with the goal of accomplishing the subdivision of respondents into individual identifiable clusters.

### **3.1 The Feasibility of Subdivision**

However, the results showed that the method of cluster analysis was not suitable for this respondent sample. The individual clusters were not different enough from each other for it to be possible to identify each of them properly and thus define individual target groups. Therefore, in this case, it is possible to answer to Research Question No. 2: "Is it beneficial for universities to divide students into groups and target these individually?" From the

questionnaire, it can be seen that this method is not an appropriate tool. Consequently, it is better to target the group as a whole.

### 3.2 Identifying Data

The following information was obtained from the respondents using completed questionnaires. Of the respondents, 95% were students engaged in on-campus studies, or had selected this form of study (the group of secondary school students). Both these groups were divided by gender – roughly 65% in favour of female. The respondents were primarily from the Pardubice and Hradec Králové regions.

**Tab. 1: The Type of Secondary Schools Where You Studied**

Subject of study	SS	Univ	Total	% total
general	275	134	409	46%
economics	69	98	167	19%
social science	92	49	141	16%
technical	64	37	101	11%
educational	27	8	35	4%
medical	17	6	23	3%
others	8	7	15	2%

*Source: authors*

The relationship between where the secondary school student studied and their subsequent choice of type of institute of higher education is a very important issue. Here, we were interested in how this fact influences what type of higher education the respondents selected. This concerns the answer to Research Question No. 3: “Is the choice of university dependent on the type of secondary school where the students are study?”

Respondents answered in the following way to the question concerning the type of secondary school where they studied in Tab 1.

## 4 Evaluating the Questionnaire

### 4.1 Influence of individual factors

Because the answers to the subsequent questions are given using a Likert scale, they can be considered ordinal variables. Verbal responses were given weight according to how important it is for the evaluator. This means that the more the given criterion influences the respondent’s decision making, the greater its weight.

In this section, we deal with the question of the importance of factors such as accommodation, the school’s distance from home, and meal plan choices when making decisions concerning the option of studying at a given institute of higher education. Even though it might seem that this information is not that important, it is a decisive factor for specific groups of students.

Evaluating the acquired data resulted in the following determination and an answer to Question No. 1: “How do different factors influence Generation Z’s decision making

(how far the school is from home, the quality of accommodation, opportunities for employment, etc.)?”

The quality of campus meal plans and accommodation does not influence the choice of an IHE. Much more important factors are opportunities for future employment (69% chose this) and programs of study (55%). Secondary school students next placed emphasis on the possibility of acquiring practice in their field during the course of their studies. For current IHE students, the school’s prestige is rather important. The ordinal dispersion was high for certain factors. Essentially, this means that the answers were dispersed equally across three categories.

This fact plays into the future of younger universities, which cannot build an image on tradition and prestige but can intensify cooperation where work experience is concerned and build their strategy on this differentiation, which also incorporates the requirement of future employment opportunities. If a university with this type of focus makes it possible for its students to obtain good jobs after school – thanks to experience and other activities (competitions, etc.) – it can help compensate for the handicap linked to its lower prestige. Some of these results are shown in Fig. 2. At the same time, such a differentiation can lead to increasing its prestige.

In this section, it is possible to obtain the answer to Research Question No. 4: “In what way are students able to be influenced by media, promotional events, or friends’ recommendations?”

**Fig. 1: How Much Influence Do Individual Factors Have When Selecting an IHE?**

	modal category	median category	median value	ordinal dispersion	significant influence	middle influence	no influence
The school’s distance from home	2	2	1,958	0,826	■	■	■
The school’s prestige	2	2	2,269	0,669	■	■	■
Opportunities for employment in the future	3	3	2,777	0,516	■	■	■
Quality of meal plan	1	1	none	0,496	■	■	■
Possibility to study abroad	1	2	1,713	0,811	■	■	■
Possibility of acquiring practice in their field	2	2	2,327	0,733	■	■	■
Financial difficulty of studies	2	2	2,088	0,756	■	■	■
Study difficulty (% of successful graduates)	2	2	1,974	0,719	■	■	■
Admissions difficulty	2	2	2,013	0,817	■	■	■
Programs of study	3	3	2,595	0,629	■	■	■
Size of city where university is	1	2	1,598	0,785	■	■	■
Cultural possibilites	1	2	1,598	0,785	■	■	■
Sports facilities	1	1	none	0,764	■	■	■
Quality of accomodations	1	2	1,579	0,699	■	■	■
Dormitory close to university	2	2	2,082	0,569	■	■	■
Friendly school environment	2	2	2,035	0,773	■	■	■
Others	1	1	none	0,596	■	■	■

Source: authors

This information is very important to respondents, because it shapes their opinion for further decision making. It was possible to divide the answers into two categories. The respondents stated that information on the given IHE’s website and recommendations from friends studying at the given IHE were the most influential. The ordinal dispersion was very high for some of these factors. This means that the answers were divided equally between the two categories in fig. 3.

**Fig. 2: What Strongly Influences You When Making Your Decision to Study at the Selected IHE?**

	modal category	median category	median value	ordinal dispersion	significant influence	no influence
Open days of the IHE	1	1	0	0,954		
Promotional materials of the IHE	1	1	0	0,943		
Information gain from web pages	2	2	1,833	0,75		
Gaudeamus trade show	1	1	0	0,839		
Video of universtity	1	1	0	0,436		
School counselors recommendations	1	1	0	0,412		
Parent recommendations	1	1	0	0,811		
Recommendations friends who were applying to the given IHE	1	1	0	0,99		
Recommendations from friends studying at the IHE	2	2	1,721	0,919		
The opinion of graduates	1	1	0	0,985		
I always wanted to study this IHE	1	1	0	0,935		
Stipend from future employer	1	1	0	0,316		
Others	1	1	0	0,476		

Source: authors

During more detailed analysis, we discovered that the answers to this often differ for future and present IHE students. Half of the respondents from the future IHE students were influenced by the opinion of graduates and friends who were applying to the given IHE.

Open house programs are influential to a degree. This type of activity influenced 40% of the respondents. The current students were also influenced by promotional materials, but this was less than 37% for the SS students.

More than 40% of the respondents had already decided which IHE they were going to. However, this does not mean that they did not list other sources that influenced them. Only a fraction of a percent listed their only influencing factor as the fact that they had always wanted to study at the given IHE. (Of the SS students, 43% listed that they wanted to go to the given school; this was only 27% for the current HE students.) The significant difference between the two groups probably occurred because some students did not get into their first choice.

The question of the influence of a stipend was recently included. This question was listed with an eye to the future. Employees in the present day target the offer of a stipend primarily on students from technical fields, but it is only a question of time before a similar phenomenon will also start to be seen more often for nontechnical fields. It will be interesting to follow this issue.

#### 4.2 The Influence of Media

In this section, it was possible to choose from four categories of questions in Fig. 4. The website of the given IHE unequivocally had the greatest influence. Today, this is the most commonly used medium for IHEs, but with IHEs increasing their use of social networks, the number of applicants saying that they were influenced by social networks has been growing, which supports the answer to the question from the section listed above.

**Fig. 3: Did This Type of Media Influence You When Choosing an IHE?**

	modal category	median category	median value	ordinal dispersion	significant influence	middle influence	small influence	no influence
Website of the given IHE	4	3	3,457	0,623				
Social network	3	3	2,574	0,728				
Radio	1	1	none	0,391				
Billboards	1	1	none	0,414				
News paper	1	2	1,547	0,601				
Promotional materials	3	3	2,653	0,743				
Addressed materials	1	1	none	0,471				
Others	1	1	none	0,491				

Source: authors

The significance of individual web servers was also examined. From this data, an IHE can use the possibilities listed in the table as a basis for where to invest their financial resources. According to the data that has been obtained and listed here, the greatest effect is achieved on the website [kampusaturite.cz](http://kampusaturite.cz) at 39.2% and the overview of IHEs presented by the Ministry of Education, Youth, and Sports at 33.2%. In next place were [jobs.cz](http://jobs.cz) at 29.7%, [vejska.cz](http://vejska.cz) at 25.9%, the list of schools at PZ Scio at 18.5%, and [www.scio.cz/nsz](http://www.scio.cz/nsz) at 16.6%. Because attention spans tend to be scattered when studying information on the internet, it is possible to recommend the combination of a number of the most visited web servers for achieving the greatest effect.

The new phenomenon of social networks. Their influence has been recorded as follows: for both groups of respondents, the answers were similar – 47% of the respondents used the Facebook network, and 41% answered that they did not use any social network when selecting an IHE.

In this section, we explored Research Question No. 5: “Can the previous generations (parent recommendations, parents’ field of education, school counsellors) influence Generation Z students’ decision making?” These groups make up a significant percentage of the people in the life of Generation Z, and it is interesting to investigate how they participate in their decision making.

School counsellors have absolutely no influence on selection. Here, this is probably a bias caused by generational shift – Generation Z does not allow itself to be advised by the older generation. They need to try things out for themselves, though if they do seek out advice it is from their peers. As to school counsellors’ influence, this fact has remained the same for many years before we conducted similar research.

Parental advice influenced only 28% of the respondents. Again, this can be seen through the context of differing generations – how respondents imagine their education and what they expect from it. However, the parents’ field of specialization was an unmistakable influence. For example, 76% of the respondents that are studying or want to study technical subjects have a father who went to an institute of technology. The respondent might not even be aware of this influence. They do not attach importance to parental advice, but they follow in their parents’ academic footsteps. The following tables depict only the selected (predominant) specialization.

## **5 A Comparison of the Two Respondent Groups**

SS students placed emphasis on the option of gaining experience in their field as part of their education. For current students, the prestige of the school where they are studying tends to be rather important. For both groups, the influence of information from the IHE's website clearly dominated (75%) as well as the recommendation of friends at the selected institute of higher education (69% for SS and 57% for HE). Current HE students were influenced by promotional materials (40%), but it was less than 37% for SS students. Future students were also influenced by the opinion of graduates, friends, and their peers who had applied to the given IHE at around 50% in comparison with IHE students at 39%.

SS respondents gave priority to a friendly school environment above a school's distance from their home. This means that the atmosphere in which its services are offered is more important (the atmosphere surrounding the actual classrooms; communication with their department of study, educators, and department representatives; student interactions; etc.). They have yet to care that much about means of transportation or related difficulties. Respondents already studying at an IHE now possibly understand how the IHE's accessibility influences the quality of their life and their comfort.

As society's level of technology increases (Castells, 2011), emphasis on the financial perspective could possibly be lowered, see Maslow's hierarchy of needs. This can drain certain schools of their applicants, i.e., those who are currently making decisions based on how expensive they are.

However, an even greater challenge – and not only for universities – will be to react to the significantly increased influence of friends and people who have experience with a given service. How to influence existing students – how to satisfy them and make them recommend the given school – has become a key question for universities. Likewise, there is the question of how to communicate with graduates and use them for sharing positive references. It will be an even greater challenge to influence SS applicants, with whom they are not in direct contact. Universities need to find ways to connect with SS students and impress them with a positive image of the given university. This is a question for public relations (cooperation with secondary schools, events, appropriate communication on social networks already focusing on younger secondary school classes, articles, etc.). However, this is a matter for the long term.

### **Conclusion**

This paper offers an overview for organizations such as (but not only) universities on to how to communicate with the generation of young secondary school students who would like to continue with their studies.

Students are very familiar with the present communication trends and know how to seek out large amounts of information. However, there is still the question of how students are able to process this information. An important issue is that students focus more on options for future employment than on the type and quality of accommodations or meal plans directly on campus. Great emphasis is also placed on the option of professional experience and school prestige. From this information, it is possible to deduce that students are more interested in information concerning their future than in information that will make their lives more pleasant during their studies.

Information that students obtain from their friends and acquaintances who are studying or have studied at the given school strongly influences decision making about universities. Therefore, just as in other service sectors, the experiences of people in the individual's surrounding environment who are able to influence them are very important. This fact is important in many areas of marketing. It is also necessary to focus on it when building brands, image, and a sense of belonging – both as they relate to existing IHE students and when communicating with graduates.

Relatively less influential are events such as open houses, promotional materials, etc. However, it is also important to take time to focus on this type of support, because it acts as supplemental publicity and is definitely an important part of building image and branding.

There is an interesting fact concerning the area of intergenerational influence. For Generation Z, the older generation does not have the same influence on decision making as they had in previous generations. For the most part, this generation needs to try everything out for themselves, though there is a very small percentage of respondents that were conscious of the importance of their parents' recommendation.

It is possible to find relatively large differences between current students and those not yet studying at an IHE. This is noticeable precisely because secondary school students do not yet have this type of experience, and they cannot relate to features such as those describing an IHE's quality. However, it is undoubtedly true for both groups that they primarily search for information on a given school's website. Another way both groups are similar is their disinterest in printed media; rather, they devote time to electronic media and share much information through applications such as Facebook, etc.

Our research illustrates the way students select their future education and can thus help universities with their promotional activities. Our conclusions also point to a certain dynamic shown by students when choosing the type of school for their studies by comparing two subcategories – students that are not yet studying at an institute of higher education and those who have already begun their studies. Our research is also able to demonstrate the way the current generation of young people think and how they obtain information about the surrounding world, which can help with understanding this group of people – even in the business world.

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# MYSTERY E-MAIL/WEBSITE CUSTOMER SERVICE. A CASE STUDY OF RETAIL COMPANIES

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**Abstract:** *This paper examines the customer service process in 5 retail companies using the method of mystery e-mail/website visits. The following study question was formulated in this article: Does the communication effectuated by the retail sector via e-mail and the content of their websites, fulfill customer expectations? The study was conducted in 60 car dealer centers of Škoda in Poland and the Czech Republic. The adjustment of the standards of customer service in such showrooms constitutes a vital issue in the ambit of a company's functioning, both in the Polish and Czech markets. Perfecting customer service standards by applying communication through the Internet (e.g. the use of e-mails and company websites) for the entrepreneurs functioning in the contemporary market, constitutes a promise of adaptations of standards aimed at meeting customer expectations. It reflects the ability and proclivity to become involved even in extra-economic activities, which, in the long run, might contribute to better economic effects of companies.*

*The document can be downloaded at <http://hdl.handle.net/10195/67930>.*

**Keywords:** *Competitiveness, Customer Service, Mystery E-Mail, Mystery Website Visits, Retail Companies.*

**JEL Classification:** *D81, D83, M31, O14.*

## Introduction

It is generally assumed that the method of **Mystery Shopping** was created in the US in the 1940s. Although nowadays it is considered to be a method of evaluating the quality of customer service, originally it came into being as a tool to fight fraud. The idea was simple - company owners, in particular, shop owners, used the services of hired auditors in order to effectuate control over their co-workers and employees and in doing so, they could contribute to reducing in-shop shrinkage caused by pilfering. Currently, a **mystery customer** is a trained professional, whose work consists of acting as a double agent. That is to say, from the point of view of an employee of an inspected company, a 'mystery shopper' is seen as an end-user (customer). However, their primary task is to evaluate the quality of customer service and to report the results of their investigation to subjects who commissioned the query (Vodák, 2008). Mystery shopping techniques may include: mystery observation, mystery visits, mystery telephone calls, mystery e-mail or fax, mystery e-mail/website visits.

## 1 Statement of the problem

As result of the observations of the market situation, and spinning from referential research, the following study premises were singled out:

- Due to market competition, company's management constantly seeks solutions, which might provide them with arguments in their efforts to keep their current customers and to attract new ones. It is important particularly in communication via the Internet,

because nowadays this type of communication constitutes the source of initial contact between a customer and a retailer.

- In any service sector that involves direct contact of a customer with a sales assistant, the level of customer satisfaction and their impressions should be constantly checked. Customer service standards become of vital importance as do, in particular, the standards related to the communication process realized via the Internet.
- The technological boom, especially the developments in the realm of telecommunications, provides big opportunities for enterprises to communicate and cooperate with their customers (Kozel, 2012). A specific example of such opportunities is e-mail communication, as well as providing customers with information by service businesses via management of their own websites (Hub, 2016).

## 2 Purpose of the study and research hypotheses

Within the context of the above exposed reasoning, the following research question was formulated: Does the communication effectuated by the retail sector via e-mail, as well as the content of websites, fulfill customer expectations? The following research hypotheses were formulated for the study question:

**RH 1:** The most important factor of customer satisfaction is the complexity of a reply they get to an inquiry submitted using a website contact form website of a given service provider (service company).

**RH2:** Employees of service companies underestimate the impact of communication through online forms and disregard this form of contact with the customer.

**RH3:** The information available on company websites and the customer service provided via the sites meets the customer expectations.

Finally, the scientific objective of the present work is to show the methodology of investigating the customer service process in retail companies using the method of **mystery e-mail/website visits** and the exemplification of such a model in a case study of Skoda centers in Poland and the Czech Republic, and the comparison of the obtained results. The study was conducted altogether in 60 dealer centers in the period from June to October 2014. The study was conducted in all districts, based on a sample of two dealer centers in each district, according to three scenarios. The following specific study targets were established for the defined research hypotheses:

- a) theoretical: the review and the systematization of international scholarship in the realm of communication process, services, quality of service, mystery shopping method, and in particular, mystery e-mail/website visits which remain in direct relation to the identified problem of the study,
  - identification of the factors affecting customer (dis)satisfaction with the service in service companies.
- b) utilitarian/ practical: providing practitioners (mainly decision-makers, entrepreneurs) with information and detailed guidelines in the realm of customer expectations in terms of the quality of customer service,
  - formulation of the conditions for upgrading the customer service standards in order to meet the expectations and needs of customers using modern forms of contact and cooperation with a company.

### 3 Review of the literature

The quality of customer service standards has a decisive impact on the company's market strength. It is therefore a key factor for achieving a competitive advantage in the market (Bondareva, 2015). From a company's point of view, the assessment of customer service standards concerns both external and internal factors. Internal factors comprise the need of efficient employee management, elaborating or verifying internal standards of customer service and the company's image in the market. Among external factors (Sucháček, 2012), it is possible to enumerate signals from customers and the employees' reaction to them, as well as competitor benchmark. The phases of the customer service process via the Internet include the following:

- Greeting – the form of greeting is the overall customer's impression of the company's website (aesthetics, legibility, content, customer service approach, etc.).
- Interaction – sending a request by means of a contact form (content, polite expressions, legibility of information, etc.).
- Feedback – response to questions (customer service standards, i.e. response time, content, scope of response, polite expressions, etc.).
- Invitation for co-operation (invitation to pay a visit at the company's headquarters, establishing a dialogue, keeping in touch by means of the CRM - Customer Relationship Management System, etc.).

The standards of the computer-mediated communication (Hawrysz, 2014a, 2014b) with the customer are very important (Madu, 2002). Inappropriate standards can lead to the loss of customers. Monitoring Internet activity indicators is not a sufficient tool to assess customer service standards. One of the methods aimed at verifying the degree in which customer service standards are met is the **Mystery shopping** method (MS). The authors of this paper will focus on the **mystery e-mail website visits** method. MS is used to assess the quality of products, but works best in services, especially in the sections related to frontline employees that work directly with the potential client. A properly conducted quality assessment program should be a part of the human resource management policy, and the results should serve not only to assess, but =mainly to improve the quality. It is closely linked with the elements of human resources management policies (Školudová, 2016) such as the creation of positive motivation, building a team spirit, identifying the needs and creating training plans, or creating feedback loops between the effects of work and the rewards.

The method begins with determining measurable, achievable objectives in terms of the quality and level of services offered by the company. The formation of measurable standards for services is particularly important due to their characteristics, such as intangibility, heterogeneity, destructibility, or inseparability. The method depending on the needs of a particular company can be used to create measurable standards of service, measure customer satisfaction with quality of service, or improve service quality. The most common sub-targets feature the next stages in the development of a quality improvement system. The MS program is most often used to highlight the importance of the customer and frontline employee interaction in the system of measurements, to identify the training needs, and above all, to determine the objective measures allowing one to measure quality in terms of the human factor.

A perfectly designed and carried out MS has many advantages (Staňková, 2007) that distinguish it from the majority of other quality testing methods. It facilitates the verification process of customer complaints, it can be used to improve the pursued strategies and sales practices, and allows for initial identification of the deterioration risk. The strongest part of this particular method is the ability to disable or at least significantly reduce consumer participation in the study process. The results are more objective. The MS program effectively measures the quality of service provider and customer relations, in which many service elements are difficult to define. The main aim of the program is a review of the staff in terms of pre-defined standards of customer service. Employees obtain an objective picture of their activities perceived by the customers, and the test result is the standard of quality that can be further improved.

The study conducted by means of the mystery e-mail/website visits method is based on the observation of a website's content, communication and assessment of the Mystery Client's relations with a given company's employee by means of a contact form. This kind of research is based on the observation of the communication staff, i.e. the so-called first line in natural conditions by a qualified auditor (the so-called mystery shopper). This method combines the assessment of quantitative and qualitative study characteristics.

The mystery e-mail/website visits study can be described by means of the following features (Maison, 2007): hidden – the employee does not know that they are dealing with a mystery client (auditor); controlled – the auditor acts on the basis of a specific scenario which is to draw attention to specific service elements; standardized – a mystery client draws attention to specific aspects related to the website service, which they annotate on an elaborated study form in accordance with a specific analysis scenario.

#### **4 Methodology**

The following research methods and tools were applied to carry out the article: critical analysis of national (Řezanková, 2011) and foreign publications (Jackson, 2012) in subject literature, construction of a survey questionnaire, survey studies conducted by applying the random purposive method, determining the average values of standard deviations, levels of trust, correlation, regression test, chi-square test, the use of layer graphs for analyzing and developing a model of the profile of factors affecting the quality of customer service (Wasilewska, 2011). All statistical calculations / analyses were conducted using the SPSS program.

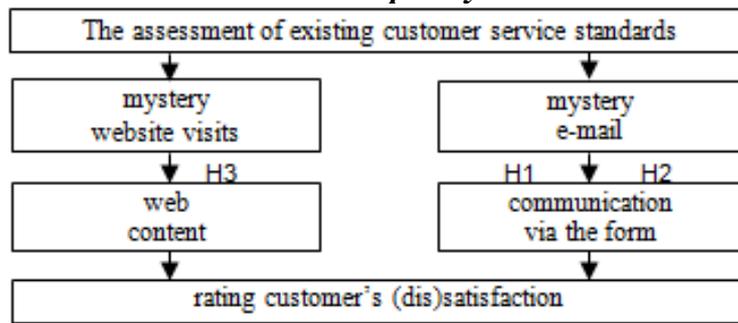
The nature of the analyzed data is ordinal. Ordinal data may be logically sorted and each pair of values clearly shows which of its value is higher and which is lower. Therefore they may be analyzed either by the use of metrics used for the nominal data analysis or by the scale analysis. That is why both the Pearson Chi-square test and correlation coefficient have been used for the analysis of mutual relationships. In the case of correlation coefficient the Spearman's correlation coefficient was chosen, as it is more applicable for ordinal data than Person's correlation coefficient.

The study was conducted in 60 Škoda dealer centers dealer centers in the period from June to October 2014, in Poland and the Czech Republic. The study covered the entire territory of the respective countries: in Poland, the study was carried out in all 16 voivodships and in the Czech Republic – in all 14 provinces. The study was conducted in each province based on two dealer centers according to three pre-defined performance scenarios. A: the purchase of a new environmentally-friendly urban car (Fabia), B: the

purchase of a new family car (Octavia, Rapid), C: the purchase of a new big car (Superb) in the settlement of an old medium-sized car.

As result of the 180 responses were obtained. The defined issue of the study has been specified in the form of a research model, i.e. the so-called universal assessment model of the customer service quality (Fig. 1). Assessment was performed on the scale from +2 – very positive evaluation to -2 – very negative evaluation for each characteristics / factors (Walker, 2013).

**Fig. 1: The research model – a universal model for assessing the standard of customer service quality**



*Source: own study*

The scenario was realized as follows. The auditor (a mystery customer) got in touch with the customer service department of a given car dealer center by means of a contact form sent from different e-mail addresses. He or she sent three different questions concerning the above mentioned situation to each of the dealer centers. According to the adopted scenario, the mystery client, was to simulate the lack of knowledge about the dealer's offer. Furthermore, he or she was to express the intention to buy a car (the three target models: new environmentally-friendly urban car (Fabia), new family car (Octavia, Rapid) or new big car (Superb)) in the settlement of an old medium-sized car) and solicit assistance in finding an appropriate car via e-mail. According to the scenario and the assessment form, the auditor established a dialogue, made an appraisal and assessed the website content of the indicated car dealer centers.

## 5 Data analysis

Exemplary customer service standards have been elaborated on the basis of the referential study. They will form the premise for subsequent analyses and conclusions of the study. The main goals and assumptions used as the basis for the formulation of exemplary customer service standards in dealer centers focused on the following factors: the guarantee of the expected customer service quality, elaboration of a positive image of a dealer center, unification of customer service and increase in customer satisfaction. As result, the following detailed and general standards have been elaborated:

- The attractiveness of the website affecting the dealer's image. It is crucial to ensure the attractiveness of a website in a scope that is visible to the customer. An aesthetic appearance, the website content and its intuitive use are the key parameters at stake here. In this scope of standard, it is vital to ensure that a visit to the dealer's website makes a positive impression on a customer.
- Active interest in the customer. The standards recommend that the front-line employee, during the e-mail contact, should remain attentive and responsive, giving the impression of constant interest in the customer. The customer requires a professional dialogue

in the scope of polite expressions used, and the factual and substantial content of the response. It is also important to ask detailed questions that tell the customer that he or she is not ignored by the employees. During the dialogue, the employee provides information making the customer feel safe. These messages concern the time necessary for a professional preparation of a response, the current status of the case and the date of its resolution.

- Customer service. In the first stage of the service, an employee should identify the customer’s needs. It is important to be able to ask appropriate questions in order to identify the actual needs of the customer. Thanks to a scrupulous dialogue, it is possible to read the customer’s needs and, at the same time, avoid misunderstandings or mistakes. Moreover, thanks to additional questions, the customer’s self-esteem increases and the customer feels that he or she is treated individually. In the second part of the service process, the employee has to explain the issue with which the customer came and to confirm that he or she understands the inquiry correctly. Active communication strengthens the image of the employee’s engagement in problem-solving and it makes the customer believe that he or she is treated seriously. The employee ought to co-operate with the customer, providing him or her with a reliable and complex response to the questions, so that he or she understands the meaning of the response. It is also important for the employee to use polite expressions (Madam/Sir, Please/Thank you, etc.).
- Saying goodbye to the customer. This is also an important element in the case of e-mail communication. A correct leave-taking is performed in accordance with the CSR standard, which means that stable relations between the service provider and the service user are created. The customer’s opinion, which will be passed to other people, concerning their satisfaction or dissatisfaction with the customer service is very important (Matzler, 2005).

## 6 Results

The first part of the study concerned the evaluation of the structure and content of Škoda’s website. Based on a prior referential study, the authors identified several key factors that affect the way a customer perceives a given website. The most important aspects affecting the customer’s assessment of a website were singled out: aesthetic appearance, colorfulness, uniqueness, legibility and attractiveness. The evaluations regarding the structure and content of Škoda’s dealer websites in Poland and the Czech Republic differed. In Poland, a decidedly greater importance was ascribed to the appearance of the website than in the case of the Czech Republic, and it was in fact difficult to point to one of the constituent factors that had the decisive impact on the evaluation. In the Czech Republic on the other hand, the paramount aspect of the evaluation was the legibility of the site, i.e. its conciseness, accuracy, intuitiveness (being user-friendly) and transparency. The detailed results are presented in Tab. 1.

**Tab. 1: Features of websites in Poland and the Czech Republic, respectively**

Country	aesthetic	colorful	unique	legibility	attractive
Poland	1.73	2.00	2.00	2.00	2.00
Czech Republic	0.82	0.81	0.70	1.22	0.63

*Source: own elaboration on the basis of survey results*

The evaluation of an Internet site also differed depending on the situation considered, i.e. with respect to the product under consideration. For customers expressing interest

in a new economic urban car (hatchback, Fabia) the most important was the site's legibility, but also its uniqueness, and the least important was the aesthetic appearance. Customers expressing interest in a new family car (sedan, Octavia, Rapid) constituted the most demanding group. They attached a far greater importance to all the above specified features of a website, in comparison to other respondents. The most crucial element in creating a website was for them the fact of it being perspicuous and colorful. Customers interested in a new large car (also a sedan, Superb) attributed the least importance to the appearance of the website (Tab. 2).

**Tab. 2: Breakdown of the Internet website features depending on the product**

Product	aesthetic	colorful	unique	legibility	attractive
Fabia	1.38	1.53	1.55	1.77	1.47
Octavia, Rapid	1.52	1.60	1.57	1.82	1.52
Superb	0.93	1.08	0.93	1.25	0.97

*Source: own elaboration on the basis of survey results*

The chi-square test analysis revealed a statistically relevant relation between the features of a website and the country in which the evaluation was performed. All the aforementioned features were deemed pertinent in Poland. The chi-square analysis also showed a statistically significant relation between the majority of the website features (apart from the feature of aesthetic appearance) and the type of product (Tab. 3).

**Tab. 3: A dealer website concerning external aspects**

Pearson Chi-Square	Value	Country df	Sig.	Value	Product df	Sig.
aesthetic	43.937	4	<b>0.000</b>	13.383	8	0.099
colorful	92.269	4	<b>0.000</b>	15.862	8	<b>0.044</b>
unique	96.923	4	<b>0.000</b>	26.064	8	<b>0.001</b>
legibility	61.791	4	<b>0.000</b>	18.712	8	<b>0.016</b>
attractive	90.000	4	<b>0.000</b>	22.911	8	<b>0.003</b>

*Source: own elaboration on the basis of survey results*

In order to analyze the dependencies between particular features we used Spearman's correlation coefficient. For all the analyzed dependencies the coefficient had positive values, which signified a positive correlation. Since in most of the cases the coefficient exceeds the value of 0.7, it signifies a strong correlation. A particularly strong relation existed in the case of evaluations, such as uniqueness, attractiveness and colorfulness. It implied that people for whom the website's uniqueness was significant also valued its attractiveness. People, that paid attention to the site's colorfulness, also valued its attractiveness (Tab. 4).

**Tab. 4: Spearman's rho correlations - external aspects**

	aesthetic	colorful	unique	legibility
aesthetic	1.000			
colorful	0.775	1.000		
unique	0.746	<b>0.926</b>	1.000	
legibility	0.685	0.773	0.826	1.000
attractive	0.787	0.933	0.951	0.846

*Source: own elaboration on the basis of survey results*

Due to the limited scope of this article, all other main outcomes of the external aspects' section that have been calculated in a similar manner are shown in a shortened version in the following table.

**Tab. 5: Tests results (other external aspects)**

	Chi-Square test (dependency)		Strongest Correlation
	Country	Situation	(couple)
website structure	4 out of 4 cases	4 out of 4 cases	intuitive - quick
content of website	5 out of 5 cases	4 out of 5 cases	orderliness - complex
availability of the website options	5 out of 5 cases	3 out of 5 cases	available - efficient

*Source: own elaboration on the basis of survey results*

The latter part of the survey concerned the contact form available on the website. The first element assessed was the time of receiving a response to a given inquiry. 41% of people received a response the same day and 27% of them were answered the next day. Experts claim that the most important aspect from the point of view of customer's satisfaction is receiving a response as fast as possible and the waiting time should not exceed 48 hours. The analysis by means of the chi-square test shows a statistically significant relation between the time of receiving a response and the country in which the assessment took place. This analysis also shows another statistically significant relation between the time of receiving a response and the product type (Tab. 6).

**Tab. 6: Pearson Chi-Square - results of response time**

Pearson Chi-Square	Country			Situation		
	Value	df	Sig.	Value	df	Sig.
time	31.026	6	<b>0.000</b>	23.075	12	<b>0.027</b>

*Source: own elaboration on the basis of survey results*

A response to an inquiry was obtained relatively faster in Poland, i.e. over 54% of the auditors received it on the same day (27% in the Czech Republic). Over 12% (41% in the Czech Republic) received a response on the following day. Those interested in buying a family car got a response to their inquiry in the shortest time. 58% got a response to their inquiry on the same day.

The following elements of the responses were analyzed: a well-defined subject of the answer (subject), selected option "confirm" (auto-response), using expressions such as "Hello", "Good morning", "Dear Sir/Madam" (manner of addressing the customer), compliance of the message's content with the inquiry (context), using complimentary clauses, writing "Mr./Mrs. ...", "Sir/Madam" (or other personal forms) in capital letters, appropriate language, spelling correctness, general correctness, contact data (address), name and surname of the responsible employee (personal details) and using emoticons. 88% of the responses had a clearly defined subject. A response most often began with the words "Dear Sir/Madam" in Poland, whereas it began with "Hello" in the Czech Republic (Tab. 7).

**Tab. 7: Elements of the reply to an inquiry**

Pearson Chi-Square	Value	Country df	Sig.	Value	Situation df	Sig.	Value	Time df	Sig.
subject	9.524	1	<b>0.002</b>	19.167	2	<b>0.000</b>	0.302	1	0.582
auto-response	8.436	1	<b>0.004</b>	26.504	2	<b>0.000</b>	0.676	1	0.411
manner of addressing the customer	59.643	3	<b>0.000</b>	8.010	6	0.237	18.869	3	<b>0.000</b>
context	0.451	1	0.502	1.253	2	0.535	0.027	1	0.869
complimentary clause	11.531	1	<b>0.001</b>	20.791	2	<b>0.000</b>	15.001	1	<b>0.000</b>
personal forms	2.689	1	0.101	2.195	2	0.334	3.498	1	0.061
language correctness	0.883	1	0.347	2.059	2	0.357	1.149	1	0.284
general correctness	13.642	1	<b>0.000</b>	0.451	2	0.798	1.816	1	0.178
contact address	5.501	1	<b>0.019</b>	4.945	2	0.084	7.157	1	<b>0.007</b>
personal details	0.883	1	0.347	2.279	2	0.320	1.149	1	0.284
emoticons	2.315	1	0.128	1.016	2	0.602	2.315	1	0.128

Source: own elaboration on the basis of survey results

The following categories of evaluating the ways of responding were analyzed: comprehensive, content developing, communicative, limited, understandable and professional. The response comprehensibility and its communicativeness were the most important aspects both in Poland and in the Czech Republic (Tab. 8).

**Tab. 8: Pearson Chi-Square - constituent parts of a reply to an inquiry**

Pearson Chi-Square	Value	Country df	Sig.	Value	Situation df	Sig.	Value	Time df	Sig.
exhaustive	14.154	4	<b>0.007</b>	33.338	8	<b>0.000</b>	7.975	4	0.092
developing contents	33.602	4	<b>0.000</b>	16.483	8	<b>0.036</b>	15.984	4	<b>0.003</b>
communicable	30.745	2	<b>0.000</b>	12.502	4	<b>0.014</b>	4.649	2	0.098
casual	25.142	4	<b>0.000</b>	21.745	8	<b>0.005</b>	14.257	4	<b>0.007</b>
comprehensible	32.573	2	<b>0.000</b>	6.176	4	0.186	0.618	2	0.734
professional	18.146	4	<b>0.001</b>	24.249	8	<b>0.002</b>	10.597	4	<b>0.031</b>

Source: own elaboration on the basis of survey results

Those interested in particular products differed from each other in their assessment of the way of responding to an inquiry. For those willing to buy an environmentally-friendly car the response's comprehensibility was most important, while for people willing to buy a family car the most important aspect of the response was its communicativeness. The response's comprehensibility and communicativeness were also very important from the point of view of the response time. A quite strong correlation takes place in the case of a comprehensive and content developing response, comprehensive and professional response, content developing and professional response, communicative and understandable response as well as communicative and professional response.

Another group of the analyzed features of an e-mail response included: presenting alternative offers, accuracy of information, escalating an inquiry and asking for personal contact. In term of customer satisfaction, asking for personal contact was the most important of the analyzed features. The second most important category was the accuracy of the response. The chi-square test analysis does not show any statistically significant relations between the analyzed features and the country where the assessment was conducted. These relations were not identified among the analyzed groups interested in different products and response time.

The final part of the analysis included summing up the correspondence. In this part, the following elements were taken into account: provision of contact information, gratitude for contact, invitation to cooperation and initiating further contact. In terms of customer

satisfaction, the invitation to a further exchange of correspondence was perceived as the most important, while gratitude for contact was the second most important aspect. From the point of view of groups expressing interest in particular products, no differences were found in the order of the features, but there were differences in the meaning ascribed to particular characteristics. For those willing to buy a family car the invitation to correspondence was the most satisfactory (Tab. 9).

**Tab. 9: Pearson Chi-Square – summary of the correspondence**

Pearson Chi-Square	Value	Country df	Sig.	Value	Situation df	Sig.	Value	Time df	Sig.
contact details	1.812	1	0.178	6.843	2	<b>0.033</b>	6.422	1	<b>0.011</b>
gratitude for contact	9.274	1	<b>0.002</b>	11.658	2	<b>0.003</b>	0.535	1	0.465
invitation to cooperation	1.264	1	0.261	7.384	2	<b>0.025</b>	0.014	1	0.905
invitation to further correspondence	1.110	1	0.292	16.158	2	<b>0.000</b>	4.585	1	<b>0.032</b>

*Source: own elaboration on the basis of survey results*

## 7 Discussion

Among all website features, the website's legibility was considered to be the most important. The ratings of other features depended on the country in which the assessment was conducted. In Poland, all features apart from the aesthetic appearance were considered to be equally important. In the Czech Republic, aesthetics were the second most important feature of the website, which was followed by attractiveness and colorfulness. In the Czech Republic, uniqueness was considered relatively as the least important feature among those included in the analysis. The respondents interested in buying a family car were particularly demanding in terms of assessing the website's features. They emphasized the importance of all of the aforementioned features. Website transparency was considered to be the most important, attractiveness and uniqueness were deemed as secondary. The high expectations of people interested in buying a family car may result from the fact that visiting dealer centers with a child, in particular with a small one, is very cumbersome. This is why parents try to minimize the time spent in dealer center by preparing for the visit as best as possible. Thus they pay a lot of attention to offers included on the dealer's website in order to use the time which they would then spend at the center in an optimal manner. In comparison to other analyzed groups, those interested in buying a big luxurious car seemed to be the least interested in the dealer's website structure and its content. It may be due to the specificity of a particular group of customers for whom social prestige is most important when buying a luxurious vehicle. Their expectations are different and they demand individual interactions and personal contact, which is not provided by the information flow on the website.

Among all website features, the website's arrangement was considered to be the most important. All features of the website were assessed as very important in Poland. In the Czech Republic, complexity was the second most important feature and was followed by intuitiveness and the speed of browsing. The Czechs considered speed of browsing to be relatively the least important of all the analyzed features. The most demanding group that assessed the websites included people willing to buy an environmentally-friendly car. The group paid attention to the importance of all of the aforementioned features. The people interested in buying a family car were also demanding. For this group, the most important website features were as follows: arrangement, complexity, intuitiveness and speed

of browsing. Among all of the analyzed groups, the people interested in buying a big car seemed to be the least interested in the dealer website's structure.

The analysis of the highlighted substantial features demonstrates that appearance and exhaustiveness were the most important. The significance of these features depended on the product in which individual mystery clients were interested. Clients interested in buying a family car were also the most demanding group. In their opinion, the most important substantial features of a website include: clarity, exhaustiveness and appearance. For clients interested in buying an environmentally-friendly car, the most important features included: appearance, exhaustiveness and clarity. Notwithstanding, for clients interested in buying a big car, the significance of the mentioned features was the same as for clients interested in buying a family car. The expectations of clients interested in buying a big car towards a website's substantial features are comparatively the highest. No other group demonstrated as high expectations.

In terms of website options, the availability of an online cost estimate – price calculator for a given car (functional) and the ability of connecting to company social networking sites (compatible website), were considered to be the most important features. The ability of changing the website's language (optional) was the least important for the respondents.

The analysis shows that there are differences in customer service in dealer centers in Poland and in the Czech Republic. Despite the fact that the Poles get a response to an inquiry within a relatively shorter time, most of their inquiries remain unanswered. There are also differences in the level of customer service depending on the product in which the customers are interested. People interested in buying a family car and then those willing to buy a big car were the groups served the fastest. This may derive from the fact that there is a relatively stable demand expressed by this group, which is why it becomes a significant buyer in the market.

The analysis of response elements shows a rather universal set of elements used to give responses to inquiries submitted via e-mail. Such a response included a detailed subject, was related to the inquiry's content and included basic complimentary forms. It was written in a correct manner in terms of grammar and spelling. The only difference concerned the manner of addressing the sender. In Poland, the messages were mostly addressed with "Dear Sir/Madam", whereas in the Czech Republic – with a "Hello".

## **Conclusion**

The standards of a company's customer service are of key importance. The management staff should design and define details in the realm of the customer service standards. After their implementation, managers should monitor the effects of their implementation and improve them if necessary. The scientific objective of the present work was to show the methodology of investigating the customer service process in retail companies using the method of **mystery e-mail/website visits**, exemplifying such a model in a case study of Škoda dealer centers in Poland and the Czech Republic, and comparing the obtained results.

This objective has been achieved. In terms of the utilitarian goals, the following recommendations for the managers have been formulated in terms of the customer service standards (recommendations formulated for particular aspects):

#### A. External aspects of a website:

- Appearance - general impression. The website should have an aesthetic appearance, be clear, i.e. the content should be concise, accurate and the arrangement - transparent.
- Structure of the website. In this area, the following factors were considered: harmonious arrangement and placement of information (i.e. organization), comprehensive information, user-friendly arrangement of content and the speed of browsing - substantive aspect - the content of the page. The important features considered here included: complexity of information, transparency, exhaustiveness, appearance and ordering.
- Website options. The most important features included: online contact form (available), optional high-speed data search (efficient), optional calculator – online cost estimate (functional), ability to connect to corporate social networks (compatible).

#### B. Contact form handling:

- a key feature is the response time to an inquiry,
- other important features: subject, auto-response, manner of addressing the customer, context, complimentary clause, personal forms of address, appropriate language, correct spelling, general correctness, contact address, personal details, emoticons.

C. Sales/consulting abilities; it was shown, that the employee's manner of responding to an inquiry is crucial and requires the following features: exhaustive responding, developing contents, communicable, casual, comprehensible, professional.

D. Response to questions concerning employee service. The most important features of a response to an inquiry submitted via e-mail were as follows: presentation of alternative offers, accuracy of information, escalating the case to another person and the employee's request for personal contact with the customer.

E. Leave-taking/recapitulation. The most important elements were as follows: placing contact information, gratitude for contact, invitation to cooperation and invitation to further correspondence.

The identification and empirical verification of research hypotheses enabled outlining of the standards of customer service via Internet communication. These standards can be recommended for use, especially to service companies.

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# QUALITY ANALYSIS OF THE BASIC REGISTER OF RIGHTS AND OBLIGATIONS

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**Abstract:** *Basic registers of public administration have been fundamental part of the Czech eGovernment already for more than 4 years. Public authorities work with reference data recorded in the basic registers in rightful cases and in the scope pursuant to the legal regulations, whereas a list of these cases and relevant authorizations are filed in the Basic Register of Rights and Obligations in the form of agendas and agenda activity roles. The Register of Rights and Obligations should become a map for public authorities, their competencies and activities used to fulfil these lawful competencies, and it should be used for procedural optimization of public administration and as a background for performance allowance for state administration performance. This contribution deals with quality analysis of registration agenda in the Register of Rights and Obligations, high level of which is necessary for achieving set goals. The research is based on three different approaches: a statistical analysis of registered agenda code list, a case study of agenda changes concerning keeping a permanent list of voters and a survey of current use of agenda activity roles for two selected agendas. Synthesis of obtained results gives us a picture of quality of agenda registration and activities in the Register of Rights and Obligations.*

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**Keywords:** *eGovernment, Basic Registers of Public Administration, Register of Rights and Obligations, Agendas, Activity Roles.*

**JEL Classification:** *H11, H76, K23, C10.*

## Introduction

The basic registers of public authority agendas and some rights and obligations referred to as the Registry of Rights and Obligations or also RRO is one of the four basic registers of public administration. The basic registers of public administration are a set of information systems pursuant to the Act No. 111/2009 Coll., on Basic Registers (hereinafter only “Act No. 111/2009 Coll.”) The first idea about creating basic registers appeared already at the end of the last century (Mates, 2009); however it was completed as late as in 2012. One of the reasons for postponing the launch of basic registers was a longer-lasting preparation of data fund in the relevant quality (Rieger, Štencl, 2010).

As mentioned in the Strategy realization of Smart Administration in the period 2007 – 2015 – Creating basic registers aimed at efficient public administration and friendly public services, “central registers of public administration were to be created so that they would enable secure data sharing by public authorities as well as citizens would be allowed a rightful access to the data filed in these registers” (See Specific goal defined in (Ministerstvo vnitra, 2007: 58). Contents of the Register of Rights and Obligations were to originate a basic map of public authorities, their competencies and activities used for fulfilling these lawful competencies. In the view of the chief architect of eGovernment O. Felix of the year 2012, this map of agendas and agenda roles of public authorities

is the main presumption for starting procedural optimization of public administration (Felix, 2012).

Let us ask, what is the quality of agenda registration in the Register of Rights and Obligations? And were the expectations as well as set goals for the base of creation the map of public authorities, their competencies and performed agendas fulfilled? In this contribution we will try to answer the raised questions.

## **1 Basic registers concept**

### **1.1 Basic registers of public administration**

Basic registers are fundamental part of the Czech eGovernment (Mates, Smejkal, 2012). Development and further use of basic registries is planned also in the following years – see Strategic framework of CR public administration development for the period of 2014–2020 (Ministerstvo vnitra, 2016), and that is particularly within the realization of electronic identity following implementation of Regulation of the European Parliament and the Council (EU) No. 910/2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/ES (Pešek, 2016).

Basic registers of public administration have operated in the Czech Republic since 1 July 2012. There are four basic registers of public administration: the Basic Register of Inhabitants, the Basic Register of Legal Entities, Self-employed Natural Persons and Public Authorities, the Basic Register of Territorial Identification, Addresses and Real Estate Property and the already above mentioned Basic Register of Rights and Obligations. Individual entities access all basic registers via reference interface, or so called information system of basic registers. An important element of basic registers includes also ID converter that provides protection of personal reference data filed in the basic registers. An impact of the implemented architecture of basic registers on their performance is described in (Fortinová, 2016).

The real start of the basic registers was postponed for several times (by amendment of relevant act), whereas one of the reasons for postponing was a longer-lasting preparation of relevant data funds in such a quality so that they could be used as reference data (Rieger, Štencl, 2010). It's not just the problem of basic registers, data quality is affecting the overall performance of public administration (Král, Žemlička, 2006).

Despite the fact that neither the Act No. 111/2009 Coll., nor other legal regulations define any transitional period for obligatory use of reference data from the basic registers, each public authority joined the information system of basic registers only very gradually. For example towards the end of September 2012 the connection and the use of reference data is proved only by 6.6 % municipalities (Lechner, Lechnerová, 2013).

Essential principles of the basic registers are defined especially in the § 4 of the Act No. 111/2009 Coll. Pursuant to the section 1 of the quoted article, the basic register contains reference data, reference bonds, identifiers of natural persons or authentication data. Principle of reference data that are guaranteed, valid and current without necessity of verification can be called revolutionary considering the previous working of public administration. Following the law articulation, then it applies, that reference data is considered correct if it is not proved contrary or if there does not originate rightful doubt about reference data correctness. Another essential rule is that persons, who are required by another legal regulation to supply data filed in the basic registries as reference data, are

legally required by public authority to supply such data only in taxatively defined cases, which are furthermore rather exceptional in practice.

It means that all public authorities should have been connected already for a long time (in fact immediately since 1 July 2012) to the basic registers and should use the mentioned data obligatorily. Nevertheless as already mentioned it was not and still is not the case. According to the official data published by the Basic Register Administration, as of July 2016 (which is exactly 4 years after basic registers started working) there were actively connected and used reference data from the basic registers only 41 % out of 7 392 public authorities (Správa základních registrů, 2016b). It has been improved only gradually. Currently to September 2016 there were actively connected and used reference data from basic registries approximately 42 % out of 7 396 currently existing public authorities (Správa základních registrů, 2016c), so there is improvement by one percentage point.

## **1.2 Registry of Rights and Obligations**

Pursuant to the Act No. 111/2009 Coll., the Register of Rights and Obligations files:

- Reference data on public authority agendas and that is including data on authorized access to data filed in the basic registries and a list of agenda titles and their number codes,
- Reference data on rights and obligations of natural persons and legal entities, if data on these persons are filed in the basic registries and that is including data on public authorities' decisions.

Further we concentrate on the firstly mentioned file of data; that is on a code list of agendas. Separate agendas are registered pursuant to the § 53 of the Act No. 111/2009 Coll., Central administration authorities or other administration authorities with nationwide power. Pursuant to the § 2 letter d) of the quoted Act, agenda is defined as a summary of activities lying in performance of limited area of mutually connected activities within public authority competence. Pursuant to the § 48 section 1 letter a) of the quoted Act, this activity is defined as a set of operations that are performed by public authorities within their agenda to perform public authority. These definitions are quite unnecessarily complicated and supplied by additional definition of a role as a summary of public officer authorizations, who performs a certain activity, to access reference data in the basic registries or data in the agenda information systems [See § 48 section 1 letter b) of the quoted Act]. Separate roles can thus differ just in the authorization to access the reference data and at the same time they are specific for certain activity.

Within the agenda notification there is among others given a list and a description of activities that must be performed within the agenda and a list of roles essential to agenda performance along with information on a range of authorization. The act also stipulates that agenda notifying body submits agenda notification at the earliest on the efficiency day of a legal regulation that defines agenda performance details. It means that there should always be a sufficient time interval between coming into force of a new or amended regulation and an entry into effect so that the whole agenda registration procedure and subsequent agenda activity notification was managed so that separate public authorities performing the given agenda were able to correctly use a defined access to the reference data from the very beginning of agenda performance. However this time space is in many times so short that it can definitely influence quality of evaluation of the agenda notification itself.

Regarding the agenda notifying, the Ministry of the Interior was put in charge of its supervision. In case of discovered shortages it appeals to the agenda notifying entity to provide their removal, whereas it is given an adequate time period for it. In the appeal to the notifying entity the Ministry of the Interior informs about the observed shortages in the agenda notification referring to the concrete provision of law. It further applies that if subsequent to the agenda registration there occurs any change of data or other background data that were given in the agenda notification and registration, the agenda must be reregistered. This is initiated by the notifying entity.

## **2 Methods**

We based the research in the quality of agenda registration in the Register of Rights and Obligation on three different approaches. We provided a statistical analysis of all registered agendas as of November 2016. Published data (Správa základních registrů, 2016a) include not only an overview of all currently registered agendas in the structure according to the § 54 section 5 of the Act No. 111/2009 Coll., but also the whole history, which is also agendas, registration of which has already expired. It allowed us to do analysis of development and frequency of agenda reregistering.

Further we have chosen one agenda performed by municipalities – keeping a permanent list of voters, for which we analysed a detailed development of registration changes. There are mainly two reasons for selecting this agenda. Partly it is an agenda performed by “category” of public authorities that still include most of the unconnected bodies (Správa základních registrů, 2016c), and partly this agenda shows relatively complex changes that did not cause changes only in one registered agenda, but a number of registered agendas changed as well and that is despite the fact that in this time there did not take place any crucial changes in legal regulations.

The latest survey we conducted for two selected agendas:

- Agenda A124 Cadastre of Real Estate notified by the Czech Office for Surveying, Mapping and Cadastre in the amended third version valid since 15 July 2014,
- Agenda A414 Registry Offices notified by the Ministry of the Interior in the currently valid fourth version efficient since 23 June 2015.

The survey was conducted for the first agenda in 5 cadastral offices where there were obtained total 108 filled questionnaires and for the second agenda in 26 registry offices where there were obtained total 65 filled questionnaires. We monitored use of separate registered activity roles for separate tasks and their frequency. The questionnaire itself and other details of this survey are specified in (Silvarová, 2016), whereas hereto published results are an expanded analysis of the obtained data.

Results of all three researches were subsequently synthetized, and we created a basic picture of the quality of agenda registration and activities in the Registry of Rights and Obligations.

## **3 Results**

### **3.1 Statistical analysis of registered agendas**

To 10 November 2016 there were in the Register of Rights and Obligations registered total 390 various registered agendas, however not all of them are still valid. Within the

changes of registered agendas there occur not only reregistration, but also termination of agenda validity. Concrete examples are mentioned in the following chapter.

As of the mentioned date 10 November the agendas code list of the RRO included total 867 records. The latest registered agenda is agenda A1881 – Records of sales valid since 1 September 2016. Comparing the number of records in the register and a number of agendas, it is obvious that reregistration is not a rare phenomenon. For example right 2 agendas have been changed twice within the past 4 months. Tab. 1 indicates how the agendas were reregistrated during the monitored more than four year old period of the agenda since its first registration in the RRO.

**Tab. 1: Numbers of agenda reregistrations**

Number of agenda registration under one code	Number of agendas	Percentage of the given number of agendas representation
1	145	37,2 %
2	114	29,2 %
3	70	17,9 %
4	36	9,2 %
5	16	4,1 %
6	5	1,3 %
7	2	0,5 %
8	2	0,5 %

*Source: Analysis of frequency of changes in the data source (Správa základných registrů, 2016a)*

Four most frequently reregistered agendas along with their notifying entities are given in the Tab. 2.

**Tab. 2: Four most frequently reregistered agendas**

Agenda code	Agenda title	Notifying entity	Number of registrations
A392	Customs agenda	Ministry of Finance	8
A483	Criminal record	Ministry of Justice	8
A115	Civil registration and identification numbers	Ministry of the Interior	7
A1149	Offences Act	Ministry of the Interior	7

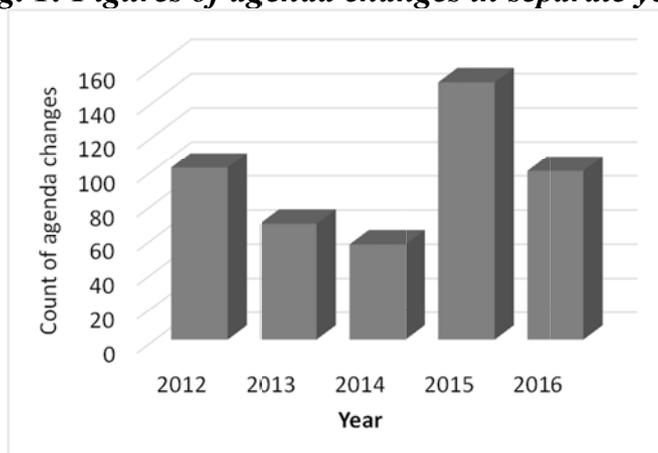
*Source: Own processing according to the source (Správa základných registrů, 2016a).*

In the view of time development of the changes of registered agendas, it is certainly interesting to ask if the changes took place more at the beginning or at the end of the analysed period. Analysis results are indicated in the chart of the Fig. 1. The chart shows that the process of agenda reregistering does not imply any global tendency in the existing course. After the first three years it could seem that numbers of changes decrease, but the result of past two years shows large increase. We must realize that the amount for the year 2016 refers to the first three quarters of the year, even though there were included also

changes that will come into force as late as the last quarter, but they have been already registered on the grounds of valid changes.

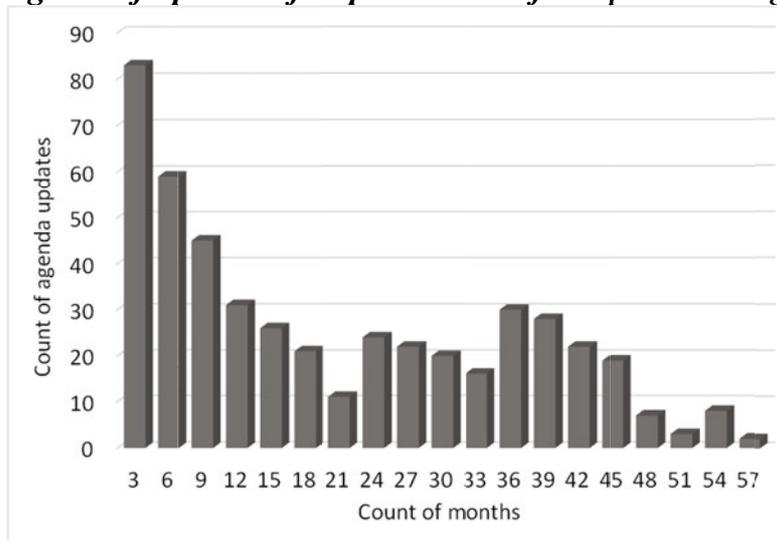
Further we have analysed “durability” of registered agendas. As mentioned above in the course of the monitored period there occurred changes in the already registered agendas, on the ground of which the relevant record on the registered agenda lost its validity to a certain date, whereas in case of reregistering the agenda there appeared a new record with the same agenda code. The analysis shows that 17 records lost their validity in the period shorter than 10 days, 83 records lost validity in the period shorter than 3 months and 218 records lost their validity in the period shorter than one year. A detailed histogram of a number of changes in the scales by quarters is described in the chart in the Fig. 2.

**Fig. 1: Figures of agenda changes in separate years**



Source: Own calculations from data (Správa základních registrů, 2016a).

**Fig. 2: Figures of updates after past months from previous registration**



Source: Own calculations from data (Správa základních registrů, 2016a).

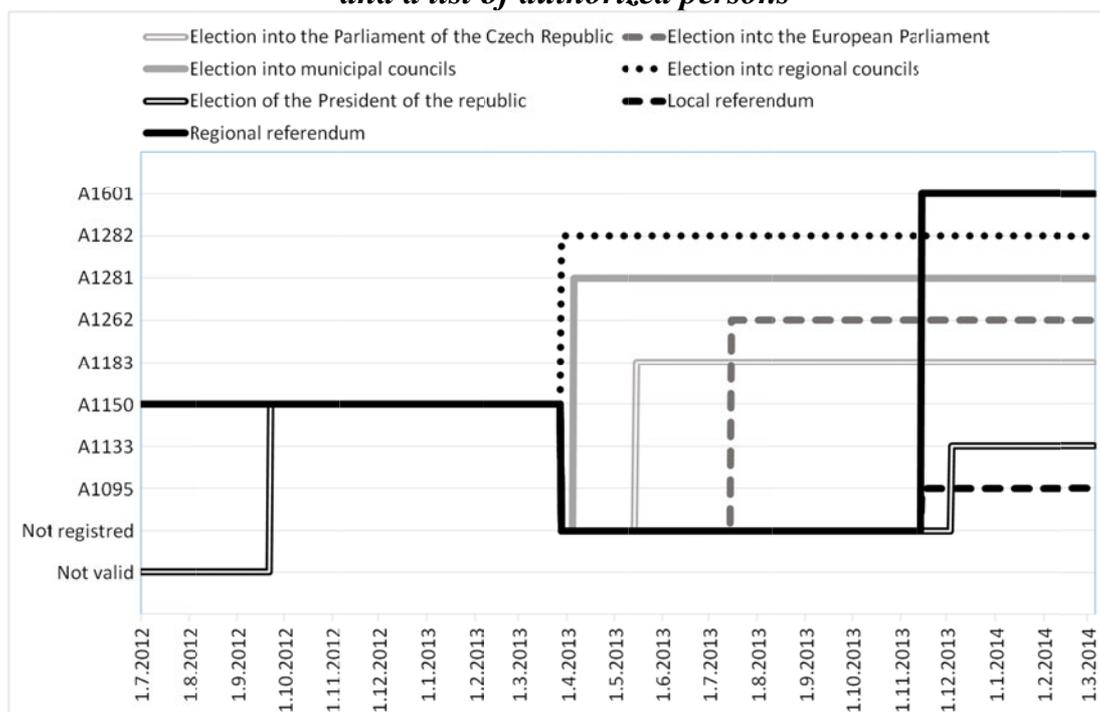
### 3.2 Development of agendas concerning keeping a permanent list of voters

Keeping a permanent list of voters for various kinds of elections and a list of authorized persons for a local or regional referendum is one of agendas performed by municipalities. Update of such a list towards basic registers is thus surely a justifiable access. Since 1 July 2012 this access has been covered by the registered agenda A1150 Keeping lists of voters and lists of authorized persons for local and regional referendum. Agenda A1150 was registered on 27 February 2012 on the grounds of a notification submitted by the Ministry of the Interior. After having been in force for not total three months, the agenda was

reregistered exactly as of 21 September 2012, whereas there was expanded the amount of legal regulations on the grounds of which the agenda was performed.

As of 28 March 2013 the agenda A1150 was totally terminated. Only later there were registered new agendas and activity roles within the existing agendas for separate types of elections and referendums. Only in case of election into regional councils there remained a direct following without an interval. In all other cases there followed a variously long period in the course of which there was valid a relevant act specifying obligation of keeping a list of voters or a list of authorized persons, but there was no registered agenda or an appropriate activity role within an agenda, on the grounds of which there could take place verification of reference data in the basic registers for the given purpose.

**Fig. 3: Development of registered agendas for keeping a list of voters and a list of authorized persons**



Source: Own analysis from data (Správa základních registrů, 2016a)

The shortest period this problem lasted, exactly 8 days, was for the election into municipal councils. The longest period of void was for the election of the president of the republic, for which the relevant agenda was registered as late as of 4 December 2013, i.e. total 250 days after termination of the validity of the agenda A1150. Apart from that there occurred within the monitored period various renaming of a registered agenda. For example agenda A1095 was originally called Local and regional referendum, later it was on 15 October 2013 renamed as Local referendum, however agenda for regional referendum was registered as late as a month later, even though certainly valid and efficient wording of the law accepted existence of regional referendum for the whole time. Total development of changes of agendas with activity role for keeping lists of voters and a list of authorized persons is shown in the scheme in the Fig. 3. Illustrated clutter of changes can at the first sight seem to look like an effort to improve quality of registered agendas, but they do not complement each other and are repeatedly changed and especially there take place unjustifiable voids, all of which does not seem positive but looks rather uncoordinated and without systematic approach based on process modelling, the absence of which is

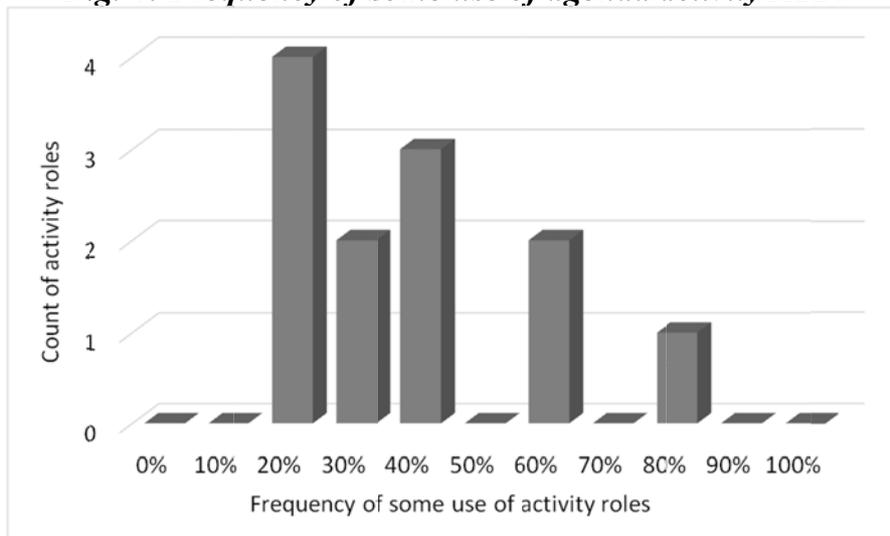
generally a common shortage of eGovernment (Heeks, 2003), (Goldfinch, 2007), especially in the Czech Republic (Jonášová et al., 2009), (Lechner, 2008), (Mates, 2011).

### 3.3 Questionnaire survey of using activity roles of two selected agendas

For the questionnaire survey there were selected two agendas each having different notifying entity as well as a type of public authority performing these agendas. The first agenda is A124 Cadastre of Real Estate that is performed by the Czech Office for Surveying, Mapping and Cadastre and Land Surveying. The agenda was for the first time registered of 2 March 2012 and the last change took place of 15 July 2014. Since then the agenda has had 12 registered activities in total.

The second agenda is A414 Registry Offices performed by registry offices that are part of municipal authorities and municipalities. It is surprising how inaccurate is the concrete list of public authorities that are entitled to perform the agenda. In the registration there is recorded only the Ministry of the Interior and the Municipality of Prague 1. Agenda notifying entity is the Ministry of the Interior. Agenda was for the first time registered of 31 January 2012 and the last change took place of 23 June 2015. At the moment the agenda has 45 registered activities in total.

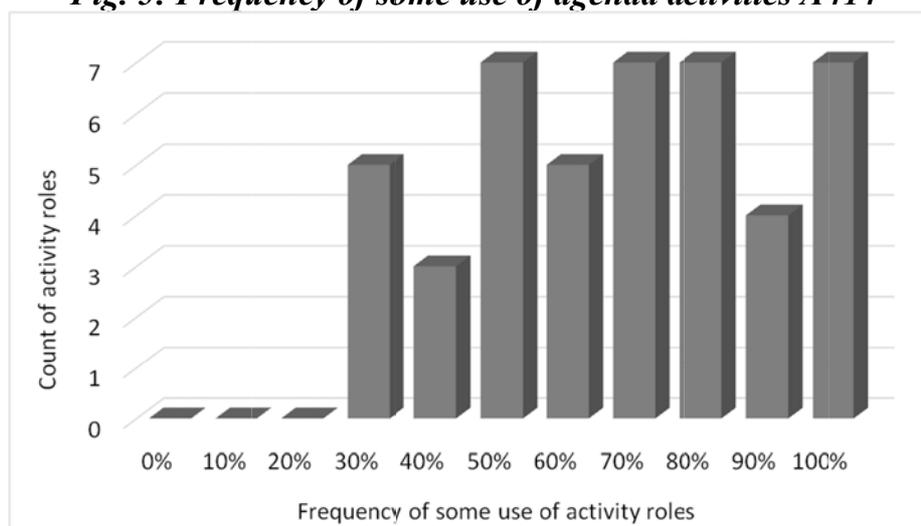
**Fig. 4: Frequency of some use of agenda activity A124**



*Source: Analysis of the survey results.*

The questionnaire survey results concerning frequency of using separate activity roles are described in the chart in the Fig. 3 for agenda A124 and in the Fig. 4 for agenda A414. Within the survey officers from relevant authorities were inquired about frequency of using separate activities, whereas there were given options: “often”, “rarely” and “never”. If another answer was given than “never”, it means that the given person could have met such activity role and used it. Both charts show histogram that shows frequency at least of some use of activities, whereas separate categories are always upper percentage limit of the given interval.

**Fig. 5: Frequency of some use of agenda activities A414**



*Source: Analysis of the survey results.*

The charts clearly imply that no activity is completely omitted. There are more and less frequent activities, whereas the less frequent ones predominate. With the agenda A124, the most frequent activity is CR2233 Providing data from the Land Cadastre that is used by 73 % of the research participants. With the agenda A414 the frequency is more spread, but apart from that there are even 7 activities that are performed by almost all the inquired. The most used activity is the activity CR9098 Data verification from the basic registry of inhabitants, from the information system of civil registration, from the information system of foreigners, from the information system of ID cards or from the information system of travel documents that is used by 98 % of the research participants.

#### **4 Discussion**

The conducted analysis clearly implies that agendas registered in the Register of Rights and Obligations are quite often changed. Partly there occur changes in activity roles and authorizations and partly there occurs fusion or on the contrary division of agendas and some agendas validities are also terminated. It is obvious that not all changes are forced by relevant changes in the legal regulations. Even though the Czech legal order changes quite rapidly (Mates, Smejkal, 2012), causing problems with the promulgation of legal regulations (Stupka, 2014), changes in the Register of Rights and Obligations come even more rapidly. For example in the case of 12 agenda records there occurred a change within 2 days from the previous one. Findings show the non-quality of supervising procedure over the agenda registration. This result correlates with (Špaček, 2012: 50-51), who identifies the lack of coordination as one of the most important eGovernment barriers. Not even our time analysis proved that speed and volume of changes of registered agendas would decrease with time.

Notifying entities, who most frequently change notified agendas, are the Ministry of Finance (one of the most frequently changed agendas), the Ministry of Justice (one of the most changed agendas) and the Ministry of the Interior (two of the most frequently changed agendas). Apart from that there were observed also formal differences in the way of description of separate agendas reported by various notifying entities. Though there should be unified methodics and supervision by a responsible body – the Ministry of the Interior, agendas are described in incongruous ways and that is including reference to the legal regulations. Again, it is a clear example of the lack of coordination, which also

included not only by (Špaček, 2012), but also by (West, 2005) and (Goldfinch, 2007) among important eGovernment barriers. For example in the agenda A414 there is given that it is performed on the grounds of the Act No. 111/2009 Coll., even though none of the activities in this agenda is stipulated in this Act according to the current registration.

Agenda case study concerning activity of keeping a list of voters proved that there are periods when a demonstrably existing agenda or an activity resulting from valid and efficient legal regulations has no registration of its own in the Register of Rights and Obligations. Already mentioned division of agendas that was shown on the case of keeping a list of authorized persons for local and regional referendum make relative problems considering fulfilment of obligations specified by the Act on Personal Data Protection. The principle of agenda identifier of natural person that is related exactly to the agendas, i.e. to the purpose for which the personal data are kept, can work only if there does not occur fusion not even on the side of the public authorities. P. Rieger and P. Mates (2010) show the importance of that general principle. R. Heeks (2006), on the other hand, shows that the privacy and income play contradictory roles in eGovernment projects. Thus, if the agendas get divided, original agenda identifiers of natural persons must be deleted and subsequently there must be repeatedly performed so call data identification, which is pairing of data kept in the agenda information systems with the basic registries. This activity (among others) generates unnecessary repeated inquiries into the basic registers and it presents an unnecessary burden both for communication with the information system of basic registers as well as for the public authorities themselves.

Even though analysis of the Register of Rights and Obligations showed that the registered agendas are not described in a stable, quality and unified way, the survey at the authorities performing two selected agendas did not prove that certain activities would not be used and that would be registered redundantly. Distribution of the use of separate activities in fact responds to the performance of given agenda by different public authorities. We must however realize limitation of such survey that does not prove really chosen activities while verifying reference data in the basic registers, but only officers' knowledge of the activities. For example at the agenda A414 there is extra registered an activity First name entry into the registry books and separately an activity Surname entry into the registry books and separately an activity of keeping and updating the collection of documents, no matter that the name entry as well as surname entry cannot succeed without updating the collection of documents.

## **Conclusion**

The conducted research showed that the Register of Rights and Obligations, or more precisely in it included a code list of agendas, subjected activities, roles of authorizations and public authorities that perform these agendas, activities and roles, is not kept in a very good quality. There occur frequent changes, many of which are not supported by justifiable reasons resulting from change in the relevant legal regulations. Agendas are described in heterogeneous and sometimes also in an inaccurate way. In many cases the agendas contain too many separate activity roles, which show an unsuitable approach to the registration, in which the description of activity roles is a simple rewriting of article wording of an act and does not follow a procedural analysis of really performed activities.

For this code list to become a real map of public authorities, their competencies and activities used for fulfilment of these legal competencies and to serve in future as a background for performance allowance for state administration performance it is

necessary to improve quality of agenda notification. It means especially to unify their formal descriptions, address their notifying in a systematic way and mainly on the ground of procedure analysis of separate agendas and last but not least to qualify supervision over the notifying performed by the Ministry of the Interior.

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# THE ROLE OF E-GOVERNMENT IN MITIGATING CORRUPTION

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**Abstract:** *E-government cannot be a panacea for fighting corruption, but per a lot of studies, it should be considered as a tool for reducing corrupt behaviour of officials in the public sector. Easy access to information for all citizens using e-government can result in greater transparency, which limits the public official to accept or even demand a bribe. This paper analyses, role of e-Government in mitigating corruption in 117 countries, regardless of their geographic location, political regime, or economic development between years 2003 and 2014. It was found that the use of information technology and the development of e-government contribute to reducing the level of corruption in the country. Used correlation and regression analysis confirmed the possible reduction of corruption both for the most economically developed countries by 0,12% for one percent increase of the use of e-government, as well as by 0,14% of the least economically developed countries.*

*The document can be downloaded at <http://hdl.handle.net/10195/67932>.*

**Keywords:** *Corruption, E-Government, Official's Discretionary Power, Anti-corruption Tool, Corruption Perception Index, E-Government Development Index.*

**JEL classification:** *D73, E6, H41.*

## Introduction

The studies that focused on the topic of corruption have shown that corruption discourages investments, reduces economic growth, changes the composition of government spending, undermines government efforts to reduce poverty and hampers the quality of life in rural and poor parts of the developing countries (Bhargava, Bolongaita, 2004; Jain, 2001; Mauro, 1995; Tanzi, 1998). These are the main reasons why governments of individual countries all over the world spend considerable financial and other resources to build an effective anti-corruption policy. One possible way to reduce corruption, especially in the public sector, may be reducing the interactions between officials and the public. This can be achieved by means of e-government. E-government can ensure not only providing more information to the public, but also remove the discretion of public officials (Bhatnagar, 2003; Mistry, 2012; Mistry, Jalal, 2012; Seo, Mehedi, 2016).

The aim of this paper is to prove or disprove the relationship between the level of corruption and the degree of utilization of e-government in the country. The paper examines the relationship between changes in the use of e-government and changes in the level of corruption in a selected group of countries.

## 1 Reducing the official's discretion as a potential way to reduce the level of corruption

The issue of corruption has become a highly-debated topic which troubles governments of countries but their citizens as well. Although corruption is not a new phenomenon, unambiguously and universally accepted definition of corruption does not exist yet.

Different perceptions and understanding of corruption may be a possible barrier to prevent the establishment of a clear definition. A gift that someone considers as an expressing of gratitude, someone else considers as a bribe. The different perception of this concept led to create a lot of definitions. The World Bank created the most known definition. It defines corruption *as an abuse of public office for private gain* (Hellmann, Jones, Kaufmann, 2009). The mentioned definition of corruption is focused just on the abuse of public power. Somewhat the corruption in the private sector is neglected, but it also exists of course. However, most studies focus on corruption in the public sector for one simple reason - the consequences of such abuse of public power hit the broad mass of taxpayers and the state in general. Corruption in the public sector can lead to increased public spending and reduce the amount of taxes collected, thereby increasing fiscal deficits, and create macroeconomic instability (Bhargava, Bolongaita, 2004; Mauro, 1997).

Some studies identified the potential role of E-government in reducing corruption. E-government eliminates the scope for bribing by elimination of intermediary services and it allows for citizens to arrange their transactions by themselves. E-government has become a term encompassing all uses of information technology in public administration and it includes sharing information and conducting transactions between government and government (G2G), between government and business (G2B) and between government and citizens (G2C) on IT background.

Torres, Pina, Acerate (2006) studied the relationship between corruption and E-government and concluded that well-designed ICT policies can be effective in the fight against corruption. Shim and Eom (2008) focus on bureaucratic professionalism factors and quality of the bureaucracy, also found that e-government has a positive effect on these variables. Following the above-mentioned research Shim and Eom (2009) examined the impact of ICT and social capital on corruption and confirmed that ICT has the potential to reduce unnecessary human intervention in the public processes, which reduces the need for corrupt behavior. Panel data from various sources used for their research concluded that information and communication technologies are an effective tool to reduce corruption in the country. E-government reduces the scope for bribery, removing intermediary services and enabling citizens to settle their affairs themselves (Singh, G. et al., 2010).

Researches carried out in this field show that factors supporting corrupt practices in public administration officials, such as monopoly power, discretionary powers or lack of accountability are mitigated by the existence of a functioning legal system and greater transparency (Mistry, 2012). These studies agree that the increased use of E-government can weaken the factors causing corruption and result in a reduction of monopoly power by officials and ultimately lead to greater transparency in public administration functions (Kim, 2007; Mistry, 2012). Mentioned authors in principle agree that an important role in the anti-corruption strategies of individual states play is by providing easy access to information for all citizens using e-government approaches and initiatives. This may result in greater transparency, which limits the possibility of a public official to accept or even demand a bribe.

Specific examples of the efficient use of E-government as a tool to fight corruption can be found in many countries regardless of their economic maturity, the political establishment or geographic location. For instance, a good example of the use of E-government as a tool for reducing corruption opportunities in the United States is The Center for Responsive Politics. It is a non-profit organization that focuses on monitoring financial flows for public policy. The Centre monitors the effects of financial flows

and lobbying on elections and public policy area, and to inform and involve the public runs an online database of information about the activities monitored. The database allows users to track federal campaign contributions, lobbying activities of organizations, individual lobbyists, etc. It also includes personal financial statements of the President, members of the US Congress and senior executives of major public authorities. Bhoomi project is jointly funded by the Government of India and the state government of Karnataka to digitize land records in their original paper form and create software for managing changes in the real estate in Karnataka. The project was designed to eliminate the long-standing problem of inefficiency and corruption in the management of land records in scattered and poorly controlled areas in India. Bhoomi reduces the discretionary powers of public officials by introducing strict rules for creating online records of property and land management. Farmers can now access the database and are entitled to information about their land track. The Bhoomi project has also created several information kiosks, where farmers can for a fee to print information about the owner of the land or the number of parcels that require, for example, getting a loan (Bhatnagar, 2003).

## 2 Methods and used variables

To verify the existence of a relationship between the level of corruption and the utilization rate of E-government, established indexes will be analyzed. Specifically, the Corruption Perception Index and the E-government Development Index will be used. Analyzed time series is the period from 2003 to 2014. This is the longest time series, which could be analyzed. 2003 was the first and 2014 was the last year of calculation of the E-government Development Index, the indicator of the level of E-government in a country.

The issue of quantifying the degree of corruption raises fierce debate. Particularly in the context of international comparisons of countries the number of corruption offenses is not exploited measure. The reason is obvious. It is not possible to determine how many detected cases are attributable to increased activity in the debit justice of the country. **The Corruption Perception Index (CPI)** has been published annually by Transparency International (TI) since 1995. It is an index that is based on corruption perceptions of respondents, which are domestic and foreign entrepreneurs, analysts, and representatives of the professional public in the evaluated countries. The index is published annually. The surveys contain questions aimed at public officials, bribery, or kickbacks in public procurements. Thus, the CPI takes values in the interval from 0 to 100, where 0 is highly corrupt country and value of 100 indicates a country without corruption.<sup>2</sup> The sample of examined countries has changed over time. For example, the index of 1995 included 41 countries, and in the last survey in 2014, there were already 175 countries evaluated. Changing the number of evaluating countries is the reason the order of ranking is not important for assessing of individual countries, but the actual value of the CPI is important for it (Transparency International, 2003, 2014). Although the Corruption Perception Index assesses the level of perceived corruption, the results received a lot of international attention. This is due to its wide-ranging in number compared countries and comparability over time.

**The E-Government Development Index (EGDI)** is a composite indicator measuring the willingness and capacity of national administrations to use ICTs to deliver better services to the public and to have telecommunication infrastructure and human capital that can make

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<sup>2</sup> CPI was until year 2011 in the interval from 0 to 10.

it possible to work and share information more efficiently (SEO, Mehedi, 2016). This measurement is based on a survey compiled in cooperation between the United Nation's Department of Economic and Social Affairs and Civic Resource Group, consulting firm providing technology solutions in the field of E-government. The Web Measure Index shows a general ability of governments to use E-government methods as a tool for information, communication, data transfer etc. The Telecommunication Infrastructure Index defines the IT capacity of the country. Finally, the Human Capital Index is based on measuring the level of human capital development in the country. EGDI has been published since 2003 and takes values in the interval  $<0; 1>$ , where 1 represents the high level of usage of E-government and a value of 0 means a low rate of application of E-government in public administration (United Nations, 2003, 2015). The EGDI variable only measures an e-government's services supply. The real use of smart cards in healthcare, for example, is not directly captured by the variable. However, it seems plausible that offer of e-government services and their actual use by the residents are highly positively correlated (Andersen, Rand, 2006).

Verification of the relationship between E-government and corruption will be carried out by using a *simple linear regression analysis* and *correlation coefficient*. Correlations between defined variables will be verified by the value of the Spearman correlation coefficient ("the correlation coefficient"). The calculation of the correlation coefficient will be conducted by using statistical software STATISTICA, version 1.10. The significance level established for the correlation analysis is 0,05.

The null hypothesis defines that the *monitored variables are not in correlative relationship*. Verification of this hypothesis is based on the subsequent comparison of the level of significance with a value (called p-value) which statistical software generates. Then we can also determine how tight the mutual correlation between the variables is. The correlation coefficient takes values between -1 and 1, inclusive. The values of the correlation coefficient close to a value of -1, respectively 1, can describe a very strong mutual correlation relationship between the observed variables. It is also possible to distinguish the positive correlation relationship (or direct relationship) that occurs when the value of the correlation coefficient becomes positive. Or otherwise, we can specify a negative correlation relationship (or indirect relationship). First will be investigated relationship exists between EGDI and CPI in two time periods (i.e. 2003-2014). Subsequently, analysis of whether there is a relationship between change in EGDI and change in the CPI during the mentioned period will be done.

Most existing studies focus on the impact of E-government in developing countries, and somewhat neglected the possible influence of E-government of corruption in more developed countries. The reason is obvious, the level of corruption among the leading civil servants and politicians is assessed as high, especially in developing countries (e.g. Angola, Mozambique, Congo). At the head of these governments often stand by former military dictators who become political leaders, regardless of transparency and accountability, and who have a low popular support and legitimacy of otherwise necessary for political survival, they compensate for bribing prominent family clans and interest groups (Volejníková, Linhartová, 2014). For these countries one can assume a greater impact any reduction in discretionary powers of officials on corruption in the country. The subject of this analysis will be a total of 117 countries, irrespective of their geographic location or the political establishment. It is a set of countries that are included in the evaluation

and CPI indices EGDI throughout the period analyzed. Eleven years' time period is reasonable to capture the effects of changes in the use of E-government on corruption.

### 3 Analysis of the impact of E-government at the level of corruption in the country

Spearman correlation coefficients for the variables are shown in the following table 1. The values identified using statistics as statistically significant, are highlighted in bold. A positive correlation relationship was found among the variables CPI and EGDI in both years. There is a relationship between corruption and using E-government methods in the analyzed countries. Improvement in the level of E-government in the countries led to improvement in the level of corruption.

**Tab. 1: Correlation matrix**

	CPI 2003	CPI 2014	% change CPI	EGDI 2003	EGDI 2014	% change EGDI
CPI 2003	1,000000	<b>0,935734</b>	<b>-0,517411</b>	<b>0,831197</b>	<b>0,796237</b>	-0,131504
CPI 2014	<b>0,935734</b>	1,000000	<b>-0,225860</b>	<b>0,840767</b>	<b>0,801507</b>	-0,135228
% change CPI	<b>-0,517411</b>	<b>-0,225860</b>	1,000000	<b>-0,290771</b>	<b>-0,308495</b>	0,124155
EGDI 2003	<b>0,831197</b>	<b>0,840767</b>	<b>-0,290771</b>	1,000000	<b>0,871197</b>	<b>-0,334537</b>
EGDI 2014	<b>0,796237</b>	<b>0,801507</b>	<b>-0,308495</b>	<b>0,871197</b>	1,000000	0,132332
% změna EGDI	-0,131504	-0,135228	0,124155	<b>-0,334537</b>	0,132332	1,000000

*Source: author's own processing*

Impact, especially of bureaucratic corruption, and on the economic performance of countries has been a favorite topic of various studies and debates for decades. The strong interaction between politicians, officials, and businessmen, aiming to obtain illegal economic rents from public activities characterizes in many countries the decision-making process of public investment and reduces their economic performance. According to studies (Jain, 2001; Kimbro, 2002; Kim, 2007; Mauro, 1997; Tanzi, 1998) and many others, corruption has an exactly quantifiable negative impact on economic efficiency and economic growth of the state. Empirical evidence shows that corruption does not produce long-term economic stability of the country, because it distorts the priorities of government policy objectives, including monetary and fiscal policies. Comparison of economic development of the country and the level of corruption perception refers to the world's poorest countries as the regions with the highest corrupt activity. These are mainly countries of the African continent, which in global comparisons are the last in the international rankings. In recognition of the significant differences in the evaluated group of 117 countries, not only in terms of the level of corruption and the use of ICT, but in general economic maturity, it is appropriate to analyze the potential impact of E-government on corruption among smaller and more homogeneous groups. As a criterion for dividing 117 countries into smaller units GDP/capita of the country in 2003 according to the World Bank data was used. Analyzed countries were divided into four numerically smaller groups of 29, respectively 30 countries.<sup>3</sup>

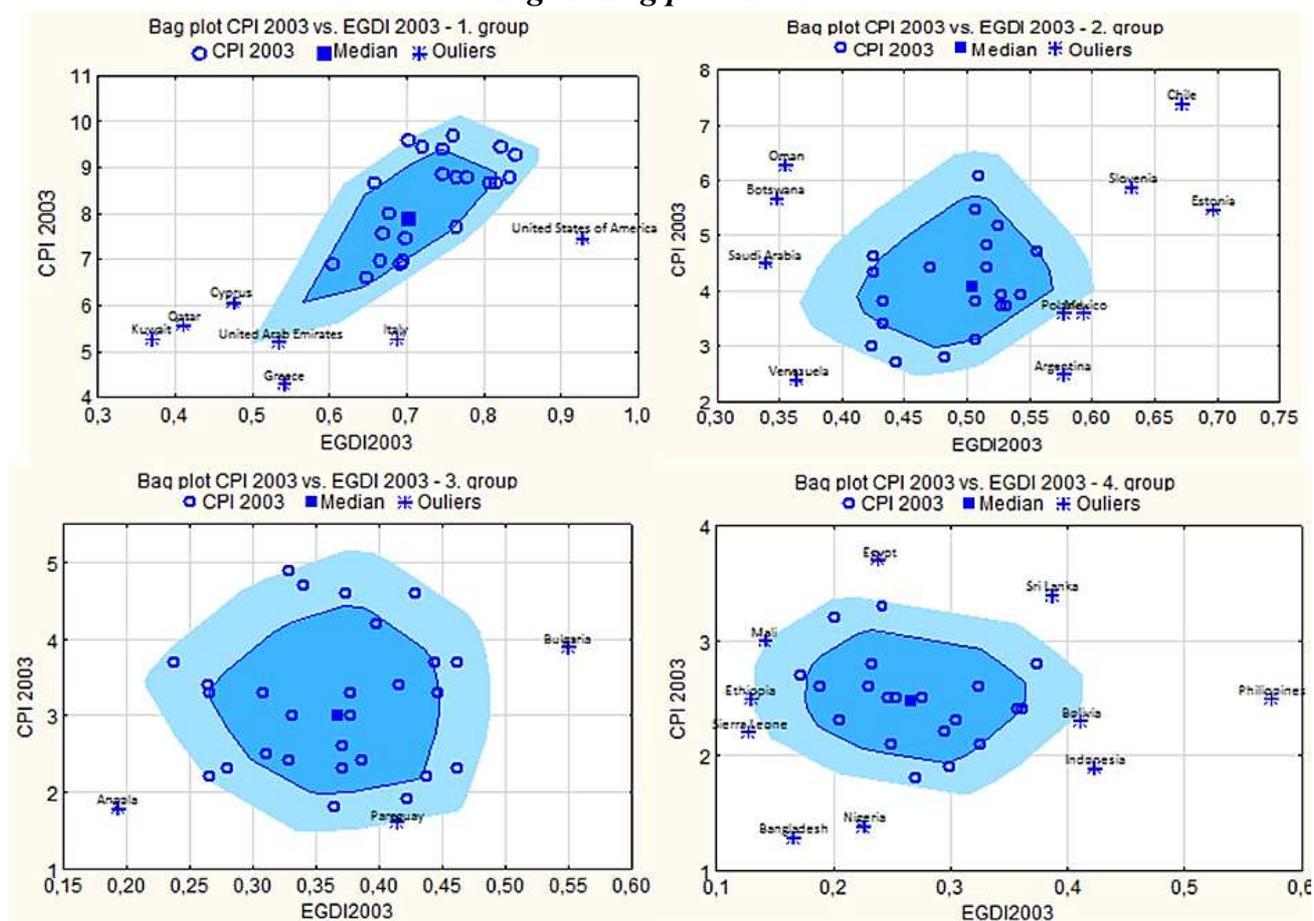
Bag plot was used for graphical interpretation of the examined variables. This is a generalized two-dimensional graph, which serves the graphic interpretation of statistical data. Points in the graph represent a combination of dependent and independent variables of individual countries. Dark -blue area (i.e. Bag) contains 50% of surveyed countries (between the first and third quartile) and dark- blue square represents the median value of the examined countries. The Light blue exterior bag contains other rated states that achieved different values than countries in the dark blue field, but are not outliers. Outside

<sup>3</sup> List of countries is attached.

of this area there are outliers that are shown in the chart with small stars. Bag plot also shows other characteristics of data displayed as the country's position within the evaluated countries, as well as the relationship between the evaluated variables indicated by the orientation of the bag (positive slope of bag indicates a positive relationship between the evaluated variables and negative slope of bag suggests the negative relationship).

Figure 1 shows bag plots of created four groups of countries that use the data from 2003. On the x-axis, there is the EGDI in 2003 and on the y-axis there is the CPI in 2003. As mentioned earlier, higher values of the EGDI indicate better readiness to use IT technology in the field of public administration and higher CPI values indicate less corruption in the country. Slope of the bag plot confirms the positive relationship between variables, especially in the first group of economically advanced countries. To a certain extent, a similar relationship between corruption and the E-government can be attributed also for other groups of countries; in the third group of countries, the relationship is not so significant. The year 2003 showed the impact of E-government at the level of corruption for most groups of evaluated countries. In all, bag plots illustrated several clusters of remote countries that are lagging in their group, both in terms of the use of E-government or the assessment of the extent of corruption. In the group of countries with the highest GDP/capita it is, for example Qatar, Kuwait, Cyprus, United Arab Emirates, Greece, and Italy. These states were included in the first group based on the used data, but in the evaluated variables lag other group members. Conversely, the United States surpassed all members of the first group of countries in assessing the level of E-government in public administration. We can say that in this country the information and telecommunications technology to communicate with customers of public administrations is used most often in the group of countries.

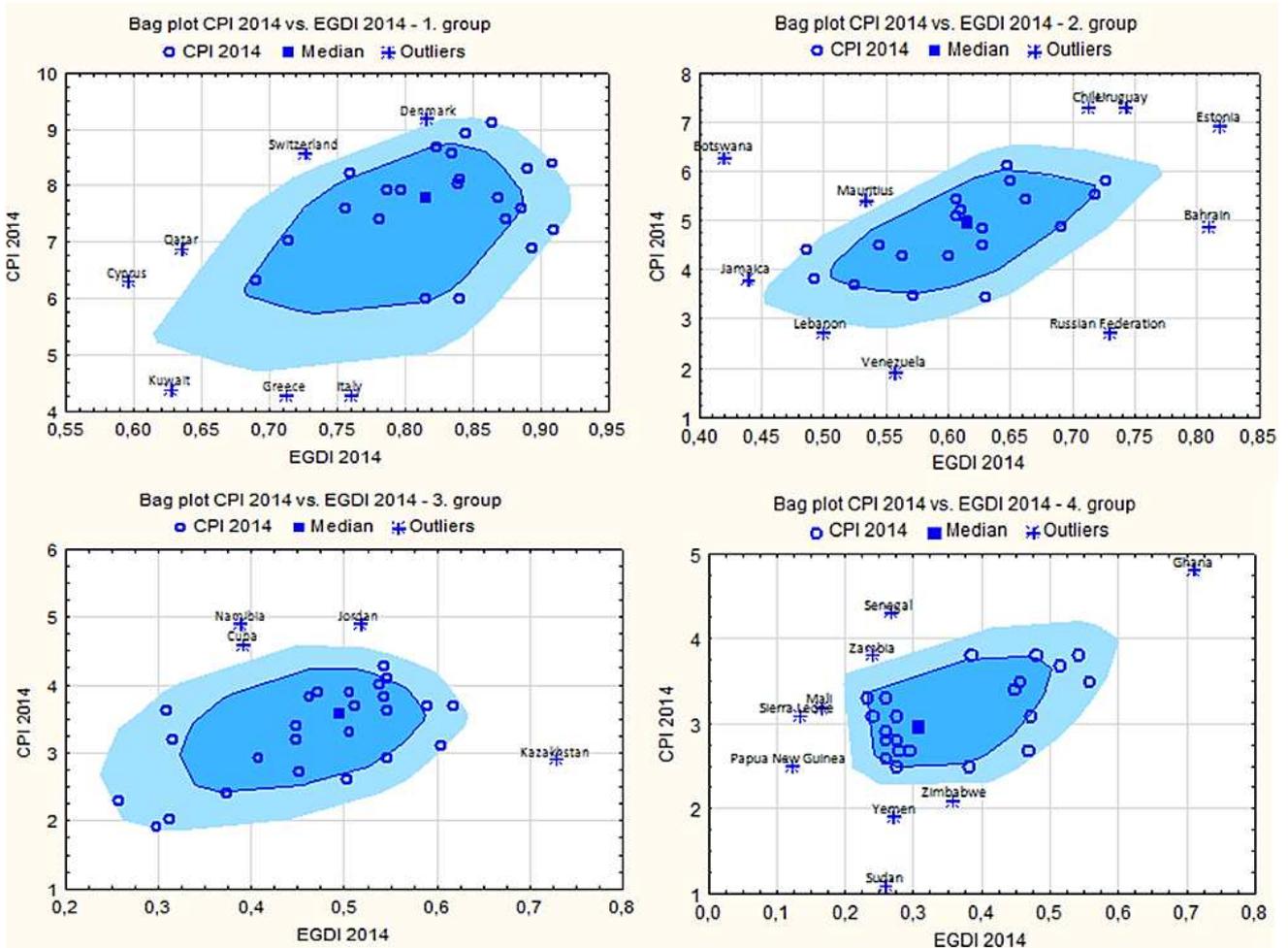
**Fig. 1: Bag plots 2003**



Source: author's own processing according to Transparency International (2003), United Nations (2003)

Figure 2 shows the same bag plots using data of 2014. The EGDI values in 2014 are again plotted on the horizontal x-axis and the CPI in 2014 on the vertical y-axis. Bag plots of 2014 values achieved a positive slope in all groups of countries, which confirms a positive relationship between the variables. There was again the creation of several clusters of remote countries that are identified in terms of the extent of corruption and the level of E-government differs from other countries in its group. For example, in the group of countries with the lowest GDP/capita was a significant separation of Ghana from other countries of the group. Ghana recorded in the reporting period 2003-2014 the most significant progress in the use of E-government in public administration. In the analyzed years, Ghana reached the level of the index EGDI 0.241 in 2003 and 0.712 in 2014, which means an increase of 95% in the level of usage of E-government. In that country, also the level of corruption was decreased by more than 45%. It is worth to mention also the development of the variables of Bangladesh, which recorded improving indicator of E-Government by almost 82%, while improving the value of the indicator of corruption by 104%.

**Fig. 2: Bag plots 2014**



Source: author's own processing according to Transparency International (2014), United Nations (2014)

The following regression function was used to verify the relationship between the CPI and the EGDI. The function is based on the least squares method (Freund, Mohr, Wilson, 2010):

$$y = \alpha + \beta * x + \varepsilon \quad (1)$$

The parameter x denotes the independent variable, in this case the use of E-government (index EGDI) and the parameter y denotes the dependent variable, ie the level of corruption (CPI). The parameter (determines the distance of the intersection of the regression line with the y-axis (the value of the regression function for x = 0). The parameter (is called the regression coefficient and shows the variation of the dependent variable value when the value of the independent variable changes. The symbol  $\varepsilon$  is the residual variance, which is a graphical representation of the distance of points from the regression line.

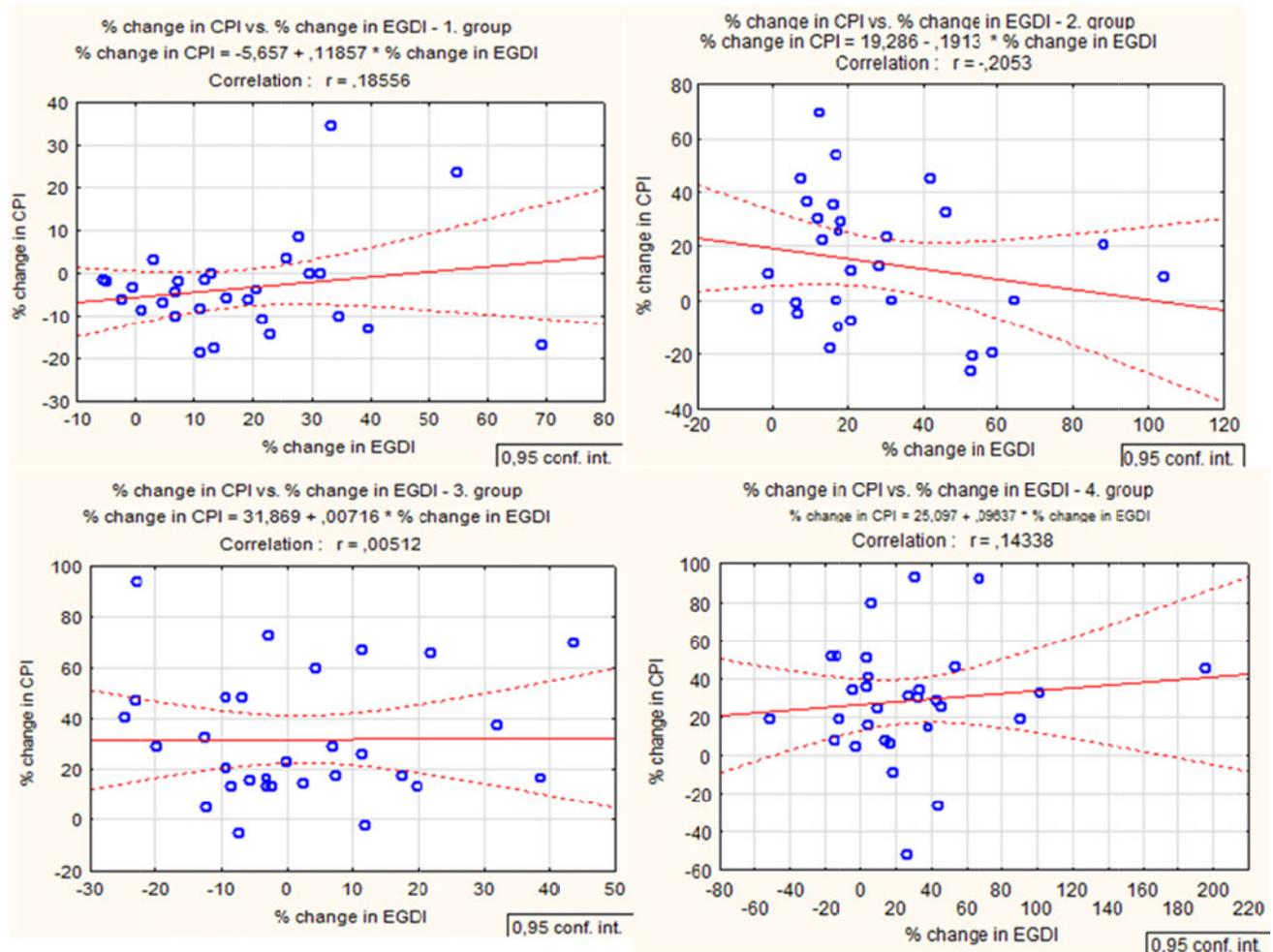
We can use the following model to estimate changes in the rates of induced changes in E-government in the country (Freund, Mohr, Wilson, 2010):

$$\Delta\text{Corruption} = \alpha + \beta * \Delta\text{E-government} + \varepsilon \quad (2)$$

Where  $\Delta\text{Corruption}$  is the change of the Corruption Perception Index between 2003 and 2014, and  $\Delta\text{E-government}$  is the change of the E-government Development Index during the same period.

Figure 3 is focused on how changes in the EGDI may affect changes in the CPI. Figure 3 shows the percentage change in the EGDI between 2003 and 2014 on the horizontal axis and the percentage change in the CPI between 2003 and 2014 on the vertical axis. This graph basically shows the evolution of the CPI and the EGDI during the sampling period. The linear regression line shows that not all countries with raised value of the EGDI recorded also simultaneously decrease of corruption. However, the linear regression line still has a slightly positive slope.

**Fig. 3: Linear regression model for variables change in years 2003-2014**



Source: author's own processing according to Transparency International, United Nations (2003, 2014)

In countries with the highest GDP/capita for the period demonstrated that at constant conditions and other variable results in a one percent change in the index EGDI nearly 0.12% change in the CPI. In other words, improvements in the assessment of E-government in the country by 1%, leads to the improvement of corruption in the country by 0.12%. In contrast, the group of countries with the lowest GDP/capita for the reference period showed that a one percent change in the index EGDI has resulted in more than 0.14% change in the CPI. Thus, improving the assessment of the level of E-government in the country was reflected in a better assessment of the extent of corruption in the country by 0.14%.

## Conclusion

This paper examined the existence of the relationship between corruption and E-government and tried to find an answer for the question, if changes in the exploitation of information technology lead to changes in the level of corruption in the country. To examine these relationships, a defined hypothesis which truth was confirmed by empirical models were stated. It was found that the use of information technology and the development of E-government contribute to reducing the level of corruption in most of the countries. The positive impact of the E-government in reducing corruption in most of the countries was confirmed by using correlation and regression analysis. The positive effect of E-government is not seen in all surveyed countries. Despite the increased level of E-government supply, worsening the state of corruption was proved in some countries. This finding only confirms the well-known fact that there are many causes of corruption, corruption occurs in different areas of public administration and takes various forms. For this reason, it is not possible to find a simple recipe for fighting corruption, which would be effective in all countries worldwide from across the political arrangements or governmental arrangements in a country. However, we can say that E-government as a tool for reducing opportunities for corruption in public administration is one of the good roads for reducing corruption among officials.

For the reporting period 2003-2014, it was found that there was a positive effect in economically more developed countries, but also in group of economically less developed countries. It has been shown that 1% percent increase in the index EGDI in the period caused reduced corruption (increase the value of the CPI) by 0.12% in the first group of countries. 1% percent increase in the index EGDI in the period caused reduced corruption (increase the value of the CPI) by 0.14% in the group of countries with the lowest GDP/capita. It is not possible to generalize the results of this paper to other groups of countries or other time periods. The level of corruption in the country is affected by numerous factors and e-government cannot be a panacea for fighting corruption. The performed analysis of the impacts of E-government on the corruption in the country builds on existing studies (e.g. Kim, 2007; Bhatnagar, 2003; Mistry, 2012; Seo, Mehedi, 2016) and confirms the possible reduction of corruption in the country using E-government for analyzed period and group of countries.

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## Attachment

A list of surveyed countries in terms of GDP/capita:

### 1. Group of countries

Luxembourg, Norway, Iceland, Switzerland, Qatar, Ireland, Denmark, United States of America, United Arab Emirates, Sweden, Netherlands, United Kingdom, Finland, Austria, Belgium, Canada, Japan, Kuwait, France, Germany, Australia, Italy, Singapore, New Zealand, Spain, Cyprus, Greece, Israel, Portugal.

### 2. Group of countries

Slovenia, Bahrain, Czech Republic, Saudi Arabia, Trinidad and Tobago, Oman, Slovakia, Hungary, Estonia, Croatia, Poland, Lithuania, Mexico, Chile, Latvia, Turkey, Argentina, Malaysia, Venezuela, South Africa, Lebanon, Russian Federation, Botswana, Uruguay, Mauritius, Brazil, Romania, Costa Rica, Panama, Jamaica.

### 3. Group of countries

Bulgaria, Cuba, Kazakhstan, Dominican Republic, Namibia, Serbia, Colombia, Tunisia, Belarus, Algeria, Ecuador, Bosnia and Herzegovina, Albania, Iran, Peru, Thailand, Jordan, Guatemala, Morocco, Ukraine, China, Congo, Angola, Armenia, Syrian Arab Republic, Azerbaijan, Paraguay, Honduras, Indonesia, Egypt.

### 4. Group of countries

Sri Lanka, Philippines, Nicaragua, Bolivia, Cameroon, Yemen, Republic of Moldova, Nigeria, Papua New Guinea, Senegal, India, Zambia, Viet Nam, Pakistan, Sudan, Kenya, Ghana, Kyrgyzstan, Zimbabwe, Mali, Bangladesh, United Republic of Tanzania, Sierra Leone, Uganda, Mozambique, Madagascar, Malawi, Ethiopia.

# IMPLEMENTATION OF THE CIVIL SERVICE COMPETENCY MODEL IN LITHUANIA

**Laima Liukinevičienė**

**Abstract:** *The article presents summarized results of a survey of the New Civil Service Competency Model which has been implemented in the Republic of Lithuania since 2013. The survey focuses on the implementation process. The study was intended to determine the responsibilities of the state and municipal and other organizations while implementing the Model as well as the purposefulness of its development. The benefit of the Model implementation for the entire public administration system, on the one hand, and an individual institution, on the other, was granted by thorough analysis of relevant scientific literature including the investigation of proper national and institutional (municipal) documents. The purpose was to find out whether separate institutions must be involved in the Model implementation and what factual measures they had to be responsible for. The results of the survey showed that separate institutions were actively involved in the personnel recruitment and training processes through implementing the Civil Service Competency Model (hereinafter CSCM, the Model), and the organizations were undergoing structural changes aiming at HR management improvement. The following directions of the institutional process improvement were suggested by the study: to increase the wider perception of the Model opportunities; to activate its use and application in such processes as personnel planning, assessment and other.*

*The document can be downloaded at <http://hdl.handle.net/10195/67933>.*

**Keywords:** *Modernization of public administration, Civil service, Development of human resources, CSCM, Municipality institutions.*

**JEL Classification:** *O15, H11.*

## **Introduction**

Human resource development is becoming the key factor in modernizing public administration. According to management theorists (Amstrong, 2008; Barney, 2007), meeting the public needs and challenges arising from globalization, and the ability to integrate them competently into the current reforms, without increasing bureaucracy, depends on the ability to plan, adopt, and execute decisions made by public bodies and public sector staff. This strategy aspirationally reflected by EU guidelines is included in the 2008-2012, 2012-2016 Government programs of the Republic of Lithuania (hereinafter - LR), and it is integrated into the main strategic documents of LR.

Currently Lithuania is in the implementation process of the new state Civil Service Competency Model. The Lithuanian human resource restructuring process was initialized by the Civil Service Department. Since the very start it has been actively supported by researchers. In 2008 the restructuring process was formalized in the political programs as well as the National, and LR Government documents. Subsequently, CSCM was created by prudently utilizing the EU funds and by learning from the experience of other states (Belgium, the Netherlands, Finland and others). Its creation initiated the following activities: creation of the virtual instruments required for the Model's implementation,

making the perspective project implementation schemes and coordinating structures, preparation of the interim solution evaluation methods and others.

## 1 Statement of a problem

This Model attracted the majority of public attention due to the General Competencies Assessment Test required to be taken while attempting to become a civil servant as well as evaluating the competence of specialists in managing positions.

Works on the CSCM implementation issues that have been published since 2014, serve as evidence that measures taken in the centralized recruitment to the public service positions have been actualized quite successfully. What concerns the CSCM implementation in other contexts (such as planning the need for staff, performance assessment, and the like) that are referred to by Lithuanian scientists (Rekašienė, Sudnickas, 2014:590-600), there is a lack of research. It is also unclear how successful separate institutions, including municipalities, are in integrating the CSCM into their activities.

At present, the LR Civil Service is comprised of 597 institutions, with a total of 58,041 office positions (see Table 1), some of which are vacant, e.g., there are 91% of occupied positions in the Seimas Office and institutions accountable to it; 93.5% of all the positions are occupied in Ministries, and 92% in the institutions accountable to them. Municipality institutions have confirmed 14,456.05 office positions, of which 13,304.47 (or 92%) are filled.

Since 2016 the number of positions in the public service sector has been reduced, and a part of the vacant positions will be either optimized or eliminated. The other part of the positions lack competent applicants, and only about 65 % of contenders pass the General Competencies Assessment Test which has been organized by LR since the middle of 2013 (see. Table 2).

The change of executive managers is influenced by the examination of management and leadership skills; 69% have passed the examination successfully.

**Tab. 1: The civil service in numbers in the Republic of Lithuania**

Civil service institutions in Lithuania	Total number of positions in state and municipal institutions /occupied office posts	Working in municipal institutions and offices	
		Civil servants	Career civil servants and institution managers
597	58.041/53.573	6.747	6.551

*Source: Civil Service in Numbers. Data of 31-08-2016. Online statistics of the Civil Service Department: <http://statistika.vtd.lt/index.html>*

**Tab. 2: Results of the centrally used Civil Service Competency Model Test for applicant selection in 2013-2016.**

<b>Applicants for civil service from 30-06-2013 to 31-08-2016</b>	
<b>Applicant selection</b>	<b>Numbers</b>
Applications submitted (figures). With a certificate of higher education - 95 %; with a master degree among them - 50%. By age the majority is: 18-30 (47%) and 31-40 (~30 %)	17.484
Passed document verification (figures)	15.474
Individuals whose general skills and, if required, management skills, have been assessed positively (figures)	11.620
Individuals who have taken and passed the General Skills Test (%)	65
Individuals whose management skills were examined and who have passed the Test (%)	69
Individuals whose knowledge of foreign languages <b>in Speaking</b> was assessed at B1-B2 levels and who have passed the Test in English/German/French (%)	62 / 61 / 66

*Source: Civil Service in Numbers. Online statistics of the Civil Service Department: <http://statistika.vtd.lt/index.html>*

The study presented in this article was carried out having assessed the lack of research on the CSCM use in other human resources management fields at the central level, and in some cases, at the individual organizational level, and that there is no deeper situational analysis of the Model implementation in different organizations, including municipal governance and other institutions. **The aim** of this research was to define responsibilities of the state and municipal institutions and organizations in implementing the CSCM and to provide purposefulness of the institutional development of the Model.

## **2 Research methodology**

The scientific literature was invoked in order to: 1) summarize the scientific insights on the expected benefits of CSCM for public service in general and an individual organization; 2) prove the wide applicability of the CSCM chosen in Lithuania with respect to the central level as well as the organizational level; 3) generalize the first year experience of the CSCM implementation process in Lithuania and foresee its purposeful continuity on the institutional level.

Analysis of legal acts was invoked in order to clarify the following: 1) institutional opportunities to apply the CSCM and institutional responsibilities (national legislation); 2) separate municipal involvement in the process of CSCM implementation and its formalization in local legislation. The choice of Mažeikiai Municipality for the document investigation was due to the facts that a) this municipality is typical and b) its administration activities have been assessed as well-functioning in the recent years, by the external evaluators. Such documents as legal regulations prepared by the Municipality and approved

by the Municipal Council or the Director's of Administration orders, and activity reports, and other activity records have been analyzed during the research.

### **3 Implementation of the State Employees Competency Model at the central and institutional levels**

#### **3.1 Lithuanian Civil Service Competency Model**

Lithuanian researchers and politicians, in agreement with foreign public management theorists, define the word competence with reference to the ability to complete certain tasks, with individual behaviour that is related to personal experience, wisdom and moral compass. According to Rekašienė and Sudnickas (2015:590-600), essential personal competencies provide an ability to predict an individual's behaviour in the workplace while performing civil service duties, and this can be measured while applying specific criteria and standards. Thus, following this logic, the competence model can be defined as skills, knowledge, experience, behaviour, and other personal characteristic sets which are required to guarantee the effectiveness of activities for a specific working position, or belonging to a related group of working positions.

The creation of a CSCM in LR was primarily determined by the following factors:

1. Membership in the EU and the desire to take over the EU Member States' good practices in civil service management (Minkevičius, Smalskys, 2008; Rekašienė, Sudnickas, 2014).
2. The requirements for civil service competency is claimed by the citizens of LR.
3. The experience already gained by modernizing other management processes in civil service by the Civil Service Department, such as strategic management, work quality management, e-management development, and others.
4. We've got valuable experience in applying the Competency Model in Lithuanian business enterprises and government institutions (e.g. the National Audit Office etc.); it has already existed over a decade.
5. Lithuanian community of researchers and scientists is mature and growing, constantly analyzing the civil service improvement issues and actively discussing them with politicians and society.

After reviewing the works of the scientists who wrote about the progress of the civil service competency models and their implementation with the purpose of better human resource management in the organizations, it can be concluded that these insights emphasize the benefits to both the state and an individual organization.

The Competency Model in Civil Service:

- increases the attractiveness of civil service in the labor market helping the transition to a higher career flexibility, due to cultural changes within institutions;
- it makes the civil service more efficient (Rekašienė, Sudnickas, 2014), visible to the public;
- the continuous application of the competence model makes the civil service more transparent, coherent, and professional (Valstybės tarnybos aktualijos, 2015);

- it is becoming the basis of the human resources management in civil service, because it enables the authorities to set the required competences in order to achieve their goals (Rekašienė, Sudnickas, 2014);
- it helps not only to implement changes in the human resource management model, but also to realize the foreseen changes on the cultural level of state institutions; while defining the competences, transitioning appears - from only performing their own functions, operating the procedures, to a broader view and realization that the function should create value for the public and the institution (Meyer-Sahling, Nakrošis, 2009:7-15);
- it becomes the basis for objective assessment of training and educational needs; evaluation of civil servants' activities results allow us to observe an employee's improvement, and assess whether one's individual competences meet the requirements set by the Competency Model (Šiugždinienė, 2008);
- it enables to associate the evaluation of the civil servants' performance and motivation with specific activities results at work, thus, liberalizing civil servants' employment and dismissal from the civil service (Nakrošis, 2011:65-98);
- its results contribute to accomplishing good public management policy;
- it helps to perceive the perspective of the personnel quality and competence needs on the state level, etc.

The analysis of the above presented scientific arguments about the CSCM benefits (making the public service more efficient, more transparent, more attractive; enabling the organization to change, leading it to competence-based management, and the like) shows that the institutions which decide to apply the Model widely, would have an instrument that helps fundamentally improve all human resource management process in the organization.

While initializing the modernization of civil service management and aiming at creating the most fitting competence model for Lithuania, the experience of foreign nations, starting with the European countries that apply competence models in their practice, was analyzed. According to Gražulis and Markuckienė who studied the implementation of the Model (Gražulis, Markuckienė, 2013:142-151), the CSCM created and being implemented in Lithuania is similar to the one used in the Netherlands, and in some respects, to the one used in Belgium: it is **partially centralized** (decentralized models are used in large countries, such as the United Kingdom or Sweden), and like a key element sums up the entirety of the human resource management system, i.e. it is used in all human resource management processes, and general competencies are also actualized in it. The model chosen and adopted in Lithuania is partially centralized. It is partially centralized in some human resource management processes, and functioning alongside with the fully centralized measures, provides decentralized stages of process implementation, thus responsibility for the employees' competence is taken by separate institutions as well. The contenders who have passed the centralized General Skills Test organized by the Civil Service Department (document verification, general skills test at [www.testavimas.vtd.lt](http://www.testavimas.vtd.lt), the results are valid for 36 months) participate in the next selection stage in the institution that has published the contest (the decentralized phase), where the main focus is put on the applicant's specific and professional competences (Konkursų į valstybės tarnautojų pareigas..., 2016).

The Civil Service Department (<http://www.vtd.lt>), responsible for coordinating the implementation of CSCM in Lithuania, in 2009 launched a project "Analysis

of Competences Necessary in Civil Service and the Catalogue of Civil Service Positions' Description" supported by EU in accordance with the implementation measure VP-4.1-VRM-01-V of the 4th Priority "Strengthening of the Administrative Capacities and Increase of Public Administration Effectiveness" of the Programme "Human Resource Development Action Programme for 2007-2013". The project started with the based Model concept (Concept of Public Service Improvement, 2010), afterwards, working together with JSC "Human Studies Centre" and JSC "Ernst & Young Baltic" the Model was developed; it was followed by the development of methodology necessary to implement the change (Valstybės tarnautojų kompetencijų modelis..., 2014).

Lithuanian CSCM consists of three groups of competencies:

1. **General Competencies** (competencies required in any field of activity, and therefore, mandatory for all civil servants).
2. **Managerial and Leadership Competencies** (competencies necessary to manage the activities of the institution (department), therefore, they are mandatory for the heads of departments and their deputies).
3. **Specific and Professional Competencies** (competencies required in professional activities. These are defined, taking into account both general and specific areas of activities).

As can be seen from the CSCM presentation, while initiating and developing the Model for Lithuania, focus was put on the versatility of its use. The Model has a part of centralized application in personnel selection, and transparent selection is very important in Lithuanian civil service. The other issues of staff management remain under the jurisdiction of the organization. The Model actualizes the competences required by the challenges of the 21st century, which motivates young and promising employees to apply for work in the public sector, as well as activates qualitative changes in the institutional public management.

Three years have passed implementing the CSCM in Lithuania. This term allows us to see the first results and to submit proposals. Having performed the analysis of speeches pronounced by scientists and public administration politicians referring to centralized implementation of staff selection in the last two years, it can be stated that the selection of the employees lacks diversity of competence identification and the diversity of evaluation methods is not wide enough. The tests that assess a person's general skills and the knowledge of laws are not good enough to fully identify the candidate's suitability for an office manager's position.

The academic Lithuanian community sees wider application possibilities of the Model and describes them in the publications:

- If the training of employees were linked to the Competency Model directly, the quality of the activities would be better, and training funds would be used more efficiently, <...> it would be possible to plan both horizontal and vertical career of an employee (Valstybės tarnybos aktualijos, 2015);
- CSCM is developed for the civil service, and it is not recommended to associate it with the civil servants' payment and promotion system, as it requires much broader objective competency assessment opportunities that require significant financial, time and human investment; first of all, the CSCM must be fully implemented in recruitment,

assessment, planning the training and education, and career (Rekašienė, Sudnickas, 2014).

Summarizing the analysis of the scientific literature, we can conclude that the implementation of change in public management, i.e., the CSCM implementation through centralized selection of staff to work in the civil service, organizing staff training in terms of the change management perspective, is currently in the phase of actualization and result evaluation (Hayes, 2010). The wider use of the Model, considering the development of human resources management system in an individual organization, is likely to be still at the planning stage. The growing interest in the Model and the acknowledgement of scientists are the evidence of this; moreover, currently there is no resistance towards the implemented changes in real life.

On the other hand, the involvement of a separate organization into the wider implementation of the Model is not under discussion. Therefore, the following question becomes urgent: are the local authorities and the state required to implement the CSCM more widely?

### **3.2 Legal regulation of the CSCM implementation at an individual institution**

Analysis of the main documents of LR legislation, of the years 2012-2016, relating to the modernization of civil service and regulation of the CSCM implementation, as well as its content, shows that these instruments are common to **all State and Municipal institutions and organizations**. Development of the main tools and measures, and coordination of their implementation takes place centrally, i.e. the process is centralized.

- In accordance with the LR Government Resolution No. 171, 07-02-2012, provisions were adopted of the “Program for the Improvement of Public Administration 2012-2020”. They aimed at improving competencies of the civil servants, the competences which were integrated into the Lithuania’s Progress Strategy “Lithuania 2030” approved by the Seimas Resolution No. XI-2015, 15-05-2012. This Strategy presented the full-scale implementation of the CSCM as a factor of public governance progress. LR Government Resolution No.1482, 28-11-2012, “For the Approval of the National Progress Program for Lithuania for the period 2014-2020” states concrete measures, deadlines and responsibilities, in accordance with which CSCM will be implemented and developed in service.
- LR Government Resolutions discussing separate processes of competency-based management, and the Ministry of Internal Affairs Minister’s Orders detailing the reorganization-implementation process, provides concrete functions and responsibilities of the State and Municipal authorities and institutions as implementing bodies (see Table 3).

LR Government Resolution No. 312, 30-03-2016, approved the “2015 Annual Report on LR Government Activities”. Its submission to the Seimas proves that the CSCM has already been implemented in the civil service and management selection processes, and the staff training system; its further development for the year 2016 has also been foreseen.

**Tab. 3: Legal regulation coordinating the involvement of State and Municipal institutions in competence-based management**

Document	Functions and responsibilities of State and Municipal institutions and offices while implementing the CSCM
<b>Lithuanian Government Resolutions</b>	
Resolution No. 228, 13-03-2013, "For the approval of priority measures implementation in the program for 2012-2016 adopted by the Government of the Republic of Lithuania"	Responsibility for the selection phase of decentralized organization, employee assessment, and staff demand planning processes.
Resolution No. 478, 31-05-2013, "For the description of the competition procedure for a civil servant's position"	The institution provides employment demand within the Public Service Information System; it announces a tender, and cancels it, according to the change in demand; it performs document verification of the tender participants, sets up commissions and performs tenders for the applicants in accordance with the competitions statutory order.
Resolution No. 481, 28-05-2014, "For the approval of civil servants training strategy for the years 2014-2017"	It is responsible for the updating the following Model constituents inside the very institution, such as training needs, training plans, and the assessment of training quality; prevision of the necessary financial resources, and training opportunities through the State and project funding.
<p><b>Orders issued by the Minister of Interior, Republic of Lithuania:</b>            Institutions were encouraged to implement the competence-based human resource management in civil service (until the fourth quarter, 2015); moreover, they were authorized to uptake the projects for civil servants' qualification development. Dissemination of the information to the staff as candidates for the office positions.</p>	

*Source: Author*

Content analysis of the National documents of the Republic of Lithuania has shown that the state and municipal institutions and organizations are authorized to implement the CSCM as well as apply it in the processes of planning the need of employees, their selection and evaluation. They are also authorized to participate in the centralized recruitment phase, moreover, they are responsible for the organization of decentralized phase. Authorities of all the public institutions were responsible for the identification of necessary training needs, planning, and reporting for the finances allotted for the training sessions. The Model was outlined to be implemented by the fourth quarter of 2015.

### **3.3 Integration of the CSCM into legal and administrative environment of an individual municipality**

A typical LR municipality has been chosen. Its involvement in the implementation process of the CSCM, formalized in the documentation, should show the course of changes activated by the implementation, as well as it may provide deeper insights for further improvement of the CSCM implementation process. The analysis also gives overview of the documents and sources published in virtual space such as strategic documents, performance reports and legislation regulating work and activities. As it can be seen from the analysis presented below in Table 4, by 2013, the strategic documents adopted by the Region Municipality administration targeted at the usual administrative processes, and the human resource management topics were not relevant. Some reference towards the topics appeared in 2013-2014 documents, but it was not a priority. Human resource development focused on specific and professional skills. The results of 2015 show a significant change: process management was computerized and connected to the whole, therefore, processes were

optimized; employees participated in trainings and acquired new competencies, including performance management.

**Tab. 4: Manifestation of competency-based management in Municipal legislation**

Document	Implementation of Competency Model or the competence-based management aspect
<b>Strategic documents adopted by Mažeikiai Region Municipality (MRM)</b>	
Strategic action plan of Mažeikiai Municipality for 2013-2015	Competency-based management <b>is not manifested</b> .
Long-term strategic development plan of Mažeikiai Municipality for 2014-2020	The CSCM <b>is projected</b> . There are some measures planned in the 2nd Priority “High Social Well-being” meant for the intended purpose “High quality of Regional management and public services”; such measures are planned as specialized training for administrative staff and politicians, and optimization of the administration process. Legal and Personnel Administration Offices of MRM Administration take the responsibility.
Strategic action plan of Mažeikiai Municipality for 2015-2017	The CSCM <b>is projected</b> . The information system consolidating and managing all the administrative and township management processes is going to be installed. All the institutions take the responsibility. It is intended to develop the employees’ qualification using the EU support.
Strategic action plan of Mažeikiai Municipality for 2016-2018	<b>It is implemented through the improvement of employees' competencies</b> . The situational analysis shows that in 2015 a computerized process control system was installed, and over 100 employees were trained to work with documents and service management system, and 70 learnt to work with the computerized financial management and accounting system, and 85 started working with the project management subsystem. Most of the administrative staff are trained to work with the optimized planning and management Model. Some EU support funds (2 projects) and Mažeikiai Municipality funds have been used for this.
<b>MRM: top management reports on the implementation of activities</b>	
2015 Annual activities report given by the Mayor of Mažeikiai Municipality	The target aspect <b>is not manifested</b> , but the fact that the Mayor’s report, where he specifically articulates his activities and his contribution to the achieved results, is publicly available on the Internet, proves that the CSCM is already functioning, and it is acknowledged that the managers’ activities must be transparent and visible.
2015 Annual activities report of Mažeikiai Municipality Council	The target aspect <b>is not manifested</b> among the priority issues of the meetings, but the approval of the carried out qualification training sessions for the municipal administration employees and the process optimization procedures shows a favorable environment for the implementation of the Competency Model.
2015 Annual activities report given by the Director of Administration of Mažeikiai Municipality	The target aspect <b>is manifested</b> as the report contains a whole chapter devoted for civil service and the modernization process of its performance. Competency Model issues are not mentioned directly, however, its implementation is projected.
<b>Operational regulation of the department responsible for personnel management</b>	
Department Regulations for Personnel Administration	The target aspect <b>is manifested</b> . CSCM is not mentioned, but all the functions to be implemented by this Department correspond to the key aspects of CSCM implementation, such as planning, selection, information, training, motivating and evaluating the personnel, etc. This new Department was established in 2015.

Source: Author

Content analysis of Mažeikiai Municipality documents is presented in Table 4 (search for the evidence in the CSCM formalization concepts, such as **is not manifested, is projected, is implemented and model deployment areas**). It showed that the largest

changes in the Municipal administration took place due to the Model implementation in 2015. Strategic plans and reports represent active involvement in the planning of trainings, and funding them by attracting money from the EU support. Contents of the trainings show the advanced use of technologies in management processes. In 2015 restructuring was completed in Mažeikiai Municipality, i.e. the functions of human resources management as well as legal regulation functions were separated and two new Departments – Personnel Administration Department and Legal Department – were established. The change was initiated by the State new policy of civil service modernization.

On the other hand, the Municipal strategic documents do not provide any measures that would contribute to the improvement of the staff planning, and the processes of the staff competency assessment, focusing on the results and reasoning, and the staff motivation are not actualized either. So far, there is no emphasis towards the strengthening of leadership competencies in the Municipal action plans.

#### **4 Discussion and conclusions**

Results of this study prove that we can start talking about the third year of the CSCM implementation in Lithuania pointing out the successes and foreseeing the purposefulness of the process improvement.

The CSCM has received the approval of Lithuanian politicians, civil servants and the academic community, and it has answered the purposes meant in the phase of its creation:

1. The Model is used in the selection of employees; it is used while planning and optimizing the demand of office positions, and assessing the competencies of the employees who wish to stay in the occupied position; it is also used in planning the training centrally. National documents and statistics serve as evidence of the going on process.
2. The academic community joined the Model implementation in the initial phase and has been actively engaged in the public administration theme since the very start. Currently the academic community goes on further development of the Model focusing on its benefits for the Lithuanian society, and the public management of individual organizations as well as the public sector governance; the community initiates public debates in the Department of Public Service Portal for the perspectives of the Model improvement.
3. Having enabled the state and local authorities to plan the necessary training, the initiative of Municipalities increased emphasizing the municipal involvement in the improvement of competencies needed to manage modern processes.
4. The institutions adjust their human resource management systems in accordance with the recommendations of the CSCM.

The survey results point out the problems of the CSCM implementation; on the other hand, they show the improvement opportunities and purposefulness of the Model on the institutional level:

1. It is likely that the authorities lack resources and qualification to carry out deeper research of the personnel needs, to carry out the staff competency assessment and the results-oriented activities assessment periodically. For the more profound analysis of these assumptions, research should be performed in several organizations.

2. The analysis of the Municipality documents shows that the strategy documents do not contain the CSCM concept at all, and there is no vision of the complex integration of the Model. Training sessions in the management of human resources, and methodical help provided by the Civil Service Department and/or the academic community would accelerate the progress of the CSCM implementation.

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# MEASURING THE LEVEL OF LEANNESS OF PRODUCTION - USE OF PRODUCTION LEAD TIME

**Michal Medonos, Marie Jurová**

***Abstract:** To manage any company process, it is essential to measure its performance. Lean production as a process of a change in a production, which is one of the main company processes, is no exception. We see that the universal methodology of a practically applicable evaluation of the level of leanness of production is missing. Many authors use some form of qualitative methodology - especially in form of questionnaires. In this paper, we focus on an analysis of possible approach using a quantitative methodology. We take Little's Law formula describing direct correlation between lead time and work in process to use lead time as a main metric to evaluate leanness of production. Thanks to the formula, we know that the shorter the production time is, the less buffers are kept and the more effective and thus the "leaner" the material flow is. As a benchmark for ideal lean company, we use one piece flow representing the top level of lean production.*

*The document can be downloaded at <http://hdl.handle.net/10195/67934>.*

***Keywords:** Lean manufacturing, Performance measurement, Little's Law, Variability, Lead time.*

***JEL Classification:** M11.*

## **Introduction**

All the state economies create one global market. Manufacturing companies can't rely on competitive advantage deriving from their local focus. All producers are compared on a global level, where there is a hyper-competition (D'Aveni, 1994). In this comparison, the only ones that can succeed are the ones achieving excellent performance. Only efficient business processes are able to satisfy customers.

One of the key processes is production. Properly functioning production system is a matter of course. But a system that is capable to maximize effectiveness of the production is often the attribute which can help overcome the competitors. Lean production (LP) is one possible approach of how to optimize production processes. Results of the firms which have successfully implemented this methodology bring enormous interest in this matter. This fact is supported by dominant interest of academics from the operations research area (Voss, 1995; Shah and Ward, 2003).

Krafcik named the new approach based on principles of Toyota Production System (TPS) "Lean production" (Krafcik, 1988). Womack with his team firstly described in detail basic principles of the LP in 1990 (Womack et al., 1990). Many other authors focused their research on understanding how LP works, how to successfully implement it and what the limitations of this principle are. Hundreds of scientific articles were written about it. From this point of view it looks like everything around lean production is described and clear, and companies shouldn't have any problem with implementation. But that is not completely true. There are still not many firms that have reached all the positive impacts of this approach. There are even some firms which fail the implementation or resist it. Schipper

and Swets made a survey of practitioners of lean implementation and found that there is only 30% success rate (Schipper and Swets, 2010).

## **1 Statement of a problem**

Behrouzi and Wong (2011) stated that the lack of an effective implementation methodology, a clear understanding of lean performance and its measurement are significant reasons behind the failure of the lean practices. Main problem is that uniform definition of LP is missing (Bhamu and Sangwan, 2014). Almost every author has their own approach and the variety is huge. Basic principles differ, implementation methodology and tools differ and even goals differ. Another issue is implementation process. Again, there is no uniform methodology and differences between companies are so big, that every implementation is unique. Not often mentioned, but important area is a measurement of the level of leanness. Organizations frequently use generic measures with a little consideration of their relevance to LP (Bhasin, 2008). A few authors tried to develop specialized system of measuring the benefits or the level of leanness, but still none of it was globally accepted and used within the implementation process.

The importance of measurement of the leanness of the production is high. If management of a company has to decide about the implementation of LP, they should understand what the actual level of the leanness is and what the realistic expectations are. Then future goals can be set and expected benefits can be calculated. During the implementation, it is necessary, for the people involved, to continuously measure their approach and if they are on the right track to achieve the goals. After the implementation, it is important to have sustainable system which can be controlled by appropriate performance indicators.

The aim of this article is to review the literature about measuring lean production and to define requirements for the development of the appropriate metric. One possible way to evaluate the level of the leanness of the production will be introduced. The organization of this paper is as follows. Literature review is divided into two parts - lean production and leanness followed by measurement of leanness. Next part will be the introduction into the topics of variability and buffers and Little's Law. Finally, one possible way to measure LP is introduced in discussion and in limitations and future research are presented in conclusion.

## **2 Methods**

For a literature review secondary data research of a scientific papers was used. Articles focused on measurement of lean production from scientific databases like Taylor & Francis, Emerald, ProQuest and others were reviewed.

### **2.1 Lean production and leanness**

Since Krafcik (1988) named for the first time TPS “Lean production” and Womack and his team described in detail principles of TPS (Womack et al., 1990), many other authors have focused on a different definitions of LP. That is why there is no universal definition of lean production (Karlsson and Ahlstrom, 1996; Qing Hu et al., 2015). First differences are in a area of company processes involved in a definition. Some are only production-oriented (Narasimhan et al., 2006), others are enterprise-oriented (Womack and Jones, 1994) and some definitions are wholly supply-chain-oriented (Naylor et al., 1999). Some authors name LP as a philosophy (Liker, 2004), as a system (Hopp and Spearman, 2004), as a process (Womack et al., 1990) or as a tool (Bicheno, 2004).

The most popular definitions are following: “Lean production is an integrated socio-technical system whose main objective is to eliminate waste by concurrently reducing or minimizing supplier, customer, and internal variability.” (Shah and Ward, 2007); “Lean production can be described as the elimination of waste.” (Liker, 2004); “Lean production is a strategy or philosophy that promotes the use of practices, such as kanban, total quality management and just-in-time, to minimize waste and enhance firm performance.” (Womack et al., 1990) or “Lean production is a manufacturing strategy, which strives to minimize waste and thereby increase efficiency.” (Hofer et al., 2012). From these definitions, we understand that lean production is a system of tools, which are used to eliminate waste. And waste is a product of variability in the company. Another important thought is that it is a strategy that influences the whole company. This definition sounds quite clear, but it is rather general. Explaining this definition in greater detail can be a problem. Every author understands this definition differently and focuses their research and papers in different ways.

Affiliated problem is implementation process. There are again many frameworks of implementation of LP, but none of them is universally applicable (Bhamu and Sangwan, 2014). Management of a company stands in front of a difficult decision because incorrect application of lean strategies results in inefficiencies of an organization’s resources and reduced employee confidence in lean strategies (Marvel et al., 2009).

Frequently used term connected with LP is “leanness”. There are more definitions of that term. “Leanness refers to the degree of the adoption and implementation of lean philosophy in the organization.” (Wong et al., 2014; Comm and Mathaisel 2000). Naylor et al. (1999) use “leanness” to describe the process of realizing lean principles while introducing the concept of “leagility”. The term “total leanness” was used by McIvor (2001) to imply a perfectly lean state of several key dimensions of lean supply. The leanness level of a system can be defined and measured by comparing the current state with the worst case and the perfect case. Thus, the level of leanness can be quantified (Anvari et al., 2013). For purposes of this article we will identify ourselves with definition of Wan and Frank Chen (2008): “Leanness level refers to the performance level of a value stream compared with perfection.” Therefore, a leanness measure shows “how lean” the system is.

## **2.2 Measurement of leanness**

Lean metrics are performance measures that are used to track the effectiveness of lean implementation (Anvari et al., 2013). There are many different ways of how to measure LP, but there is no universal methodology, that can be used to evaluate LP in every company. The tools for assessing leanness can be basically divided into two types: qualitative and quantitative.

Qualitative tools are based on surveys, checklist and other forms of getting data about how company meets different conditions and prerequisites connected with lean manufacturing. Analysis and evaluation of these data shows the level of leanness. One of the most popular tool is Lean Enterprise Self-Assessment Tool developed by lean aerospace initiative at MIT (Hallam, 2003). The model is made of 36 indicators that are divided in six groups, followed by 101 metrics to match wastes. Seyedhosseini et al. (2011) have investigated the leanness criteria in auto part manufacturing using a Balance Scorecard approach. They have considered five different perspectives: finances, processes, customers, employees, and suppliers; and extracted more than 50 criteria for being lean. Various lean assessment surveys have also been conducted by lean practitioners and researchers to assess

the leanness (Fullerton and Wempe, 2009; Karlsson and Ahlstrom, 1996; Soriano-Meier and Forrester, 2002). Most lean assessment tools provide just qualitative analysis and do not provide any clear direction of where the improvement efforts should be directed (Srinivasaraghavan and Allada, 2006).

In comparison of qualitative surveys, quantitative metrics and models provide better leanness score (Karim and Arif-Uz-Zaman, 2013). These tools can be divided into two groups. First group is focused on a techniques of an overall evaluation of the system. For example Srinivasaraghavan and Allada (2006) have measured leanness by calculating the Mahalanobis distance between the current state of the system and the benchmarking performance. In that case, other companies in the market are taken as a benchmark. The outcome depends heavily on the quality of the benchmark. Wan et al. (2007) measured the overall leanness by VSM (Value Stream Mapping) considering cost, time and output values. Fullerton and Wempe (2009) and Agus and Hajinoor (2012) used Structural Equation Modeling (SEM) to establish the relationship between different lean tools and lean production performance. They conducted several surveys to validate the relationships.

Second group is represented by tools, which are more narrowly focused on specific aspects of the leanness. For example the Manufacturing Cycle Efficiency (MCE) index represents leanness level in terms of time-based performance. This index for cycle time reduction compares value-adding time with total cycle time to show the efficiency of a manufacturing process. Fogarty (1992) has developed the Value Added Efficiency (VAE) index to assess leanness from value-added performance perspective. It is defined as the ratio of total run time to the total manufacturing time. Dai and Lee (2009) further expressed it as the ratio of the time in actual production and setup process over the total time in the production area. Wu and Wee (2009) measured overall equipment effectiveness. Swamidass (2007) used the ratio of total inventory to sales as a general performance index to analyze over 14,000 firm-years of lean practitioners. Eroglu and Hofer (2011) used Empirical Leanness Indicator (ELI) for measuring inventory leanness. This indicator measures a firm's deviation from size adjusted within-industry average inventory levels which represents the level of inventory leanness of the company.

Researchers also explored various operational research techniques to measure leanness, such as using Data Envelopment Analysis (DEA) (Wan and Chen 2008). Some researchers used fuzzy logic algorithm to measure the manufacturing leanness, since leanness can be measured considering quantitative as well as qualitative indicators with this algorithm (Bayou and de Korvin, 2008; Behrouzi and Wong, 2011; Vinodh and Balaji 2011). And Detty and Yingling (2000) have utilised simulation models with several performance metrics to quantify leanness level.

### **3 Problem solving**

#### **3.1 Variability and buffers**

Variability is one of the main reasons why companies aren't lean. Even definitions of LP by Wacker (2004) or de Treville and Antonakis (2006) discuss variability: "LP can be referred to as an integrated manufacturing system aimed at minimizing inventory levels and maximizing capacity use through the minimization of variability in the system." Formal definition of variability is the quality of nonuniformity of a class of entities and it is a naturally connected with randomness (Hopp and Spearman, 2008). Variability has many different causes. We can divide them into the two groups. First group is an external

variability consisting of a causes resulting from the environment outside the company. As an example we can take deviations in a customer orders or natural disasters. For managers, it is hard to influence this type of variability. Its reduction is almost impossible. The only way how to fight with it is some kind of protection against its effects - to have for example bigger stocks of finished goods or insurance against natural disasters.

The second group is an internal variability. Here belong causes arising from the company itself. This variability is created by internal processes and activities. There are two possible ways of how to respond to it. First is the same like with the causes of external variability - to prevent impacts caused by the variability. In production, it means mostly to create buffers. Generally, this is the easier way. Second way is to reduce the variability itself. Quite popular methodology is Six sigma, which is based on work with randomness and variability. Other possibility is to use some LP tools like SMED (Single minute exchange of dies), 5S, TPM (Total productive maintenance) or many others. Its purpose is to eliminate or reduce as many causes of the variability as possible, so the randomness is minimal and the uncertainty becomes certainty. Then there is no need to have any other protection in terms of buffers.

All buffers represents some kind of inefficiency. That is why the company should pay attention to identification of buffers in the system. All buffers cost money and from the customer point of view they don't have any added value and customers aren't willing to pay for them. Since buffers are hidden in the system, it is not easy to identify them. For conventional production systems, it is natural to include these buffers. It is important to find them, because they cover many types of variability in the system the same way as water in the lake hides the rocks at the bottom. Therefore, if you reduce the buffers it will show you the variability like lowering water-level in a lake will show the rocks.

Buffers, built to cover both external and internal variability, consume money and don't generate value added. Within the internal variability, the ineffectiveness of the system or how some authors call it "waste" is hidden. In general, buffers can have 3 major forms (Hopp and Spearman, 2008):

- inventory buffer,
- time buffer,
- capacity buffer.

Inventory buffer means that extra material in the transformation process is kept. This extra material can cover unstable process or other problems in the production. Time buffer means that pieces in advance are produced to cover potential delay in the production. Capacity buffer significate that free capacity is kept and can be used in situation of unplanned problems in production. Without these buffers conventional production systems collapse.

One of the main buffers defending the improvement of the production system is Work In Process (WIP). High level of WIP is a common problem in many companies. It is remnant of the old production systems used in the 20th century. In many cases, it is connected with planning systems. One of the famous planning systems created in the 60's is Material Requirements Planning (MRP), which is surprisingly still the basis for planning processes in modern Enterprise Resource Planning (ERP) systems. MRP and other systems need a high level of WIP for their proper working. When they were created there wasn't such a big pressure on efficiency of production processes, so their inaccuracy

and imperfection wasn't a problem. Times have changed and today, this system is a problem for improving the performance of the company.

### 3.2 Little's Law

Buffers created to protect the company against the variability can significantly influence the dynamic of production. There is a direct correlation between WIP as a main form of a buffers and cycle time which represents total time of a batch in a production. To understand it, it is important to remember Little's Law. This law (1) explains the relationship between WIP measured in number of pieces, throughput (TH) measured in number of pieces per time unit, and cycle time (CT) measured in time units - days usually (Hopp and Spearman, 2008):

$$WIP = TH \times CT \quad (1)$$

Instead of CT which represents actual production time, we can use lead time (LT) as a planned or expected production time. This formula came from queuing theory, when in 1961, John D.C. Little (1961) published his article about a proof of the queuing formula (2):

$$L = \lambda W \quad (2)$$

Here L represents the average number of items in a queuing system,  $\lambda$  stands for the average arrival rate of items to the system and W is the average waiting time of an item in the system. Production systems can be taken as a special form of a queuing system, so we can apply formulas and rules from queuing theory on them. There is only one difference between these two formulas. It is throughput representing output in (1) and arrival rate representing input in (2) (Little, 2011). We can use (1) only in case that WIP meets special conditions, for example if there is a strict adherence to the First-In-First-Out (FIFO) system. Otherwise we should use input rate instead of throughput.

In this formula, we can see the mentioned direct correlation between the amount of WIP and production time. From this relation, it is obvious that the bigger the buffers are the longer it takes to produce a batch of products. The connection between these two parameters is throughput. This parameter is normally defined by the needs of customers and limited by production capacity. Batch size is a parameter that isn't explicitly included in the formula, but can significantly influence both WIP and CT parameters. From this point of view, the decision is about how the TH will be divided into batches. Again, there is a direct correlation. It means the bigger the batch size, the bigger amount of WIP is kept in a system and the longer the production time is.

## 4 Discussion

Bhamu and Sangwan (2014) stated that measurement of LP is a key topic for future research and development of this methodology. Leanness level or level of implementation of LP or measurement of benefits of LP is often discussed in scientific articles. But since the time Booth (1996) stated that universal way of how to measure level of leanness is missing, not much has changed in this area. Generally, it is critical for proper functioning of every process in the company to measure it. If we take the implementation of LP as a process of a change and we don't measure the results, then we can't expect it to be on a right track. Other problem is to identify the current state of the production process in a company and to set the right goal of the implementation process.

The literature review section showed that there are quite a lot methodologies trying to measure the leanness level of the company. Each has its own way how to do it.

For typical lean assessment tools, questionnaires are developed to survey the degree of adoption of lean principles (Wan and Chen 2008). Questionnaires are quite popular qualitative measurements of the leanness. The problem with these self assessment tools is the nature of subjectivity; the predefined lean indicators of a questionnaire may not fit in every system perfectly (Wong et al., 2014).

Due to these facts, we prefer to use quantitative measurements of the leanness. Many scientists introduced their quantitative methodologies. But still none is generally accepted. Hallam (2003) stated that the right metric should have following characteristics:

- They should be measurable and in-line with the strategic objectives of a company and customer value.
- They should enable control and evaluation of performance.
- They should aid in understanding the current scenario and help identifying improvement opportunities.
- They should be up-to-date and realistic.

We think that there is one main characteristics, which is missing in some methodologies and can be reason why there is no universal metric. It is the problem with complexity of the calculation and affiliated problem with difficulty and repeatability of the calculations. The performance should be measured over periods of time in order to determine whether any substantial improvement has been achieved (Srinivasaraghavan and Allada, 2006). Many metrics are based on a historical data. Although past models are extremely useful, they only provide problem-tool connection without a quantitative measure of leanness (Wong et al., 2014). For the shop floor management it is essential to have a measurement that can be used to evaluate immediate state of the process. Then it is possible to track the improvements and use it as a motivation for the employees.

For the top management it is important to measure the organization's performance, benchmark it against an industry standard, and point to specific direction for future improvements (Srinivasaraghavan and Allada, 2006). The metric should be able to carry the strategic content. Decision about implementation of LP is a long-term goal and whole company must be involved in this process. That is why it is important to set the right target of this change and to be able to measure the progress.

All the characteristics and requirements about measurement of leanness point to the following methodology. To prevent the subjectivity of the metric, it should be quantitative. It is also better while taking into consideration the universal use and ability to benchmark the company. To ensure the simplicity of the calculation, we will use only one metric instead of complex system of indicators to evaluate the whole system. Here, we want to focus only on evaluation of the leanness of the production. The complex performance analysis of the company is different topic, where a lot of methodologies, like for example EFQM model are used. The metric should be calculated from actual data of a company system. This should ensure that the metric can be used on the daily basis. This would be the tool that would be able to track the improvements of the process.

Lead time is the "key" measure of leanness. Short lead times and lead time reduction is such a basic tool in LP that you will find it to be a strong measure of leanness (Naderi et. al, 2009). Although lead time is quite a simple indicator, it represents really strong tool revealing the level of LP. From Little's Law, it is obvious that there is a direct correlation

between lead time and WIP. Here WIP represents one of the most common forms of buffers. Buffers are created to cover variability, which is a source of inefficiency of the process. Long lead times represent high level of WIP, which means high level of buffers covering big variability and inefficiency of the production. One of the main characteristic of lean production is to decrease the inefficiency. From this point of view, short lead times represent lower level of variability and pointing out the high level of leanness.

Manufacturing parameters that cause long cycle times also cause high-production costs and factors that cause short cycle time lead to lower production costs. To maintain excessive amount of WIP, extra cash is needed. The turnover of stocks is lower and money are inefficiently utilized. The flexibility of the production is lower and the reaction time to the changes on the market is long. Customers are not willing to pay for any of that. Focus on customers is another important characteristic of lean principles.

Getting data about lead times is quite easy. Each production system should contain start date and finish date of each batch. But how can we set the goal or how can we compare two different companies or even two different material flows? Wan and Chen (2008) stated that ideally a lean manufacturing system runs with one-piece flow without interruption. Using the ideal case as a benchmark, the leanness level of a system can be measured based on the performance of the flow of each work piece. It was already Toyota who set one-piece flow as the top level of LP. All lean initiatives should lead to achieving this goal. This is benchmark for each company. We can calculate lead time in the theoretical case of one-piece flow with no interruption and compare it with the actually achieved cycle time in a production. The difference shows the level of leanness and the potential for improvement.

## **Conclusion**

The real benefits of LP are restricted as Liker summarizes “50 per cent of the auto suppliers are talking Lean, 2 per cent are actually doing it.” (Bhasin, 2008). Many organizations around the world have attempted to implement LP but the lack of a clear understanding of the main attributes of leanness, lean performance and its measurement contribute to the failure of lean practices (Anvari et. al, 2013). Lean production is a phenomenon of this age, but still it isn't fully understood. It is a process of a change, which needs to have a clearly defined goal. It is crucial to measure the performance for realizing the benefits of lean practices (Karim and Arif-Uz-Zaman, 2013). All processes in a company must be measured and evaluated. Without it, they can't be managed. Although, there are numerous theoretical and practical studies that address lean tools and techniques, few studies focus systematically on measuring the influence of lean attributes on leanness (Anvari et. al, 2013). Our target was to try to fulfill this research gap. We believe that the use of production lead time could be the way. We successfully tested this indicator on a few production companies with interesting results. Next steps are to make comprehensive research in companies to test the functionality and practical use of this metric.

We see a few limitations of this metric. Firstly, it focuses on production process and production companies. We haven't tried to use it for other company processes or other types of industry, especially services. Other limitation is the narrow focus on evaluation of leanness. Our aim isn't to measure the whole company performance but only the level of leanness. Practical use of this metric and evaluation of the results must be tested. We made a few tests in real companies with positive results, but thorough research is necessary.

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# SELECTED BUSINESS INTELLIGENCE METHODS FOR DECISION-MAKING SUPPORT IN A FINANCE INSTITUTION

Filip Mezera, Jiří Křupka

**Abstract:** *This article deals with decision-making support methods' implementation in a medium size financial company with international operations. The objective of this article is to show the abilities of these methods to precise decision-making of management. At the beginning of this article there is briefly described the existing situation in this business sector in Central Europe. After that part Business Intelligence methods are described as well as the reasons while these methods have been introduced in small and medium enterprises. These methods are dependent on data, on acquisition of data and on validation of this data. Pre-processed data can be used for standard reporting. Utilization of this type of reporting is described on two examples in this article. These examples show dependences between exchange rate volatility and a specific period of the year. Then follows a demonstration of client classification - firstly on historical data from years 2010 to 2013 utilizing a cluster analysis. New clients have then been provisionally allocated to already designed groups thanks to the above-mentioned description of clusters. When the external environment changed, due to primarily the Czech National Bank interventions, it has been essential to design better classification methods for new clients. These methods are described in this article and results of these classification methods are compared.*

*The document can be downloaded at <http://hdl.handle.net/10195/67935>.*

**Keywords:** *Business intelligence, Classification, Decision-making, Electronic money institution, Reporting.*

**JEL Classification:** *C15, D89, O16.*

## Introduction

Utilization of decision-making support methods has been, for a long period of time, the domain of primarily large companies. Currently these methods are becoming to be a regular tool for management by means of interlinking individual information systems and thanks to a larger offer of robust solutions targeted also at small and medium enterprises. During and after the economic crises of years 2008 - 2011 it was essential to more strictly control costs and to concentrate more on higher value added activities because of reduced margins arising due to lower demand. This pressure was visible across the entire economy while some companies were hit harder and some companies were hit less. In the framework of the banking sector some banks had to ask state bodies for support while some other banks went bankrupt. In the Czech Republic (CR) this crisis demonstrated itself by increased competition in acquisition of new clients, both from the business and the private sectors (e.g. saving cooperatives or banking subjects).

Finance sector has been at the same time influenced by financial regulation. Since January 1, 2011 in the European Union, new institutional order for regulation and supervision has been introduced under the name European System of Financial Supervision.

This system includes European Systemic Risk Board, three sector regulation European Supervisory Authorities and supervisory bodies in the individual European Union states. The individual organizations organize stress tests for subjects under their supervision. Regulatory elements are linked to these stress tests – primarily requirements for capital adequacy, risk diversification including diversification of bonds portfolio and so on. Another regulatory element is the introduction of a sector tax imposed on financial institutions. From among the Central European countries this applies primarily to Hungary where reduction of this tax has been recently announced. On the other hand this tax has been newly introduced in Poland (Balthazar, 2006), (Deloitte, 2015), (Slovik, Cournède, 2011).

The decision-making manner in any private company differs not only on the basis of the company size, or based on e.g. the size of its decision-making and support bodies, but also based on the company's sector orientation and on the branch in which it operates. A production company observes primarily input prices, supplies in stock and fulfilment of forecasted sales margins. Trading companies strive to understand trends and customers' needs, to set prices in relation to competition and to run marketing campaigns (Sekerka, 2002). For support to decision-making it is possible to use methods that are stated for instance in Business Intelligence (BI) (Grochowski, 1981) pyramid where on the base level is regular reporting (charts and graphs), then follows selective reporting, Dashboards and Ad Hoc analyses; then follow advanced analyses (classification and prediction) and on the top there is modelling (What-If scenarios and sensitivity analysis).

The objective of this article is to show the abilities and possibilities of a standard daily reporting and of BI. Standard reporting, on a daily basis, provides a basic overview of performance of an electronic money institution (EMI). Advanced BI analyses allow for categorization of existing clients and of new clients in the EMI.

## 1 Problem formulation

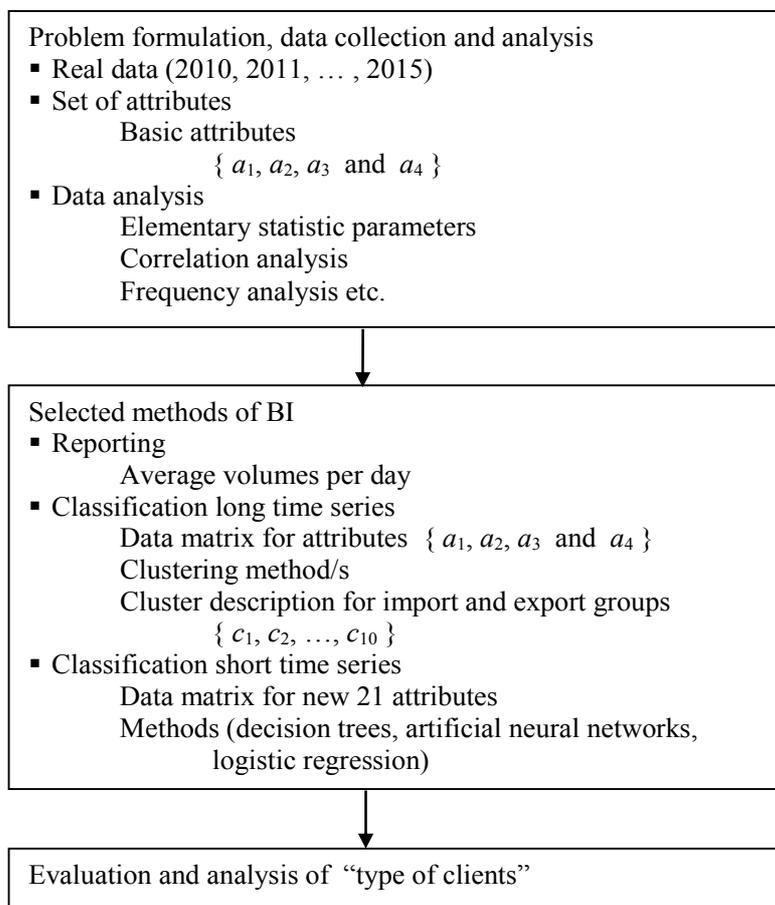
Fundamental attributes that have been utilized for observing EMIs are: volume of exchanged money  $a_1$  and profits from this exchange  $a_2$  (hereinafter the Volume and the Profit). Further the attributes Number of transactions  $a_3$  and the Average profit per transaction  $a_4$  have been employed. All of this is primarily observed from the position of clients and time- an individual client, a region, a state, a day, a week, a month, a quarter of a year and a year. The data have been calculated since January 1, 2010. The EMI analysis model is stated in Fig. 1.

Fundamental statistical parameters have been worked out for the given attributes. Large range is primarily with the Volume and the Profit. The values of the attributes have Poisson Distribution of probability. Then correlation coefficients have been calculated. These are illustrated in Tab. 1. From the correlation coefficients it issues that the Volume, the Profit and the Number of transactions are heavily dependent quantities. To replace these parameters by a single attribute is possible when observing one single client where the Volume and the Profit are linked by the set client's margin and thus the correlation coefficient approaches the value 1. With larger groups of clients' observation it is not possible to replace the parameters by a single parameter without loss of significant data (Šoltés, 2008).

In Tab. 2 there are stated values that illustrate uneven distribution of revenues. If we arrange clients, in descending order, based on the parameters Volume and Profit from the largest clients to the smallest clients then the first three columns show a relative number

of clients who generate the given percentage of turnover, of profits respectively. Next columns then show how big part of the volume, the profit respectively, is realized by individual by frequency arranged groups of clients.

**Fig. 1: Model of EMI analysis**



Source: Authors

A cluster analysis has been used for analysis of clients (profitable and non-profitable). The input data were the values of attributes  $a_1$ ,  $a_2$ ,  $a_3$  and  $a_4$  for years from 2010 to 2013. “New” clients’ analysis done on the basis of defined clusters according to annual data is not sufficiently dynamic and does not take into consideration any shorter-term periods.

**Tab. 1: Correlation coefficients for basic attributes**

Attribute	Attribute		
	Volume total	Profits total	Number of transactions
Volume total	1		
Profits total	0.8267	1	
Number of transactions	0.7043	0.7387	1
Average profit per transaction	0.1877	0.2162	-0.0269

Source: Authors

**Tab. 2: Frequency sorted groups of clients (in percent)**

Volume of turnover or profits in %	Number of clients in % for		Volume of clients in %	Sum of percentage		Percentages per group	
	turnover	profits		turnover	profits	turnover	profits
10	0.18	0.39	10	63.98	59.45	63.98	59.45
20	0.72	1.19	20	79.83	77.08	15.86	17.63
30	1.66	2.42	30	88.17	86.53	8.34	9.46
40	3.13	4.22	40	93.07	92.11	4.90	5.58
50	5.29	6.78	50	96.04	95.53	2.97	3.41
60	8.04	10.23	60	97.86	97.59	1.82	2.06
70	12.98	15.12	70	98.97	98.82	1.11	1.23
80	20.15	22.55	80	99.61	99.54	0.63	0.72
90	33.17	35.61	90	99.91	99.90	0.31	0.35
100	100	100	100	100	100	0.09	0.10

Source: Authors

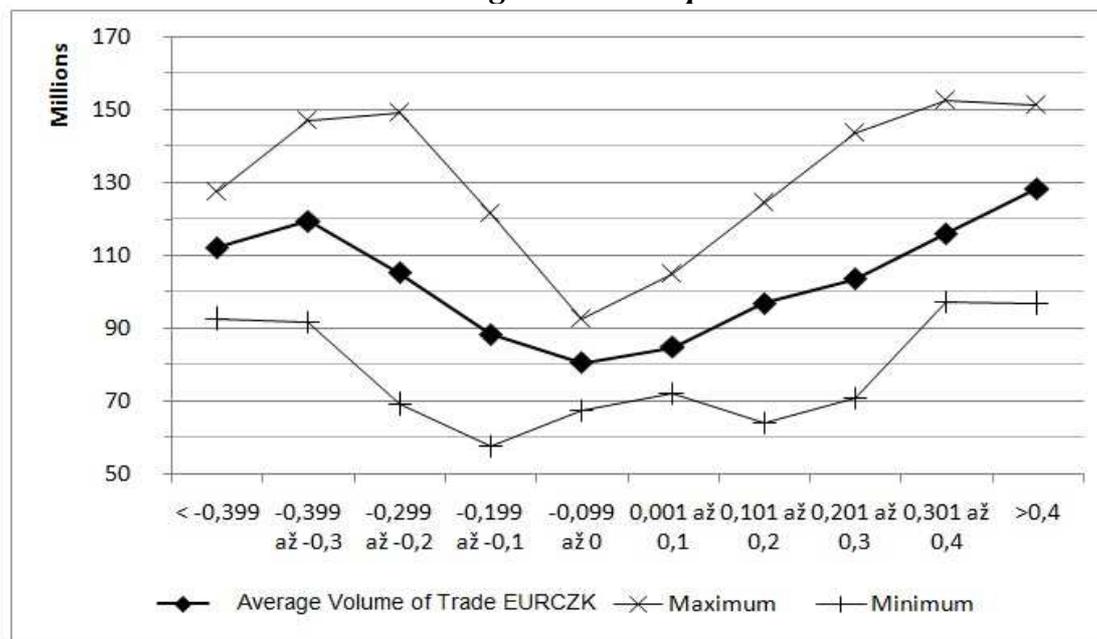
- Aggregated output attribute „a creditworthy client“ is defined based on 6 indicators: Volume for the first 6 and 12 months from signature of the Framework Agreement (FA); profit for the first 6 and 12 months from FA signature; number of transactions for the first 6 and 12 months from FA signature
- Input classification attributes (21 attributes) that are defined in the following way: Volume indicators (7 attributes) – the total volume for the first 3 months after FA signature, the volume of the first to the sixth transaction of the client, profit indicators (7 attributes) – the total profit for the first three month after the FA signature, the time period between the FA signature and the first trade stated in days, the time period between six consequent transactions stated in days. All input attributes have the character of the Poisson distribution of probability.

## 2 Reporting methods

Regular reporting is the basis for decision-making. Basic reporting cannot only summarize fundamental indicators of an entity, but it can also be helpful in the evaluation of these indicators. Its introduction is very cheap. In majority of cases MS Excel program is successfully used, or free open source is used – office packet software LibreOffice is available free of charge. In case more employees are supposed to work with the information in the reporting then it is useful to create a unified Dashboard that shows all key indicators at one place. Basic forms are on the Internet. From these examples it is possible to create, by means of a simple adjustment, unique decision-making reports (Excel Dashboards, 2016a), (Excel Dashboards, 2016b). The daily profit report is such an example. It is one of the key indicators for any company and it is a part of other further activities such as is for instance planning of costs. Top management, or possibly managers directly responsible for sales, are evaluated based on this indicator. This indicator influences also a number of other factors. In a payment institution one of such factors is exchange rate fluctuation. After very good results achieved for a couple of days consequent to the Czech National

Bank (CNB) interventions (the CNB introduced them in November 2013) drop of profits came about on a currency pair EUR-CZK. For this reason the Ad Hoc analysis has been executed, the results of this analysis are demonstrated in Fig. 2. The Left side shows the volume of exchanged finance of clients in one day and the bottom line shows the Exchange rate fluctuation on the specific day on the currency pair Euro-Czech Crown in crowns (Czech National Bank, 2013).

**Fig. 2: Average volume of trades on the currency pair EUR/CZK according to exchange rate development**

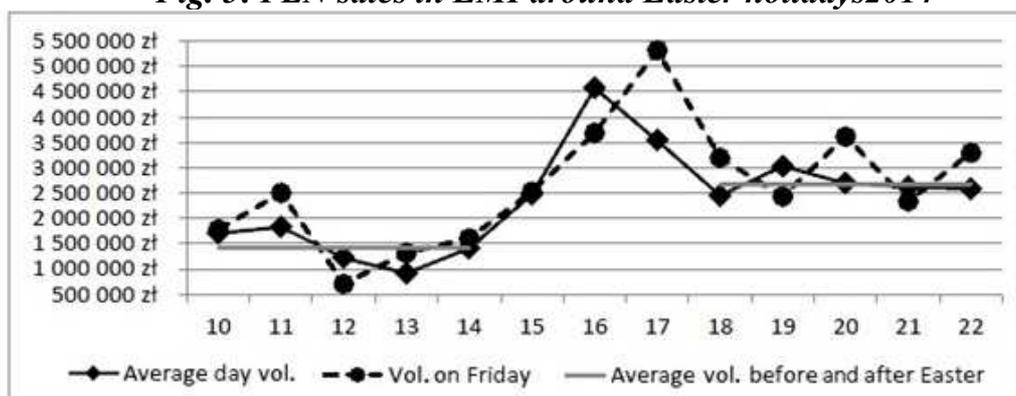


Source: (Mezera, Křupka, 2016)

The profit has been influenced by long-term stagnation of the exchange rate. Its development cannot be forecasted with reliability and that is why only the long-term expected development has been included in the plan. However, the evaluation of profit and potential changes in the plan are done with the knowledge of this quantity. It is, jointly with other factors as seasonal and weekly cycles, holidays and similar, the substantive part of the reporting (Gormley, Meade, 2007), (Hinderer, Waldmann, 2001), (Mezera, Křupka, 2015).

The influence of public holidays and seasonal cycles is visible in Fig. 3. There on the left axis is visible the volume of exchanged zlotys by Polish clients and on the bottom axis there are stated weeks from the first half of year 2014. Weeks 10 to 14 illustrate low economic activity that is typical for the first quarter of the year. Then comes Easter Holidays – on this holiday exchange offices need a large volume of zlotys because Polish nationals working abroad travel to Poland (they work primarily in Great Britain, Ireland and Germany). After Easter holidays economic activities in Poland increase because an agriculture season starts. In other Central European states there is not so prominent seasonal element. Despite that the first quarter of the year is the still low activity period of the entire year (Andersen, et al., 2003), (Kiymaz, Berument, 2003).

**Fig. 3: PLN sales in EMI around Easter holidays2014**



Source: (Mezera, Křupka, 2015)

### 3 Advanced analyses

Advanced analyses deal with the detection of so far undetected interlinks or they should determine the rate in which an output parameter is influenced by individual input parameters. When doing a classification we strive to assign an element, based on the information we have already, to a group of similar elements. Based on the group (into which the element have been assigned) we can later deduce its future behaviour (Pal, Shiu, 2004). With prediction we strive to estimate the volume of the input parameter that is in majority cases solved by regression methods. It is possible also to use different methods such as artificial neural networks (Kvasnička, et al., 1997, p. 98), decision trees, logistic regression, and similar. In the framework of these analyses it is essential to find valid parameters that in fact really influence the outputs. With a growing size of the company there usually also grows the number of these parameters and by that, at the same time, the volume of data that is possible to process. There are two possible approaches for this large volume of data. The first approach is the decomposition of large units into smaller units and consequently solving the smaller units. This is less demanding regarding capacities and all capabilities of statistics and of BI can be used for this task. The second approach is to work with big data where big data it means terabytes or petabytes size (Jemal, Faiz, 2015). The advantage here is that any hidden connections can be detected that cannot be detected at data decomposition. On top of that standard BI methodology can be used “Cross Industry Standard Process for Data Mining”, commonly known by the acronym CRISP-DM. The disadvantage is high demands on company technical and human capacities. That is why a number of such services, also in large companies, are outsourced. The results of such analysis are then used in standard reports or in decomposed observations (Calegari, Ciucci, 2010).

The first step toward analysis of clients by means of clustering was normalization and standardization of data. As it has been mentioned above data had, prior to the normalization, Poisson distribution of probability. The normalization was done by means of logarithmic functions. Then standardization of data followed. Then it was already possible to sort out data into groups. The number of these groups was not possible to estimate. That is why Kohonen’s maps (the neural network that utilizes learning without a teacher) were used for the determination of the number. By using these maps the number of groups was set at 10 (Kvasnička, et al., 1997). K-means method was used as the clustering method. This method sorted out data into ten groups. With a detailed view on the individual groups clients were sorted out into two large groups-to exporters (sellers of foreign currency) and to importers (sellers of domestic currency). Their character

and business opportunities define the difference between these two groups. The importers are usually trading companies. They purchase in the time when they have little goods for sale left available. They must exchange currency also in the time periods when the exchange rate is less favourable for them. Further they have a dramatically higher number of transactions than the exporters. For this reason they are more sensitive to fees related to currency exchange and sending of money (that means the type of a price list). At the same time they strive to keep the margin low. However, due to lower Volumes their negotiation power is less strong.

On the contrary, exporters sell goods and receive foreign currency. In case they have at the same time also sales on the domestic market then they utilize so called natural hedging toward Exchange rate fluctuations in such way that they pay out wages and salaries and taxes in the domestic currency while they pay for loans, energy fees and inter-company invoices in foreign currencies (usually in EURs). Thanks to that strategy, they do not exchange money so often and with regard to the size of such companies volumes are also relatively small and not so frequent. It is done usually once or twice in a quarter of a year. As an example of such company we can state company BRAVO Isolit located in Jablonné nad Orlicí. Also with those companies that have more than 90% of revenues from abroad (for instance – piano producer Petrof) it can be observed that they exchange foreign currency less frequently than the importers. In this case it happens about two or three times in a month. With regard to the fact that these companies do not send out foreign currency but only receive it, such companies are not burdened by the fees related to such transfers and thereby they are not so sensitive to these fees. At the same time they have time space available to wait for better exchange rates. When the market is volatile these companies welcome the option to monitor the exchange rate by means of an order. When the market reaches the pre-defined values they already quickly confirm the deal. When the market is less volatile (the current state on the currency pair EUR/CZK) then, thanks to the volumes they have, the negotiation position of the exporters is strong and they can push for and achieve reduction of the margin (Baillie, Bollerslev, 1991), (Baillie, Bollerslev, 2002), (Melvin, Yin, 2000).

The average values for the individual clusters are in Tab. 3. The difference between the first and the second clusters' volumes is given by the fact that the first cluster includes also exchange offices that have a high volume and a high number of transactions. That is why the difference in both the Turnover and the Profit is so high. These first two clusters illustrate The Most Important Clients (13.8%), whose participation in the entire company volume is 78.73% (Mezera, Křupka, 2014).

Smaller clients create the following four clusters. Here we can see how similar these clusters are in both the Volume and the Profit but how dissimilar they are in the Number of transactions and consequently by the Profit per transaction (profit/transaction). This fully corresponds to the above-described behaviour of the importers and the exporters.

**Tab. 3: Average values of the basic attributes in the individual clusters**

<b>Cluster</b>	<b>Type of group</b>	<b>Turnover volume total (in CZE)</b>	<b>Profit volume total (in CZE)</b>	<b>Number of transactions</b>	<b>Average of profit per transaction</b>
$c_1$	Import	52 427 378	148 156	272.06	550.70
$c_2$	Export	34 836 204	81 686	68.55	1 188.70
$c_3$	Import	8 257 069	28 148	94.46	299.20

$c_4$	Export	9 024 410	20 901	23.61	887.90
$c_5$	Import	2 216 415	7 316	32.80	220.50
$c_6$	Export	3 777 535	7 549	7.21	1 041.10
$c_7$	Import	698 142	1 993	12.24	164.70
$c_8$	Export	978 580	1 931	3.13	612.40
$c_9$	Not defined	194 181	472	3.48	135.00
$c_{10}$	Not defined	32 836	82	3.18	25.40

*Source: Authors*

The seventh and the eighth clusters are created by so called threshold clients. The company does not realize any loss on these clients, but neither these clients contribute to any major profits of the company. Firstly these clients should be reference clients (e.g. natural entities with any relations to some significant firms). Or they are natural business entities that are just on the start of their business activities and it is good to offer to them some good conditions since they can become more important clients in the future.

The ninth and the tenth clusters are those clients for which the differentiation to exporters or importers is not significant. Both clusters represent one-time clients or clients whose importance for the company is very limited. Such clients are utilized only in regions where there is low brand recognition and thus these clients can become reference clients for such regions.

This sorting out of clients into clusters according to their significance has helped EMI to correctly set price-lists. Further it is of major importance for marketing actions and for exchange offers and orders. For a long period of time the average profit per transaction was used for classification of new clients with no client history.

In the middle of the year 2014 it was clear that the existing status of sorting of new clients into clusters only by means of the Average profit per transaction could not be used any longer due to increased error levels. In that period the exchange rate was stabilized due to the CNB intervention measures above the limit of 27CZK/Euro. Thanks to this it was easier for clients to be knowledgeable/to understand the offered exchange rates. This situation increased pressure in order to lower margins and to lower the profit per transaction. This is the reason why it became essential to divide new clients to profitable and non-profitable clients based on another data from the first three months after contract signature. This classification is done after one-year time have elapsed from contract signature. The estimate is thus very complex. A number of factors enter into the business relation and these factors cannot be easily quantified – for instance competition offers, production failure, exchange rate disadvantageous for the client, and similar issues. However it is essential to try to do this because of margin settings, price list and agent compensations. In year 2015 the payment institution found out by means of an analysis that the share of non-profitable clients that were classified as profitable is among individuals (IN) bigger that among legal entities (LE) or among entrepreneurs / freelancers (EN). On the other hand with the LE group a high rate of errors in the existing classification has been identified. 2385 clients have been tested, out of that 743 IN and 1292 LE. According to standard statistical methods (comparison of the median value, median and other parameters according to individual attributes) classification parameters have been changed. Thanks to that the quality of the output (profitable and non-profitable) has improved by more than 10% (see Tab. 4). Consequently also other possibilities for classification improvement have been researched into. In Tab. 4 there are stated three most successful algorithms: the Top Down Induction

of Decision Trees (TDTID) – C5 algorithm, the neural network – Multi Layer Perceptron (MLP) and logistics regression. The above-stated classification algorithms have shifted the quality of the classification again by about 10% (with IN over 87%). The results stated here are for a test group comprising 30% clients (223 IN and 388 LE).

Thanks to this significant improvement profits have increased (less profitable clients have less friendly tariffs and margins, more profitable clients have relevant trading conditions and are less prone to switch to competition) and costs have become optimized (optimization of the reward system)

**Tab. 4: Comparison of classification methods**

Method	Classification of LE client	Classification of IN client
	correct / incorrect (in %)	correct/incorrect (in %)
Original classification	62.71 / 37.29	66.03 / 33.97
Statistical methods	73.54 / 26.46	76.31 / 23.68
TDIDT – C5	81.76 / 18.24	87.15 / 12.85
MLP	83.65 / 16.35	87.25 / 12.75
Logistic regression	79.25 / 20.75	86.85 / 13.15

*Source: (Mezera, Křupka, 2016)*

Decomposition thus not only reduces demands on capacities of companies in comparison with utilization of Big data, but at the same time, it is a way how to improve individual decision-making processes and to increase efficiency especially in those cases where this efficiency is managed according to the behaviour of very different groups of the researched objects. Utilization of similar principles is possible also for e.g. tax administration – it also deals with different groups of tax payers (IN, EN and LE).

## Conclusion

In this article standard decision making processes in the EMI have been introduced. In the introduction the financial sector has been described as well as its changes in recent years. Primarily new regulatory measures imposed in order to prevent the recurrence of the financial crisis have been mentioned. Due to the CNB interventions companies (primarily banks and EMIs), which are operating in the currency exchange sector, had to react to this situation adequately. One of the approaches used to tackle this situation was the introduction of BI. The BI was utilized primarily in two areas. One area was the daily reporting and the related observation of the key parameters of a company. Another area was the approach to new and existing clients, that means customer relationship management (CRM) optimization. Both of these areas have been illustrated on examples.

The first case illustrates a simple utilization of reporting for review of an undertaking's financial results. Exchange fluctuations cannot be predicted for a longer period of time. Despite that they significantly influence business parameters including, for instance, meeting profit goals. Thereby it is important to monitor their development and when it is necessary to adjust company's evaluation or company's business plan respectively because the difference between the lowest and the highest average value is more than 60%.

The classification of clients for the objective of better CRM in EMI was started even before the CNB interventions. Clients were assigned to clusters by clustering methods (Kohonens' maps and K-means method). This sorting showed big differences in behaviour between the group Importers and the group Exporters. Each of these groups was then divided into four groups according to the volume of exchanged money. Other clients are too

small and next division does not make any sense. The discovered knowledge about clusters was used, for a certain period of time, also for the classification of new clients. This changed after the interventions when it became important to make this classification more precise.

Data from the time period three months after contract signature had to be used. The original situation with error rate from 33% (IN clients) to 38% (LE clients) has been improved by means of statistical modelling methods. New classification criteria have led to accuracy improved by 10%. More advanced methods (TDIDT, NNs, LR) increase the accuracy again by 10% and have been utilized for setting trading parameters (margin, price list) for the period after three months of contract signature. This arrangement is fully in the payment institution's competence and as such it does not have to be totally unambiguous and it may change. In this way savings in costs have been achieved by means of optimization of bonuses for agents as well as increased profits per clients have been achieved – for those clients that otherwise used to be little profitable or even represented loss for the company.

Both of the executed analyses show how the BI methods are employed in the EMI. The illustrated differences in profit fulfilment in the first case and the improved quality of classification in the second case are a clear evidence that BI provides a very strong support for decision-making and it prevents hasty and inaccurate decisions. In the future association rules can be used for the classification of clients, too (Kašparová, Pilc, 2016).

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# WHO REACTS TO INCOME TAX RATE CHANGES? THE RELATIONSHIP BETWEEN INCOME TAXES AND THE MOTIVATION TO WORK: THE CASE OF AZERBAIJAN

Orkhan Nadirov, Bruce Dehning, Khatai Aliyev, Minura Iskandarova

***Abstract:** This research investigates the effects of income taxation on the motivation to work by employing a survey method for the Azerbaijan population. The two research questions of interest are, if subjects consider income taxes when deciding how many hours to work and how subjects would react to a hypothetical 5% income tax rate increase. Also examined are the responses to these questions between subjects with different socio-economic characteristics. Examining cross-sectional data of 326 respondents reveals that income taxes do not influence Azerbaijan labour market participants' motivation to work, regardless of their socio-economic characteristics. Empirical results indicate that reactions to hypothetical income tax rate increases show that the strength of response differs significantly across gender, age, marital status, field of employment, and income level. However, there are no significant results for differences in gender and after-tax wages. Our study contributes to the labour supply literature with the theory that after an income tax is imposed, both the average price and the average utility of leisure is greater for high wage earners than low wage earners.*

*The document can be downloaded at <http://hdl.handle.net/10195/67936>.*

***Keywords:** Income taxes, Motivation to work, Survey design, OLS method, Azerbaijan.*

***JEL Classification:** H24, J22.*

## Introduction

Most economists have accepted the notion that high income tax rates severely reduce the motivation to work for many years. Prior studies on the subject of income taxes and the motivation to work have been predominantly theoretical (Pigou, 1929). According to the early hypothesis of Knight (1921), the motivation to work increases after direct income taxes are imposed or increased, in order to overcome the decline in after-tax income. However, Robbins (1997) and Cooper (1952) expand the theoretical formulation of this problem and assert that it is not possible, a priori, to measure the effect of a direct income tax on leisure and the motivation to work. They suggest that a direct income tax might have negative, positive or no effect on the work-leisure relationship and empirical measurements are needed to predict each direction. These formal treatments refer to the choice between leisure and income when they test the effect of income taxes on the motivation to work (Wald, 1945; Black, 1965; Henderson, 1948). But Rolph and Break (1961) touched upon a more comprehensive review of the theoretical reasoning related to income taxes and the motivation to work. Theory that stems from the neoclassical economic perspective defines the two ways in which income taxes may affect the motivation to work, the income effect and the substitution effect. The substitution effect is the decision a labourer makes when considering the price of an hour of leisure. The income effect is the decision a labourer makes when considering the number of hours of work required to maintain their level of income.

In prior studies, economists refer to the price of leisure because they are considering the price to be the opportunity cost of leisure compared to the alternative of working. For instance, Goode (1949), Rolfe and Furness (1957), Break (1957), Musgrave (1959), Rolph and Break (1961), Fields and Stanbury (1971) and Robbins (1997) stated in their studies that the imposition of an income tax or increase in the tax rate is equal to a drop in the price of leisure. The income effect is straightforward, which moves people to do extra work to bring back their preceding level of disposable income. Income taxes make people feel poorer and leisure is a normal good, which means that workers prefer to consume less of it when they are poorer. But the substitution effect has an opposite effect that moves people to do less work because of a decline in the price of leisure. As a result, people feel compelled to take more time off since it will cost them less in forgone income. On the other hand, the income effect is less clear and its effect depends on government services producing a form of income for them. If the government services are satisfactory for taxpayers, then the income effect of income taxes is reduced and vice versa. If it is not satisfactory for taxpayers, their net wage would be reduced and taxes will have an income effect. For this reason, the substitution effect becomes comparatively more significant. Moreover, the impact of income taxes on the motivation to work cannot be defined by theorizing alone, because theory cannot explain the net effect of income taxes on the motivation to work. In one direction, the motivation to work is reduced if the substitution effect dominates income effect. In the other direction, the motivation to work is increased if the income effect is larger than the substitution effect. Which effect is stronger is an empirical question that must be resolved by empirical analysis rather than theoretical analysis (Cooper, 1952).

Various methodologies and different types of populations have been used in previous studies. For example, these include the study of 160 American business executives by Sander (1951), the survey of 1,429 British industrial workers carried out by the Prest (1956), the study of 1,000 German businessmen and professionals by Strümpel (1966) and a more sophisticated study of almost a thousand affluent Americans by Barlow et al. (1966). All of these studies have concluded that income taxes have minor disincentive effects on the motivation to work. In addition, Break (1957) attempted to measure the effects of high marginal rates of personal income taxes on the motivation to work of 306 British solicitors and accountants that are free to change their work incentives and are more informed about their marginal tax rates than most individuals are. In addition, he found that income taxes have little effect on the motivation to work.

After Break's study, Rolfe and Furness (1957), Chatterjee and Robinson (1969) tested the same relationship, but none of them found anything to contradict Break's earlier results. Fields and Stanbury (1971) used the same systematic approach employed by Break (1957). Fields and Stanbury (1971) interviewed 285 British solicitors and accountants in their study. They provided results similar to Break (1957). The main problem with these survey studies (e.g. Break, 1957; Fields and Stanbury, 1971) is that they have relied primarily on middle-class respondents. The study of 2000 weekly-paid workers by Brown and Levin (1974) was the first large survey that relied on responses from other socio-economic groups. They found that 74% of the men and 93% of the women stated that income taxes had no effect on the motivation to work. Afterwards, Brown et al. (1986) used simulation models based on very large-scale survey to estimate the effects of various tax changes on the motivation to work. They found that most individual's motivation to work is unresponsive to tax changes.

Calderwood and Webley (1992) attempted to characterise the respondents whose motivation to work is responsive to taxes. They showed that income taxation is not salient for the most people in the UK. They stated that 31 persons out of 74 would work more if the tax rate increased, but the rest would work the same or less. However, their study was limited only to the employed persons. There is a notion that gender influences change in motivation to work due to tax rate changes. The argument is that men increase and women decrease their motivation to work when there is an increase in the income tax rate (Leuthold, 1983; James, 1992). More recent studies such as Eissa et al. (2008), Meghir and Phillips (2010), Keane (2011), and Saez et al. (2012) analyse differences in men and women's motivation to work. Their findings are similar to the results of previous studies that taxes increases men's motivation to work, but women's motivation to work is decreased by the prospect of their earnings being taxed. On the other hand, Manski (2014) concludes that we really do not know how the motivation to work responds to income tax rates. As a result, little is known about the effect of income taxes on all class respondents such as low, middle and high-income earners, and our study tries to go some way towards dealing with this ambiguity. However, elementary economic theory (substitution and income effects) might not apply in real life, because in reality income tax rates for low wage earners do not change, while high wage earners are affected. Contrary to prior economic-psychology approaches, our unique theory is the combination of the price of an hour of leisure, and also the utility of an hour of leisure, assuming it is higher for the high wage earners than the low wage earners (on average).

## **1 Method**

### **1.1 Subjects and Procedure**

Our target population was employed and unemployed persons in Azerbaijan. The survey was conducted in the form of online questionnaires between 1 July and 1 October 2016. The questionnaires were mailed to 1,330 people that were randomly selected with regard to gender, age, and their respective region of residence. There were 326 responses to the questionnaires, a response rate of 24.5%. However, 19 questionnaires were not useable, resulting in 23% final response rate. The age of participants ranges from 18-65 with a mean of 28.9 years (std dev = 7.67). Approximately 42% of the sample is female. The majority of subjects have an after-tax wage of below 500 AZN per month (52%) compared to participants in higher income categories (500-1000 AZN: 33%; above 1000 AZN: 15%).

### **1.2 Questionnaire, data description and analysis**

The questionnaire was divided into three parts: (1) perception of income taxes, (2) reactions to tax rate changes and (3) socio-demographic characteristics. The first section investigates whether income taxes affect the respondent's motivation to work by using the approach of Hayo and Uhl (2015). Subjects were asked, "Does the tax burden usually matter when you determine extent and intensity of your work activities?". Based on the responses, the dummy variable *Tax\_problem* was coded 1 if income taxes affect the subject's motivation to work and 0 if income taxes do not affect the subject's motivation to work.

The second section involves a measure based on Calderwood and Webley (1992) to assess people's reactions to hypothetical tax rate changes. In our analysis, *Tax\_react* captures the responses of the survey participants to a 5% hypothetical increase in the income tax rate. Subjects were asked, "Suppose, it is announced tomorrow that income tax rates

increased by 5%”. Its value varies between 0 for subjects strongly reducing the amount of work to 5 for subjects strongly increasing the amount that they work.

Responses from the final demographics section on socio-economic characteristics were captured in the following variables and employed in the empirical analysis:

- *Female* is a dummy variable to measure the differences due to gender status; *Female* equals 1 if the participant is female, and 0 otherwise.
- *Age* is the participant’s age in years, and is included in the analysis to test the effects of age on the research questions.
- *Married* is a dummy variable that equals 1 if the participant is married, otherwise 0.
- *Fiancé* is a dummy variable that equals 1 if the participant is engaged to be married, otherwise 0.
- *Single* is a dummy variable that equals 1 if the respondent is not engaged and is not married or has not been married, and 0 otherwise. This variable is used as a base group to examine the response differences due to marital status.
- *Academic* is a dummy variable that equals 1 if the participant works in a position of mostly academic related activity, otherwise 0.
- *Other\_prof* is a dummy variable that equals 1 for subjects working in positions outside of academia that require professional skills, otherwise 0.
- *Ins\_empl* is a dummy variable that equals 1 for those who are not employed in positions that require professional skills, otherwise 0. This variable is used as a base group to examine the response differences due to field of employment.
- *Unemp* is a dummy variable that equals 1 if the subject is unemployed, otherwise 0.
- *High\_income* is a dummy variable that equals 1 if the after-tax income of the corresponding candidate is more than 1000 AZN per month, otherwise 0.
- *Middle\_income* is a dummy variable that equals 1 if the after-tax income of the participant is 500-1000 AZN per month, otherwise 0.
- *Low\_income* is a dummy variable that equals 1 if the after-tax income of the respondent is less than 500 AZN per month, otherwise 0. This variable is employed as a base group to examine the response differences due to income.

SPSS analytical tools were employed in all empirical tests. Multivariate regression analysis using Ordinary Least Squares (OLS) as well as Binary Logit and Binary Probit estimation was used on cross-sectional data for robustness checks. The econometric models are estimated with different dependent variables but the same combination of independent variables. The models can be specified mathematically as follows:

$$\begin{aligned}
 Tax\_problem_i = & \delta_0 + \delta_1 * female_i + \delta_2 * \log(age)_i + \delta_3 * married_i + \delta_4 * fiance_i + \\
 & + \delta_5 * academiç_i + \delta_6 * other\_prof_i + \delta_7 * unemp_i + \delta_8 * high\_income_i + \delta_9 * middle\_income_i + \\
 & + v_i
 \end{aligned} \tag{1}$$

$$\begin{aligned}
 Tax\_react_i = & \gamma_0 + \gamma_1 * female_i + \gamma_2 * \log(age)_i + \gamma_3 * married_i + \gamma_4 * fiance_i + \\
 & + \gamma_5 * academiç_i + \gamma_6 * other\_prof_i + \gamma_7 * unemp_i + \gamma_8 * high\_income_i + \gamma_9 * middle\_income_i + \\
 & + v_i
 \end{aligned} \tag{2}$$

Here,  $\delta$  and  $\gamma$  represent regression coefficients,  $i$  denotes the  $i^{\text{th}}$  observation,  $v_i$  and  $u_i$  are error terms.

## 2 Results

### 2.1 Descriptive statistics

The empirical findings are presented according to the two research questions. The first one addresses if taxes affect subjects' motivation to work. The second one addresses a 5% hypothetical income tax rate increase and whether it affects subjects' motivation to work. The survey results show that 65.4% of respondents do not consider taxes when making their working decisions, while 34.6% do (see Table 1). There were 306 useable responses to this question. These results confirm previous literature that finds that income taxes have only minor disincentive effects on the motivation to work (Sander, 1951; Prest, 1956; Strümpel, 1966; Barlow et al., 1966; Break, 1957; Rolfe and Furness, 1957; Chatterjee and Robinson, 1969; Fields and Stanbury, 1971; Brown and Levin, 1974; Brown et al., 1986; Hayo and Uhl, 2015).

**Tab. 1: Do taxes have any influence on your working decisions? Whole sample group analysis.**

	Frequency	Percent	Standard error	Conf. interval
No	200	65.4	2.7	[60.9, 69.9]
Yes	106	34.6	2.7	[30.1, 39.1]
Total	306	100	-	-

*Source: Authors' own compilation*

Meanwhile, 308 survey participants provided their reaction to a hypothetical 5% increase in income tax rates. Table 2 presents the overall response degree statistics (from strongly reduce labour supply to strongly increase labour supply).

**Tab. 2: What would your reaction be to a 5% income tax rate increase? Whole sample group analysis.**

	Frequency	Percent	Standard error	Conf. interval
Strongly reduce labour supply	12	3.9	1.1	[2.1, 5.7]
Reduce labour supply	29	9.4	1.7	[6.7, 12.1]
Unchanged	178	57.8	2.8	[53.2, 62.4]
Increase labour supply	34	11.0	1.8	[8.1, 13.9]
Highly increase labour supply	40	13.0	1.9	[9.9, 16.2]
Strongly increase labour supply	15	4.9	1.2	[2.9, 6.9]
Total	308	100	-	-

*Source: Authors' own compilation*

Both Table 1 and Table 2 imply the same conclusion for the overall group; Azerbaijan labour market participant are not very sensitive to taxes. The majority of the participants do not consider taxes when deciding how much to work. This is supported by Table 2, as 57.8% of the sample responded that their motivation to work would not change if income taxes increased by 5%. Our results provide very strong support for the hypothetical situation of Calderwood and Webley (1992). This result, however, is for all subjects and the responsiveness may differ across socio-economic characteristics. Demographic information was collected to test the research questions across different socio-economic characteristics of the respondents. Table 3 tabulates overall descriptive outputs.

**Tab. 3: Do taxes have any influence on your working decisions? Socio-economic categorical analysis.**

	Yes	No
<i>According to gender</i>		
Male	32.6%	67.4%
Female	38.1%	61.9%
<i>Pearson Chi-Square (p-value) = 0.321</i>		
<i>According to marital status</i>		
Married	32.3%	67.7%
Fiancé	36.8%	63.2%
Single	36.8%	63.2%
<i>Pearson Chi-Square (p-value) = 0.715</i>		
<i>According to after-tax wage category</i>		
High income	33.3%	66.7%
Middle income	37.6%	62.4%
Low income	33.8%	66.2%
<i>Pearson Chi-Square (p-value) = 0.803</i>		
<i>According to employment field</i>		
Academic	37.5%	62.5%
Other professional	31.0%	69.0%
Insignificantly employed	32.1%	67.9%
Unemployed	36.5%	63.5%
<i>Pearson Chi-Square (p-value) = 0.817</i>		

*Source: Authors' own compilation*

Similarly, proportional distribution to the primary research questions across groups with different socio-economic characteristics confirms the unresponsiveness of workers to taxes in Azerbaijan. The majority of responses are 'No' irrespective of gender, marital status, income level, or industry. This implies that taxes are not part of decision making for working purposes. It is interesting that across all socio-economic categories, approximately the same proportion of participants do not consider taxes when deciding how much to work. Only around 31-37.5% consider taxes when making decision on how much to work. Pearson Chi-Square p-values are also highly revealing. In all cases the value is greater than 0.05, which means that there are no significant differences between the specified groups within each category.

How a 5% hypothetical income tax rate increase affects the motivation to work of Azerbaijan labour force participants with different socio-economic characteristics is tabulated in Table 4.

**Tab. 4: What would your reaction be to a 5% income tax rate increase? Socio-economic categorical analysis.**

	Reduce labour supply	Unchanged	Increase labour supply
<i>According to gender</i>			
Male	12.9%	57.3%	29.8%
Female	14.0%	58.9%	27.1%
<i>Pearson Chi-Square (p-value)= 0.871</i>			
<i>According to marital status</i>			
Married	9.6%	65.2%	25.2%
Fiancé	5.3%	42.1%	52.6%
Single	17.1%	53.9%	28.9%
<i>Pearson Chi-Square (p-value)= 0.029</i>			
<i>According to after-tax wage category</i>			

High income	9.3%	76.7%	14.0%
Middle income	15.8%	57.9%	26.3%
Low income	13.2%	52.6%	34.2%
<i>Pearson Chi-Square (p-value) = 0.520</i>			
<i>According to employment field</i>			
Academic	10.0%	62.0%	28.0%
Other professional	7.0%	58.1%	34.9%
Insignificantly employed	21.5%	62.0%	16.5%
Unemployed	13.5%	47.3%	39.2%
<i>Pearson Chi-Square (p-value)= 0.011</i>			

*Source: Authors' own compilation*

The response to a 5% hypothetical tax rate increase does not differ significantly between genders (*Pearson Chi-Square (p-value) > 0.05*). For both genders, more than half of the respondents say that the increase will not affect how much they work. 12.9% of males said that the increase would reduce the amount that they work, while 29.8% said they would work more, with the remainder responding that there would be no change in the number of hours worked. 14% of females said that the increase would reduce the amount that they work, while 27.1% said they would work more, with the remainder responding that there would be no change in the number of hours worked.

The impact of a hypothetical 5% income tax rate increase is significantly different depending on the subject's marital status (*Pearson Chi-Square (p-value) < 0.05*). This is particularly true for respondents engaged to be married. *Fiancé* was the only sub-category where a majority of the respondents said they would increase the number of hours worked if taxes increased. The majority of married and single subjects said that there would not be any significant impact.

There was no significant difference in responses for subjects in different income categories (*Pearson Chi-Square (p-value) > 0.05*). Nevertheless, there is a trend in the results. As after-tax income level falls, the share of participants who claim that their labour supply will not change decreases, while the share of responses in favour of more labour supply increases.

Across employment field, there were significant differences in the response to a hypothetical 5% tax rate increase (*Pearson Chi-Square (p-value) > 0.05*). However, it is very difficult to interpret the differences by examining the proportions. It appears as though more professionals, working either in or outside of academia, will reduce their output less than non-professionals, while non-professionals are less likely to increase their labour supply. For all three groups the majority of respondents would work the same regardless of the tax rate increase. Additional empirical analysis might clarify some of these results.

## 2.2 Empirical Results

Estimation outputs for equation (1) and (2) are presented in Table 5 below. There are no statistically significant coefficients for equation (1), which supports the statistical analysis shown previously in Table 1 and Table 3. Such output is straightforward and plausible. Income taxes do not impact the motivation to work of people in the Azerbaijan labour market. This is true across different socio-economic characteristics.

Before interpreting estimation results, it is noteworthy to mention that residuals for both models are tested for heteroscedasticity by employing ARCH and White tests, autocorrelation by using Breusch-Godfrey Serial Correlation LM Test, and functional misspecification problem with Ramsey-Reset test. Moreover, the Jarque-Bera test is applied

to examine normality in the distribution of residuals. Test results show no heteroscedasticity, autocorrelation, or functional misspecification in equation (1) nor in equation (2) ( $p > 0.10$ ). In equation (2), test output indicates a normal distribution of residuals ( $p > 0.10$ ). For equation (1), the value of the Jarque-Bera test result is fairly high ( $JB_N = 39.13645$ ), which means rejection of the null hypothesis ( $H_0$ : residuals are normally distributed) at 1% significance level ( $p < 0.01$ ). However, normal distribution of residuals is not a serious problem in large samples. As the sample size in equation (1) is fairly large (250), this shortcoming can be ignored.

**Tab. 5: Empirical results**

Independent variables	Tax_problem (equation 1)			Tax_react (equation 2)
	<i>OLS</i>	<i>Logit</i>	<i>Probit</i>	
Female	0.0585 (0.3702)	0.2638 (0.2898)	0.1698 (0.1777)	<b>-0.2560*</b> <b>(0.1471)</b>
Log(age)	0.1161 (0.4813)	0.5287 (0.7261)	0.3258 (0.4425)	<b>-0.9791 ***</b> <b>(0.3657)</b>
Married	-0.0151 (0.8563)	-0.0696 (0.3701)	-0.0421 (0.2264)	0.2230 (0.1859)
Fiancé	0.0616 (0.6145)	0.2797 (0.5307)	0.1728 (0.3263)	<b>0.7172 **</b> <b>(0.2767)</b>
Academic	-0.0349 (0.7140)	-0.1527 (0.4256)	-0.0892 (0.2599)	0.2246 (0.2138)
Other_professional	-0.0329 (0.6527)	-0.1474 (0.3285)	-0.0861 (0.2008)	<b>0.4713 ***</b> <b>(0.1652)</b>
Unemployed	0.1290 (0.0696)	0.5666 (0.3085)	0.3512 (0.1904)	-0.2229 (0.1603)
Middle_income	0.0996 (0.1707)	0.4439 (0.3197)	0.2777 (0.1962)	-0.2154 (0.1625)
High_income	0.0314 (0.7485)	0.1421 (0.4398)	0.0871 (0.2679)	<b>-0.5063 **</b> <b>(0.2213)</b>
C	-0.1181 (0.8230)	-2.7592 (2.3351)	-1.7102 (1.4227)	<b>5.5900 ***</b> <b>(1.1723)</b>
R <sup>2</sup>	0.0281	0.0217	0.0220	0.1181
Included Obs.	250	250	250	251
St. Error of regression	0.4780	0.4784	0.4784	1.0816
<b>Statistics and Residuals Diagnostics tests results</b>				
<b>Equation 1 (OLS)</b>	$\sigma = 0.477986$ ; $\chi^2_{SC}(2) = 0.589780$ [0.5553]; $\chi^2_{ARCH}(4) = 1.517827$ [0.2054]; $\chi^2_{HETR} = 0.821921$ [0.7750]; $JB_N = 39.13645$ [0.0000]; $F_{FF} = 1.177992$ [0.3097]			
<b>Equation 2</b>	$\sigma = 1.081646$ ; $\chi^2_{SC}(2) = 0.201762$ [0.8174]; $\chi^2_{ARCH}(4) = 0.224480$ [0.9239]; $\chi^2_{HETR} = 1.319861$ [0.1047]; $JB_N = 2.659610$ [0.2654]; $F_{FF} = 0.169034$ [0.8446]			
<i>Note: <math>\sigma</math> is standard error of regression; <math>\chi^2_{SC}</math>, <math>\chi^2_{ARCH}</math> and <math>\chi^2_{HETR}</math> denote chi-squared statistics to test the null hypotheses of no autocorrelation, no autoregressive conditioned heteroscedasticity, and no heteroscedasticity (White test) in the residuals; <math>JB_N</math> indicate statistics to test the null hypotheses of normal distribution; *, **, and *** denote significance level of 10%, 5%, and 1% levels, respectively; Standard errors for each coefficient are in (). Probabilities are in [].</i>				

Source: Authors' own compilation

Estimation results for equation (2) are highly valuable in helping evaluate the determining factors for labour supply response to a hypothetical 5% income tax rate increase. The coefficient on the gender dummy variable, *Female*, is negative and significant ( $p < .10$ ). Females are much more sensitive to income tax changes and will reduce their work compared to males when faced with an income tax rate increase. These results are in line with previous studies that have reported that women are more sensitive than men are

to income taxes (Leuthold, 1983; James, 1992; Eissa et al., 2008; Meghir and Phillips, 2010; Keane, 2011; Saez et al., 2012). Age is also a statistically significant factor ( $\gamma = -.97, p < 0.01$ ). As age increases the motivation to work change of participants, on average, decreases significantly. However, if we look at the size of the coefficient, it seems to be economically insignificant. A 1% increase in age level decreases the motivation to work by only 0.0097 points on average.

The regression results for marital status are similar to the univariate results. Compared to single participants, married subjects' responses are not statistically significant. However, the impact of the tax rate increase is significantly higher for fiancé subjects' motivation to work ( $\gamma = .71, p < 0.05$ ) compared to married and single subjects. Therefore, the research reveals that fiancés are more responsive to income tax rate increases.

Considering the employment status of the participants, empirical results provide no significant differences between academicians, non-professional, and unemployed subjects. Note that unemployed subjects also considered taxes more than others in their decision-making (equation 1), although this difference is not statistically significant. However, non-academic professionals' labour supply change response is significantly higher ( $\gamma = .47, p < 0.01$ ) and positive. The overall conclusion is that only non-academic professionals are highly responsive to income tax rate changes.

In the labour supply literature, it is quite interesting how the motivation to work changes in response to income tax rate increases based on the after-tax wage category (Hausman, 1985). As shown in the univariate results, we observed a decline in the motivation to work as after-tax wages increase. Compared to low income participants, the middle-income group's response is higher, i.e., the coefficient is negative, but it is not statistically significant. In the high-income category we observe a negative and statistically significant difference ( $\gamma = -.50, p < 0.01$ ) compared to lower income categories. This means that high-income participants are more sensitive to income tax rate increases than low-income participants are.

## Conclusion

Economists primarily use three methodological approaches to studying the relationship between income taxes and the motivation to work: surveys of attitudes and perceived behaviour, laboratory experiments, and observed labour market behaviour through analysis of aggregate data (Atkinson and Stiglitz, 2015; Lewis, 1982). Our approach is the study of attitude and perceived behaviour, where the most apparent congruence between economics and social psychology occurs. Directly questioning individuals about the effect of economic policy on their attitudes is unusual and nonstandard in economic fields. Therefore, using self-reported answers to tax changes helps us to make a diverse contribution to the literature on income taxes and the motivation to work. This research strategy allows policymakers to estimate the effects of income tax changes on labour markets with different socio-economic characteristics.

The first test was the extent to which the Azerbaijan population is sensitive to income taxes. Only around 35% report taking income taxes into consideration, which shows that the majority of the Azerbaijan population is unresponsive to income taxes. The second test assesses reactions to a hypothetical income tax rate change. Around 57.8% of the sample responded that their motivation to work would not change if income tax rates increased by 5%.

Using our first research item (perception of income taxes), we find that responses do not vary across groups with different socio-economic characteristics such as gender, marital status, after-tax wage category, and employment field. Using the second research item (reactions to tax rate changes), we find that significant differences in the strength of responses to a hypothetical income tax rate change across gender, age, marital status (engaged), employment field (non-academic professionals), and after tax wages (high-income only).

Although this study is small in scale and limited to only two research questions and a few social-economic variables, future research can examine additional psychological and economic variables such as social services, welfare, attitudes towards work, the value placed on leisure time, the number of dependents, households with one instead of two working parents, non-labour income, etc. However, we believe that our conclusions have several implications for policy and decision-making. One of the strongest ideas is that *after an income tax is imposed, both the price and utility of leisure are higher for the higher wage earners than for low wage earners (on average)*. Our theory is that as people make more money the utility of their leisure time goes up because they can spend the money they make to purchase activities with higher utility. Testing with a 5% hypothetical income tax rate change, we found that higher wage earners in Azerbaijan will be more sensitive to this change and thus they will start to work less. This theory can be tested with the aggregate time series evidence (life-cycle models) to see also how tax policy shocks affect the motivation to work along with individual's saving decisions, human capital accumulation, and the history dependence in preferences (Keane, 2011). But, the difficulty of collecting empirical data on tax behaviour has led scholars to generate their own data with survey techniques (Kirchler, 2007). Consequently, using this research method in the future will allow us to determine whether increasing income tax rates can be salient in the daily lives of workers in Azerbaijan. To the best of our knowledge, little is known about the effect of tax rate changes on labourers' work motivation in poor and rich countries. For this reason, future research can test our theory with hypothetical tax rate changes for poor and rich countries with different economic and legal systems to see if there is a differences between the price and utility of leisure for higher and lower wage earners. Finally, the most popular hypothesis about women's motivation to work (more sensitive to taxation) and men's motivation to work (less sensitive to taxation) is supported by our data and empirical results for the Azerbaijan population.

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# **NONGOVERNMENTAL NONPROFIT ORGANISATIONS IN SOCIAL SERVICES: THEORIES VERSUS THE REAL SITUATION IN THE CZECH REPUBLIC**

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***Abstract:** The national economy can be divided by theory into four segments - public sector, the nongovernmental non-profit sector, the nongovernmental for-profit sector, and the household sector. For a long time, the nongovernmental nonprofit sector has been considered to be a very active and important segment in the area of providing public services. In this paper, we outline the actual situation in the Czech Republic, the role and scope of Czech nongovernmental nonprofit organisations in the field of social services that is significant. On the basis of official statistics of the Ministry of Labour and Social Affairs of the Czech Republic (The Register of Social Service Providers) and other databases (Register of Economic Entities and Public Register), we show that almost two third of all social services (approximately 5,600 services) is provided by nongovernmental nonprofit providers (especially by Public beneficiary corporations, Churches and religious communities and Societies). The contribution also include detailed characteristics of these organizations (their legal form, the location of their seat, number of provided services, etc.). The findings and results of our research are then critically discussed with regard to relevant theories and results of previous studies.*

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***JEL Classification:** A13, L31.*

## **Introduction**

The area of social services potentially concerns everybody because it is not possible to exclude from life situations that can result in a need of social assistance. Generally, various governmental as well as nongovernmental, for-profit and nonprofit, formal and informal entities get engaged in solving social situations. There is a big amount of papers dealing with the topic of providing social services (especially the financial aspects). As it was written by Baines (2010), nonprofit social services provide a particularly rich research node, epitomizing some of the central themes and tensions crisscrossing the nonprofit sector. This contribution more or less successfully deals with the role and the scope of the nongovernmental nonprofit sector (hereinafter referred to as the "NNS") in providing social services in the Czech republic on the basis of real data. The scope of nongovernmental nonprofit organisations (hereinafter only "NNOs") means the percentage of social services provided by NNOs. Furthermore, it is also legitimate to determine the legal forms of the NNOs represented in the Czech system of social services.

The paper therefore focuses on how potential and existing clients of the social services system are interconnected with the civil society forming the NNS in the Czech Republic.

According to the established academic culture, the NNS is defined by means of an extensive theoretical base. It delimits the NNS with respect to the other components

of the national economy (the public sector, the private market sector, and the household sector), perceiving the NNS and organisations operating within it as something unique, with a specific approach towards their mission and their very functioning itself.

Active organisations within the sector are usually characterized as self-governing, private and organised entities with their operations based on volunteering and aimed at achieving objectives other than profits (Salamon, Anheier, 1997). As part of this contribution, we will try to define the role and scope of Czech NNOs in one of the traditional areas of their activities, i.e. in social services. Before we move forward towards describing the reality, we believe it is appropriate to start by outlining the theory substantiating the importance of the NNS and the tasks of NNOs within the framework of public services securing, which also includes social services securing.

## **1 Statement of a problem**

### **1.1 The Nongovernmental Nonprofit Sector in Theory**

The most frequent theoretical approaches defending the existence and importance of the NNS include single-factor theories, viewing the importance of NNOs through one selected perspective. We will briefly present some of the single-factor approaches that Hyánek (Hyánek, 2011) or others, e.g. partly Schmid (2013), present as a fundamental definition.

The first among the single-factor approaches is based on the assumption that there are economic and microeconomic failures. Burton Weisbrod in his Government (or also Market) Failure Theory reasons that, apart from the well known market failures, the public sector, which focuses on the needs of the median voter under the pressure of and in view of further election success, also suffers from its own insufficiency. Due to such a narrowed perspective of the whole spectrum of a society's needs there are unsatisfied minority groups that representatives of the NNS focus on. (Weisbrod, 1977)

Lester Salomon does not hesitate to follow this approach up with the Interdependence Theory that adds in the same breath that not even NNOs are perfect. According to Salomon, problems are also typical for NNOs and they considerably limit the capacity of NNOs to assist in solving a society's needs. The theory considers philanthropic deficiency, amateurism, paternalism and particularism to be the basic shortcomings of the sector. The presented problems stem in particular from insufficient capacities and resources of NNOs, their quality or possible risks of becoming estranged from an organisation's own mission. This approach outlines possible solutions that are based on cooperation among sectors. Salomon then extends this to the Third Party Government that supplements both outlined approaches to failures with proposals of possible cooperation thanks to which higher efficiency of individual activities can be achieved. Hence, the theory assumes that the relationship between NNOs and the public sector is complementary by definition. The NNS secures the whole range of tasks that the State may not be up to, on the other hand, the public sector offers (not only financial) support from the means collected through taxes or helps in securing higher quality of services through various standards and norms. (Salamon, 1987)

The last of the basic single-factor approaches that we will mention is the Trust Theory and the cognate Informational Asymmetry (or also Contractual Failure) Theory. It assumes that there is an information asymmetry, i.e. the situation when the seller has more information necessary for taking a correct decision than the buyer. Thanks to their nonprofit character, NNOs are generally considered to be more trustworthy and fair partners than their

profit counterparts conducting their business with the aim to achieve personal benefits in the form of profits. Hence, the theory ascribes the need to act in a fair manner to the entities of the NNS, therefore they can be considered to be suitable suppliers in the areas where the information superiority exists. (Hansmann, 1980) Health care or the aforementioned social services can be an example of such areas as they can also be connected with sensitive and delicate information.

## **1.2 Nongovernmental Nonprofit Organisations in the Public Service**

The individual theoretical approaches defined above draw attention to the necessity of the NNS in the national economy, thus directly or indirectly highlighting NNOs as important providers of public services. This means the services that are guaranteed or provided to the extent decided by a public choice, the content of which is determined by the type of the social state and historical social-economic development of a given country and the existence of which depends on the funding from public resources (Medved', Nemeč, Orviská, et al., 2005). With time, we can see other shifts as regards the entities providing public services, specifically from the public sector to entities that can be better in providing the services. It is a natural process aiming at higher efficiency of complex mechanisms of public services functioning (Hyánek, Prouzová, Škarabelová, 2007). Therefore, the already mentioned NNOs play an important role in providing services, which does not necessarily mean that the role of the State, which remains a significant guarantor securing the funding of provided services and guaranteeing their quality, is suppressed (Pestoff, 1995). As it was stated by Van Slyke (2003), as government increases its use of contracting of the social services to NNOs, it simultaneously reduces its own public-management capacity, imperiling its ability to be a smart buyer of contracted goods and services.

As it was already indicated above, our contribution deals with the role and scope of NNOs in the area of social services the area that is traditionally connected to shifts of providers from the public sector to the entities of NNS. (Van Slyke, 2007) In accordance with Czech legislation, we can perceive these services as an activity or a package of activities targeting persons in an unfavourable life situation. The objective of these activities is to prevent social exclusion, support self-sufficiency of concerned people and assist them in achieving the highest possible level of involvement into a common independent life. Such services target a wide group of endangered people from among children, adolescents, adults and older adults in the whole varied range of life situations, for example families with children, the handicapped, marginalized people (Law: Act No. 108/2006).

According to the international comparative study (Salamon, Anheier, List, et al., 1999) dealing, among other things, with the employment aspect, social services can be considered to be a traditional base of NNOs' activities (18% of the employees of the NNS globally). The study also points out to the differences among the regions of the world, the difference among the employment rates in social services between the countries of Western Europe (27%) and Central Europe (12%). This can also confirm the thesis about the dependency between what the sector looks like and the historical development of individual countries or regions, when the public sector in the countries of Central and Eastern Europe holds the position of the guarantor and provider of the services, which can be one of the relicts of the communist era.

The aforementioned international study also considers differences in the funding across the areas of activities of the NNS. The area of social services is listed among the

“government dominant” areas, where the main source of funds are public subsidies (45%), followed by revenues for rendered services (37%), and the role of philanthropy is not negligible either (18 %). (Salamon, Anheier, List, Toepler, Sokolowski, 1999). This is in accordance with Kissane (2003) who was mentioning that many policy makers assume that NNOs will assist current and former welfare recipients reach self-sufficiency and make ends meet with their own private funds. Simultaneously NNOs could stabilize their financial base and still serve their communities by delivering municipal social services (Struyk, 2002).

On the basis of the data on the funding of social services, it can be concluded that the public sector gets increasingly interested in the area, which however does not necessarily mean that the sector provides social services on a large scale, but it definitely confirms a high level of its guarantees given to the services. The indicated conclusions of the original study are affirmed by outputs of enhanced replication (realised in 35 countries of the World) (Salamon, Sokolowski, List, 2003) or through selected chapters of publication about civil society in the countries of Visegrad (Schreier, 2015).

From the total number of people employed in the NNS in the Czech Republic (105 thousand), more than 12 thousand are active in the area of social services (i.e. 11.7% of all employees in the nonprofit sector) (Czech Statistical Office, 2015b). In addition, the highest amount of the public sources, nearly one third of all the public funds designated to assist the NNS through subsidies (29.6%), goes to the area of social services and employment (Government of the Czech Republic, 2016). The current data thus indicate that social services still play a significant role in the activities of Czech NNOs. After all, this is what a whole range of authors draw attention to, for example Varvažovská (Varvažovská, 2008), Molek (Molek, 2011). The following text deals with the detailed information about social services and the NNOs operating in the field.

## **2 Methods**

The following research methods were used. First, a bibliographic research was conducted with emphasis on the reasons why social services were provided by the NNS and the role of NNOs in providing social (or public) services. The propositions identified on the basis of obtained information were subsequently confronted with the Czech environment. For this purpose official data were used about the social services provided by NNOs.

Subsequently the researched area was defined in two ways. First, territorially, by means of the area of the Czech Republic, and secondly by means of the definition of social services stipulated in Czech legal regulations, specifically Act No. 108/2006 Coll., on social services. This legal regulation defines the possibilities of providing social services in the Czech Republic, listing the standards defining the quality of services, manners of their financing, and the possibilities of subsequent control of their providing.

We have done the research in the time period from year 2015 to year 2016, using the data (obtained mainly in the first half of year 2016) from the official real time processed electronic Register of Social Services Providers (hereinafter only the “Register”) administered by the Ministry of Labour and Social Affairs of the Czech Republic and the Register of Economic Entities administered by the Czech Statistical Office.

We have collected basic data from the respective legal regulations and the Register. The Register offers an extensive database of information about social services providers (e.g. the start of the period of providing, contacts of social services, etc.), regardless of their affiliation to the national economy sectors. We have grouped the data from the Register

by key character - registration number of individual organization (because they are arranged by individual services in the Register, regardless of their affiliation with a specific organisation) and separately supplemented with other data from the public Register of Economic Entities (e.g. the date of establishment of an organisation, the number of employees of an organisation, postal code of the seat of an organisation, etc.). The data we have arranged in the above specified manner were consequently converted into spreadsheet, analysed and described by us through the use of descriptive statistics. Our results and findings are in the subsequent sections of this paper.

### **3 Problem solving**

This section is divided into the two parts. Part 3.1 describes the system of the social services in the Czech Republic. The results of the analysis of the laws and other relevant document were used for the purpose of providing a broader context of the results presented in part 3.2.

#### **3.1 The System of Social Services in the Czech Republic**

This section will be opened by a brief introduction of the main characteristics of the social services system in the Czech Republic. The reason for this is to provide the context of national specificities in which the results of our analysis can be understood. The basic legal regulation that predetermines a number of national specificities to a certain extent is aforementioned Act No. 108/2006 Coll., on social services. It provides a list of activities that can be perceived as social services, while clearly defining the part of the publicly beneficial activities of NNOs that we can define as activities in social services. The activities are divided into three groups (social advisory services; social care services; social prevention services) depending on their type, that are further divided to 33 types of services (for example personal assistance, homes for the elderly, low-threshold facilities for children and adolescents, social therapy workshops, etc.). Social services can be provided in the residential, ambulatory or field regime (Law: Act No. 108/2006).

According to law, social services can be provided by natural persons and legal entities without exception. Entities having any of the legal forms that are regarded to be NNOs can also be included among social services providers. According to the Czech Statistical Office that uses the aforementioned operationally structural definition, they are, among others, also the following: foundations, endowment funds, public benefit corporations (or asylums/homes), associations (or societies), organisations established by churches, organisational units of associations (or branch societies), and other (Czech Statistical Office, 2015a).

Registration in the Register is a necessary precondition for the providers subject to the registration by the territorially competent Regional Authority entitling them to provide social services and also obtain contributions from public funds for rendered services. Hence, the Register represents a basic tool for obtaining an overview of provided social services and also a tool for maintaining the quality of services. Their quality is also supervised by the Inspection of Social Services Providing that inspects how the Standards of Social Services Quality stipulated by Ministerial Decree No. 505/2006 Coll. are fulfilled. Therefore, the Standards represent a tool that defines parameters of quality services, which is essential for their comparing and for the comparing of the quality of providers themselves (Law: Announcement of Act No. 505/2006 or eventually more about Standardization - Halásková and Halásková, 2014). This fact implies, among other things, the conclusion

that the role of NNOs in the current system is to provide a certain amount of social services in the quality determined by the State.

### 3.2 Social Services in the Czech Practice - Results of the Research

In this part the results of our analysis based on descriptive statistics are presented. As regards the scope of activities conducted by NNOs in social services in the Czech Republic, our research found out the following. According to official data more than 5,600 social services (of all types) are provided in the Czech Republic. From the whole package of social services, 3,451 services are provided by entities of the NNS (i.e. 61.55%), 279 by entities of the profit sector (i.e. 4.97%) and 1,876 by entities of the public sector (i.e. 33.46%). Such results do not represent anything surprising in the world context. Similar values are for example mentioned by the authors of the contribution about social services in Italy, where the share of services provided by NNOs represents almost 75% (Borzaga, Tortia, 2006).

In addition, the Czech social services provided within the NNS often occur repeatedly; hence, out of the 3,451 services there are 2,574 unique occurrences of rendered services for the 1,058 entities that can be considered to be NNOs according to the above defined circle of entities. The accurate distribution of individual legal forms and the accurate distribution of services among individual organisations are shown in the table below (Tab. 1).

**Tab. 1: Classification of the NNS providers of social services**

Legal form of a provider	Share of the total number of providers (%)	Share of social services (%)
Society (Civic association)	36.48	29.85
Branch society (Organisational unit of a civic association)	4.35	2.43
Asylum/home (Public beneficiary corporation)	39.89	34.98
Foundation	0.09	0.03
Endowment fund	0.09	0.03
Church and religious community	17.39	31.30
Cooperative - social cooperative	0.09	0.06
Other (Interest grouping, etc.)	1.61	1.33

*Source: Authors*

The table clearly shows that, as regards the NNS providers, social services are most frequently rendered by asylums/homes and public benefit corporations (39.89%), societies and civic associations (36.48%) and churches and religious communities (17.39%). The legal form of asylum/homes and public benefit corporations also has the biggest share in the rendered social services (34.98%). With respect to the share in rendered social services, this legal form is followed by churches and religious communities that have a big aggregate share in social services (31.30%) despite their less significant representation as individual organisations (already mentioned 17.39%). Quite visible difference between number of churches and religious communities providers (especially Caritas and Diaconia organizations) can be surprising because the number of believers is in the Czech Republic still diminishing (approximately 10.4% of respondents of census in 2011, Czech Statistical

Office, 2011), but organizations of churches and religious type are subjects with wider coverage and broad net of branch offices with quite strict hierarchical structure. Societies and civic associations (29.85%) provide nearly one third of social services. The remaining legal forms that we can list under the NNS are more likely not to operate in the area of social services and if they do, they provide social services rather marginally.

A vast majority of the NNS providers of social services focuses on a limited range of activities (410 entities secure just one service, 246 entities two services, 148 entities three services, etc.). Nevertheless, there are organisations with a wider scope of activities appearing among social services providers. This is also evidenced by the fact that there are only nine entities from the NNS in the Czech Republic per 518 services. Churches and religious communities in accordance with the above mentioned clearly prevail in these nine entities (four entities: 286 services). Societies and civic associations (three entities: 179 services) rank second, while asylums/homes and public benefit corporations rank third (two entities: 53 services). The biggest provider of social services in terms of the number of provided services is the Diocesan Caritas Brno (church and religious community) with its 123 provided services, which is followed up by the Silesian Diaconia (church and religious community) with 98 provided services, and the NADĚJE society with 79 provided services.

Although social services are relatively evenly accessible, via postal code, most of the NNO providers have their seat in big cities. Nearly one fifth of the organisations providing social services have their seat in the capital city of Prague (17.58%), the remaining big cities (seats of regional authorities and chartered towns) are evenly represented among the seats of the NNS social services providers (Brno - City: 4.91 %, Ostrava: 3.50 %, České Budějovice: 3.12 %, Liberec: 2.65 %, etc.). These findings also confirm Halásková and Halásková (2014) with quotation that the capital city of Prague, Brno region and Ostrava region represent areas with high level of accessibility of social services.

## **4 Discussion**

### **4.1 Consistency between Theory and Practice and the Research Limits**

The presented data may indicate consistency between the reality of social services providing in the Czech Republic and the Government Failure Theory, when Czech NNOs participate in meeting the neglected demand resulting from intentional orientation of the public sector towards a limited circle of voters, the median voter. In our case, minority groups are users of social services from among disabled (physically and mentally) people, homeless people, the elderly, and similar groups.

The information obtained about the structure of social services providers broken down by the national economy sectors imply further interesting conclusions in the context of the standards stipulated by legal regulations, which may indicate an apparent complementary relationship between the State and the NNS, as it was described in Salamon's Third Party Government. In providing social services, NNOs use their know-how, contacts and goodwill, thus compensating the State's insufficiencies. The State makes financial contributions to the services provided by the NNS, thus supporting sustainability of the sector. On the other hand, the State also sets the legislative framework within which social services providers operate, thus ensuring much-needed quality of individual services and satisfaction of their clients. Both above mentioned sectors continue cooperating to develop the system of social services.

The State's willingness to engage the NNS in the whole system of social services, including the planning of its further development, implies a connection with the Trust Theory. We can be reassured that this approach is valid in the Czech environment, among other things, by the ability of the NNS to obtain sufficient financial means (from public and private resources) for implementation of more than three fifths of all social services. This is what can also confirm the relatively high level of the trust that people (private donors) have in the NNS in practice, which the theory explains by the need of the NNS to act fairly. A considerable role here is also played by the ability of NNOs to achieve the required level of professionalism so that they would be able to meet quite demanding legal requirements for quality.

In addition to the consistency with theory, we can also point out to the consistency of our basic conclusions on the importance of the NNS in the area of social services with previous publications and papers dealing with this topic. The high participation of NNOs in the field of social services is also proved by the results of a complex research from 2007 (Hyánek, Prouzová, Škarabelová, 2007). Accordingly, the paper by Varvažovská (Varvažovská, 2008) also informs that the sector's participation is higher than one half, and the Molek's article (Molek, 2011) even talks about the monopoly position of NNOs in the providing of social services.

The share of social services providers as established by us does not necessarily have to represent the maximum utilization of the NNS's capacities because there is still a high rate of clients whose needs have not been met in the area of social services, as is highlighted by the results of the Statistical Yearbook from the area of labour and social affairs. The number of registered clients whose demand for community care services was not satisfied in 2014 alone reached 1,500, and nearly 2,000 clients in the case of respite care services (Ministry of Labour and Social Affairs, 2015). Thus, the space where NNOs can operate and implement their activities does not necessarily have to be fully exhausted yet.

The answer we are offering imply further questions suitable for further researches because the information presented herein answers only a part of questions that can arise with respect to the areas of social services providing and the role of the NNS in these areas. The main limitation is that there is no answer to the question what the real percentage of clients served by the sector is. It is this figure that would inform about the real necessity of engagement of the NNS in the area of social services. For sure, it would also be interesting to search for answers to the issues of possible regional disproportions in social services providing (that is partially processed for selected social services by Halásková and Halásková, 2014) or the structure of financing of individual social services providers. The data obtained by us however do not state any of the required information. Therefore, it would be necessary to conduct a more detailed research of the reality of social services providing at specific NNOs or to obtain more data from the Ministry of Labour and Social Affairs of the Czech Republic as the Ministry indicates these facts for example in its Statistical Yearbook from the area of labour and social services for 2014 or in the Network of Selected Social Care Facilities for 2013. However, both the resources state only the numbers of clients of selected social services who have or have not been provided the required service, without indicating individual sectors or regions the clients belong to.

## **Conclusion**

NNOs have become traditional providers of social services in many countries all over the world, including the Czech Republic. The role that the NNS plays in this field as well as the

scope of the social services provided by NNOs have therefore become increasingly relevant topics.

On the basis of the conducted research, we can say that NNOs hold a significant position in providing social services in the Czech Republic (approximately two thirds of services are provided by NNOs), and therefore supplement providers from the public sector and the profit sector, with the latter holding rather a marginal position. In the Czech Republic, the role of NNOs in social services lies in securing a given amount of social services in the quality stipulated in respective legislation. In addition, NNOs also have to raise necessary funds (from public and private sources) to cover the costs related to the providing of social services. Because NNOs are involved in developing community plans of social services, we can also include into NNOs' roles implementation of the tasks set for NNOs in these development materials.

With respect to the studied data, we can identify the NNS as an important provider of social services that is perceived by the general public and governmental entities as a trustworthy cooperating entity and receiver of donations and special-purpose subsidies. In our contribution, the scope of NNOs' activities in social services was identified more accurately, when in particular the fact that the NNS provides more than three fifths of the total number of all social services is worthy of notice. At the same time, it is interesting that a large number of services is secured by quite a limited circle of organisations (nine entities provide more than 500 services) among them paradoxically play an important role churches and religious communities (paradoxically because of the big share of non-believers in the Czech Republic). The legal forms that regularly occur among social services providers are the society and civic association, the asylum/home and public benefit corporation, and the church and religious organisation. All the three groups of legal forms of NNOs secure approximately the same number of services each (i.e. one third). In terms of their seats, the services are evenly distributed all over the territory of the Czech Republic. As regards the size of the seats, big cities prevail.

We can therefore consider the objective of our text, which was to outline the role and scope of NNOs with respect to social services in the Czech Republic, to have been partially fulfilled. The results of our research also give rise to several follow-up questions that stem in particular from the limited availability of data, hence representing an impulse for further research that should be directed towards securing more accurate information about the number of served clients of NNOs and the regional distribution of services of the NNS with respect to the other sectors.

Another interesting topic that may become a subject of possible future research is the financing of social services provided by the NNS because, on the basis of available statistical data, it can be expected that the organisations providing social services are largely dependent on private resources of donors. Therefore, due to their characteristic features, they bring the funds to the field that could be used in a different manner or as the case may be would possibly not reach the field of social services at all. In such a case, it would be possible to consider NNOs in social services as a certain multiplier of public funds dependent on fundraising activities. However, we do not have enough evidence now to verify this assertion, therefore this can also become another of the subjects of further research that would answer the outlined questions.

Our contribution hence answers the basic question we asked about the role and scope of the NNS as regards the providing of social services in the Czech Republic. One answer however opens a space for asking further questions and seeking further answers.

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# NON-FINANCIAL FACTORS OF PERFORMANCE: THE CASE OF MECHANICAL ENGINEERING COMPANIES IN THE CZECH REPUBLIC

**Mária Režňáková, Michal Karas, Michala Strnadová**

**Abstract:** *Successful achievement of strategic goals requires an effective performance management system, i.e. determining the appropriate indicators measuring the rate of goal achievement. These indicators are known as key performance indicators or value drivers according to the principles of value-based management. Performance is monitored by both financial and non-financial indicators. In order to gain further insight into the topic, this paper presents the results of research identifying the non-financial factors that affect the performance of mechanical engineering enterprises in the Czech Republic. The data were obtained from a questionnaire survey of the enterprises' senior management. The results of the survey were evaluated on the basis of response rate. The evaluation also included a comparison of the managers' opinions and the performance of their enterprises – measured by return on equity. The results of the analyses show that the factors most detrimental to enterprise performance include the incompetence of responsible employees and the disregard of the customers' requirements. Factors most frequently shown to increase the value of the enterprise are the product quality, product innovation and flexibility in meeting customers' requirements.*

*The document can be downloaded at <http://hdl.handle.net/10195/67938>.*

**Keywords:** *Performance measurement, Value-based management, Value drivers, Financial ratios, Mechanical engineering enterprises.*

**JEL Classification:** *G30, G32.*

## **Introduction**

Business performance in the broadest sense is defined as the ability to efficiently utilise the resources available to achieve the objectives pursued by the company. This is why the identification of factors affecting business performance is the main task of company management. Value-based management (VBM) has developed since the mid-1990s for the identification of the factors of business performance (or value). Value-based management works on the assumption that the value of the business is derived from its ability to generate future revenues. It means that it is dependent on factors such as originality and quality of the product offered, market position, level of effective cost management, and innovation capability of business employees, which are reflected in the financial results of the business. The business performance measurement system must be based on financial as well as non-financial indicators. Financial ratios are most useful in strategic management, since they indicate whether a company's strategy implementation and execution are contributing to bottom line improvement. Non-financial indicators are mainly used for short-term decisions. Their identification is rather difficult and may show signs of subjectivity. They are determined mostly on the basis of knowledge and experience of managers who work in the companies, or on the basis of studying documents. However, in order for the factors

indicated by managers to be considered as performance indicators it is crucial to compare the managers' claims with the actual business performance achieved.

## **1 Performance indicators**

Indicators clearly contributing to business value at all levels of management should become the starting point for measuring business performance. Since changes in business values are dependent on changes in the value drivers, it is an important task in value management to seek and identify factors that accelerate performance and value or, as the case may be, compromise the value. According to Frigo (2002), value-based management is a strategic performance measurement tool that provokes management to focus on internal performance and thus support business value creation, namely through motivation and definition of activities that maximise business value. Knight (1998) describes value-based management as an approach combining strategy, performance metrics and activities contributing to the maximisation of value for owners. Koller (1994) defines value-based management as a "link between ideas contributing to the business value and performance management systems". Similarly, Fourie (2011) comments on this topic saying that the goal of value-based management is to contribute to business value and identify value drivers in the enterprise. Performance indicators used in value-based management should enable the use of as much information as possible from the accounting and simultaneously overcome existing objections to accounting indicators capturing financial efficiency, particularly including risk calculation leading to business value identification. Cooper et al. (2001) see the advantage of applying value-based management principles in the ability to provide information for making decisions about the allocation of investments, comparison of business performance with competitors, reducing the capital demands of processes and formulating business strategy. However, they also point out its shortfalls, namely the difficulty of projecting financial indicators of performance metrics in the operational metrics and technical limitations in measuring performance in some areas (e.g. cost of capital metrics), stemming mostly from the difficulty in defining the value of businesses and forecasting their development. If value generators are properly defined they can help managers understand what creates business value and how it can be increased; subsequently they can coordinate value drivers with the managers' and employees' objectives (see Copeland et al, 2005). As stated by Ittner et al (2001), identification of these drivers and their interrelations is expected to improve resource allocation, performance measurement and the design of information systems by identifying the specific actions or factors that cause costs to arise or revenues to change. In terms of value-based management principles, value drivers can be identical with key performance indicators (KPI) that the company should follow and be able to influence. These indicators should use as much information as possible from accounting but, at the same time, overcome existing objections to accounting indicators used to measure the financial position of the business. Therefore they should be based on management accounting that focuses particularly on cost efficiency (see e.g. Ittner et al, 2001). At the same time, they should be structured in a way that considers the business risks. Economic value added (EVA) is perhaps the best known indicator associated with value-based management. It represents the difference between net profit and the opportunity cost, i.e. the cost of the firm's capital (see e.g. Young and Byrne, 2001). The strength of this indicator is that its calculation includes not only interest on outside capital but also the cost of equity. According to the authors of this indicator, changes in economic value measures track changes in shareholder wealth more closely than traditional accounting measures, and should therefore replace accounting measures for goal

setting, capital budgeting and compensation purposes (see Stern et al, 1995). Looking into the performance of businesses that are not publicly tradeable makes it difficult to measure the value and identify value drivers. For this reason there are still various alternative financial indicators for measuring performance that are calculated on the basis of accounting data. It is possible to use the knowledge of relations between individual financial-ratio indicators to identify partial performance factors. Needles et al (2004) investigated the relationship between strategy and financial performance in firms in the chemical and mechanical engineering industries and promotion services. To this purpose they worked with asset turnover, profit margin, debt to equity, cash flow yield and turnover ratio, i.e. indicators that can be considered as value determinants. In our previous research (see Režňáková et al, 2013) a sensitivity analysis was used to identify factors that have the largest impact on the change in business value. Our point of reference was a model defining business value using the discounted free cash flow method. The research indicated the highest interrelation between the rate of return on investments and the resulting price. This finding was rather surprising in view of the fact that as a rule literature indicates a high sensitivity of pricing to the rate of increase in turnover in the second phase (g parameter). On the other hand, this finding can be considered as logical: the free cash flow growth rate is conditioned by the new investment return rate. The second highest level of positive correlation was achieved between operating profit and resulting pricing. According to Losbichler et al (2008) the identified value drivers can be different if a different approach is adopted in measuring business performance. In their research they concentrated on using the economic value added (EVA) concept. They concluded that EVA can be affected by four major value drivers: revenue growth, cost efficiency, fixed asset utilisation and cash-to-cash cycle time. In a large-scale empirical study in Europe they also concluded that the cash-to-cash cycle time is used as the key metric. In this context it is appropriate to mention that in their study the authors focus on the value for stakeholders from the point of view of the logistics and supply chain management. Tiwari and Kumar (2015) researched value drivers in the Indian manufacturing industry. Based on their model they determined that sales, net margin, book value of equity, dividend per share, beta factor and earnings per share are the six major financial drives.

## **2 Methods**

The aim of our research is to identify performance factors in mechanical engineering companies in the Czech Republic, excluding businesses in the automotive industry which are developing differently from the rest of the industry. In this paper we will focus on the partial objective of identifying non-financial performance factors in companies which were measured by profitability indicators. Since typical performance indicators do not reflect risk factors, our research concentrates on a single industry because the business risk is conditional on the industry. Mechanical engineering was chosen because it is considered to be one of the indicators of the condition and future development of the Czech economy on account of the industrial history and orientation of the Czech Republic. This field is dominated by the production of machine tools, lifting and handling equipment, industrial refrigeration and air conditioning equipment (CZ-NACE 28). When identifying the performance indicators, we worked with published research which emphasises the importance of non-financial factors for business performance. In order to identify them we established the views of senior managers (qualitative data) and compared them to the performance of the enterprises they managed (quantitative data). The qualitative data were obtained from a questionnaire survey of the enterprises' senior management. For effective

performance management it is vital to avoid factors that may reduce (or even destroy) business value. Among the known factors reducing the enterprise value are the lack of capital, lack of strategic management system and poor quality of production. To this purpose we sought the views of managers concerning factors influencing business value by asking two questions. The questionnaire prompted managers to list factors which affect the business performance of their enterprises negatively and positively. The range of potential factors was based on secondary research – analysis of previously undertaken questionnaire surveys and research of studies published in the scientific literature. The respondents were allowed personal comments. The views of the respondents concerning the importance of factors was measured on a 1-10 scale where 1 is the least significant influence and 10 the most significant influence on business value. The importance of potentially negative value drivers was evaluated on the basis of the response rate for the whole sample. Subsequently, these factors were analysed in relation to the business performance measured by the return on equity and return on assets indicators. The questionnaire survey took place in 2014. The questionnaire was distributed to all enterprises active in this industry for which data were available in the AMADEUS database, i.e. 1,107 enterprises in total. Completed questionnaires were obtained from 80 respondents, which represents a return rate of 7.23%. The analysis used the most frequent responses because we consider them to be more conclusive in the evaluation of the importance of factors influencing business value than other statistical characteristics. The profit ratio indicators were analysed for the years 2009 – 2014, i.e. before the implementation of the questionnaire survey and in the year of the survey. We believe that the performance achieved can influence the attitude of the respondents. We can estimate from the responses which areas the managers consider to be most important (both in a positive and a negative sense) from the perspective of managing business performance. In order to identify factors influencing business performance we used the non-parametric chi-square test. To this end the return on equity (ROE) indicator values were split into categories. The applied chi-square test of independence tests the null hypothesis that the two qualitative features are independent. Tests' statistics, for the contingency table of r rows and s columns, can be written in the following form:

$$G = \sum_{j=1}^k \frac{(n_j - \Gamma_j)^2}{\Gamma_j} \quad (1)$$

Where:  $\Gamma_j = n \cdot \pi_{0,j}$  is the theoretical frequency of  $j^{\text{th}}$  class at range n, while  $n_j$  is the empirical frequency in the same  $j^{\text{th}}$  class. Under the null hypothesis, test statistics  $\chi^2$  has a distribution with (k-1) degrees of freedom. Among the assumption of the test application is that,  $\Gamma_j = n \cdot \pi_{0,j} > 1$  in all classes and at least in 80% of classes the  $\Gamma_j = n \cdot \pi_{0,j} > 5$  (see Cyhelský et al (1999)).

### 3 Results and discussion

Small and medium-sized enterprises prevailed among the respondents; their share in the total number of retrieved questionnaires was 65%. Large enterprises constituted 12.5% and micro-enterprises 22.5% of the research sample. The structure of the sample is similar to the structure of the population, where the proportion of small and medium is 73% of total number of companies (see CZSO, 2015). We therefore consider the structure of the sample as representative.

In terms of ownership, enterprises with majority owners in the Czech Republic (holding more than 50%), of which there were 47.50%, prevailed. One quarter

of respondents had foreign owners (mostly in Europe) and the remaining 27.50% of enterprises did not have majority owners. The survey period was greatly influenced by the global financial crisis which manifested itself in the Czech Republic in 2011 and 2012. The instability of the internal environment was projected mainly in the high variability of the ROE indicator where the values fluctuated from -1,862% in 2012 to 1,600% in 2009.

**Tab. 1: Basic descriptive statistics of ROE**

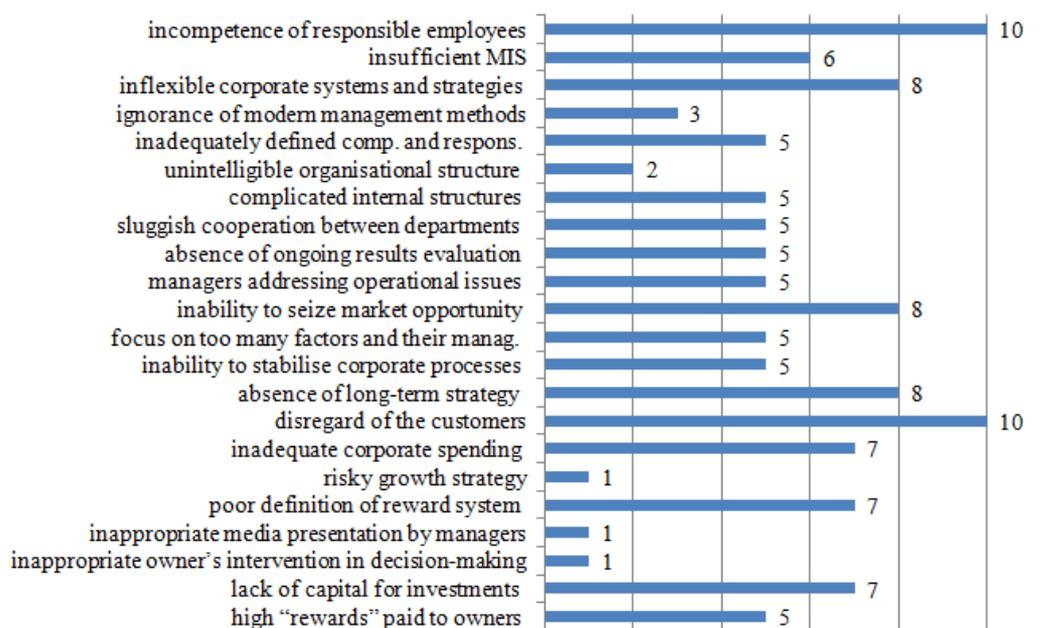
Indicator		Period					
		2009	2010	2011	2012	2013	2014
ROE (index)	Average	0.2776	0.1374	0.0257	-0.2330	0.2852	0.0100
	St. Deviation	1.8283	0.8740	0.6348	2.1687	2.0470	1.6326
	Median	0.0665	0.0900	0.0819	0.0616	0.0649	0.1084
	Min. value	-2.3535	-3.8526	-3.0490	-18.6186	-6.7523	-12.2487
	Max. value	16.0000	6.1387	1.7838	1.5795	12.3037	3.2808

Source: authors' own processing

### 3.1 Factors compromising business performance

The results of evaluating factors negatively influencing improvement of business performance are shown in the following figure which gives an overview of factors and their most common rating. For example, the factor “incompetence of responsible employees” was often rated 10, the “insufficient MIS” factor was rated 6 (see Figure 1).

**Fig. 1: Most commonly rated factors compromising business performance**



Source: authors' own processing

“Disregard of the customers” requirements” (with 37.5% respondents rating the highest score) and “incompetence of responsible employees” (43.75% respondents) were indicated as factors that most compromise business performance; while respondents less frequently chose the following factors: “risky growth strategy”, “inappropriate media presentation by managers” and “inappropriate owner’s intervention in decision-making”. When analysing responses by **size of enterprise**, the biggest differences were identified between respondents from micro and small businesses on one hand and those from large corporations on the other. This was manifested mainly in factors such as “ignorance of modern management methods”; managers consider this factor to be very important as it might adversely affect business value; on the other hand, managers of micro-enterprises find

it to be the least important. Managers of large corporations consider the factor of “risky growth strategy” to be the least important in terms of a negative impact on business value but managers of small enterprises consider it to be important (mostly rated 8). The most frequent responses by size of enterprise are provided in Table 2.

**Tab. 2: Most commonly rated factors compromising business performance by size of enterprise**

Factor	Micro	Small	Medium	Large
Incompetence of responsible employees	10	10	10	10
Insufficient MIS	9	5	5	6
Inflexible corporate systems and strategies	8	3	8	8
Ignorance of modern management methods	2	5	3	8
Inadequately defined competences and responsibilities	10	3	5	8
Unintelligible organisational structure	5	5	2	2
Complicated internal structures	8	5	5	6
Sluggish cooperation between departments	5	6	5	5
Absence of ongoing results evaluation	10	5	5	3
Managers addressing operational issues	8	5	5	5
Inability to seize market opportunity	8	4	8	4
Focus on too many factors and their management	5	5	5	5
Inability to stabilise corporate processes	5	5	5	10
Absence of long-term strategy	5	8	7	10
Disregard of the customers' requirements	10	10	10	10
Inadequate corporate spending	10	7	7	8
Risky growth strategy	1	8	3	1
Poor definition of reward system	3	7	4	4
Inappropriate media presentation by managers	1	6	1	4
Inappropriate owner's intervention in decision-making	1	7	1	3
Lack of capital for investments	3	7	9	5
High “rewards” paid to owners	1	10	1	2

*Source: authors' own processing*

When analysing the rating by ownership structure the differences are less distinct: in 12 factors the enterprises agreed on the same rating regardless of the ownership structure. In this analysis we compared the responses of managers in enterprises with majority owners (foreign or local) with responses of managers with fragmented ownership structures (without a majority owner). The biggest differences were observed in the following factors:

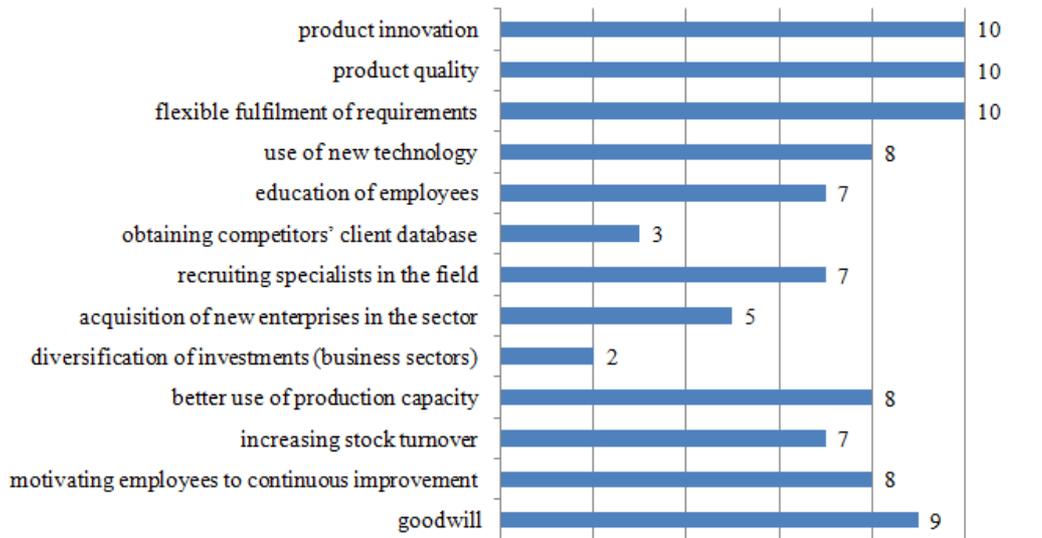
- “Absence of long-term strategy” – respondents in companies with majority owners rated this factor as one of the most important (mostly rated 8 in enterprises with a foreign majority owner and 10 with a local majority owner); in enterprises with a fragmented ownership structure it was considered one of the least important factors (most often rated 3).
- “Inappropriate owner's intervention in decision-making” – enterprises without majority owners most often rated 10; those with a majority owner consider this the least important factor (rated 1).
- “Inflexible corporate systems and strategies” – respondents in companies with majority owners mostly rated 8; those without majority owners rated it 3.
- “Risky growth strategy” – this factor was rated as important by respondents from companies with foreign majority owners (mostly 6); in other groups it was mostly rated 1.

This selection of results shows that perception of factors compromising business performance varies depending on the enterprise size as well as on the ownership structure. It clearly follows from differences in managerial problems that are associated with the management of different types of businesses and the specifics of their business.

### 3.2 Factors supporting business performance

Factors that positively influence business performance growth and their most frequent rating are shown in the following figure (see Figure 2).

**Fig. 2: Most frequently rated factors increasing business performance**



*Source: authors' own processing*

“Product quality” (52.5% of respondents assigned the highest rating for this factor), “flexible fulfilment of requirements” (35% of respondents assigned the highest rating), “product innovation” (29% of respondents assigned the highest rating) and “goodwill” (50% of respondents assigned two highest ratings) are most often considered the most important factors contributing to improvements in the performance of mechanical engineering companies. The least significant factors are the “diversification of investments (business sectors)” and “obtaining competitors’ client database”. When analysing the responses **by enterprise size** the differences are less distinct than in the analysis of factors compromising business value. The most striking difference in ratings was observed in the factor pertaining to the “better use of production capacity”: managers of medium-sized enterprises rated this factor mostly 9; while managers of micro-enterprises rated it only 2, i.e. they do not consider it to be a major factor. Detailed results are shown in Table 3.

**Tab. 3: Most frequently marked factors increasing business performance by size of enterprise**

Factor	Micro	Small	Medium	Large
Product innovation	10	8	8	10
Product quality	10	10	10	10
Flexible fulfilment of requirements	10	10	10	8
Use of new technology	7	8	8	8
Education of employees	7	6	7	10
Obtaining competitors' client database	2	5	3	1
Recruiting specialists in the field	5	7	7	8
Acquisition of new enterprises in the sector	6	5	5	2
Diversification of investments (business sectors)	2	5	1	6
Better use of production capacity	2	7	9	4
Increasing stock turnover	7	7	5	10
Motivating employees to continuous improvement	8	6	7	7
Goodwill	9	10	9	10

*Source: authors' own processing*

When analysing the rating by ownership structure the differences are less distinct. In the case of factors such as “product innovation”, “product quality”, “flexible fulfilment of requirements”, “better use of production capacity”, “motivating employees to continuous improvement” and “goodwill”, they were almost in agreement. A difference of three points was recorded in the following factors:

- “Use of new technology” – managers of enterprises without majority owners consider this factor to be one of average importance; managers of enterprises with majority owners find it to be very important.
- “Acquisition of new enterprises in the sector” – enterprises with local majority owners consider this factor to be unimportant (rating 2).
- “Diversification of investments (business sectors)” – managers of enterprises with foreign majority owners assign average importance to it; other enterprises find it unimportant (rating 2).

### 3.3 Non-financial factors determining business value and performance

When analysing the responses we tried to identify the relationship between ratings assigned to various factors and the business performance achieved. Business performance was measured using Return on Equity (ROE) indicators. By comparing managers' claims (rating assigned to individual factors) and the performance achieved by enterprises we tried to identify business performance factors. Firstly, we investigated whether the rated performance differed significantly in enterprises of various size or ownership structure. To this purpose we used the chi-square test of statistical independence. The results are shown in the following table.

**Tab. 4: Test of statistical importance of size and ownership factors**

Factor	Period	Chi-square	p-value	Factor	Chi-square	p-value
Size	2009	15.95801	0.193167	Ownership	6.02101	0.987867
	2010	6.725926	0.665630		7.590175	0.816281
	2011	10.82953	0.543582		7.83049	0.953753
	2012	3.987981	0.262765		1.092780	0.895416
	2013	19.47857	0.362927		13.58141	0.955547
	2014	1.081413	0.781563		1.226054	0.873791

*Source: authors' own processing*

According to the result of the chi-square test, neither the size nor the type of ownership are important factors significantly affecting performance measured by ROE at any standard significance level. Therefore there is no need to divide the responses by size and type of ownership and evaluate the performance of different groups of enterprises separately. We again used the chi-square test of statistical independence for the evaluation of the impact of non-financial factors on business performance.

**Tab. 5: Statistically significant factors of business performance**

Factor	Year	Chi-sq.	p-value
Ignorance of modern management methods	2011**	52.47042	0.037427
Inadequately defined competences and responsibilities	2010***	50.09947	0.004432
	2013***	109.4579	0.000012
Unintelligible organisational structure	2011**	53.56772	0.02995
Focus on too many factors and their managem.	2011**	54.21918	0.026168
Inability to stabilise corporate processes	2011**	56.32829	0.016677
Inappropriate media presentation by managers	2009*	42.74089	0.0972
	2010**	42.18864	0.012291
Inappropriate owner's intervention in decision-making	2009*	47.54166	0.094439
Product innovation	2012***	38.99359	0.000002
Flexible fulfilment of requirements	2012***	38.99359	0.000002
Education of employees	2014**	20.65608	0.014268
Obtaining competitors' client database Recruiting specialists in the field	2009*	49.90604	0.061551
	2011**	52.73059	0.035519
Acquisition of new enterprises in the sector	2011***	67.7845	0.001054
	2010***	49.95912	0.001433
	2011**	49.46407	0.02509
Obtaining competitors' client database	2013**	67.4115	0.033656
	2011***	62.55969	0.003947

Note: \*significant at 10% level of significance, \*\*significant at 5% level of significance, \*\*\*significant at 1% level of significance.

*Source: authors' own processing*

The tables above contain the results of the testing of non-financial factors showing only those factors that achieve a level of significance of at least 10% in at least one of the evaluated periods; 14 such factors were identified. Of these 14 factors there are only six which are at the level of 1% significance in at least one period. If we evaluated factors which reach the defined level of significance in at least two periods there would be a single factor, "inappropriately defined competences and responsibilities", i.e. a factor that compromises business performance and was important in the years 2010 and 2013. Other factors that reach this level of significance are: "acquisition of new businesses in the sector", "product innovation", "flexible fulfilment of requirements", "recruitment of specialists" and "better use of production capacity". The "acquisition of new enterprises in the field" factor has a 5% level of significance in as many as three periods (2010, 2011, 2013). Other factors improving business performance at this level of significance are "education of employees" and "obtaining competitors' client database". Four factors exacerbating business performance are on the same level of significance: "ignorance of modern management methods", "focus on too many factors and their management", "unintelligible organisational structure" and "inappropriate media presentation by managers". The last factor compromising business performance which achieved some statistical significance,

specifically 10%, is the “inappropriate owner’s intervention in decision-making”. The results of statistical tests only partially correspond with the perception and evaluation of factors under assessment. One reason could be the high variability of performance affected by the global financial crisis (see Table 1). Another reason might be the fact that managers rated the significance of factors from the point of view of their own personal experience which had not yet been reflected in business operations (i.e. if it had worked, the enterprise could have achieved better performance).

## Conclusion

The aim of this paper was to identify qualitative factors that affect the performance of mechanical engineering companies in the Czech Republic. Data used in this research were obtained in a questionnaire survey among senior managers. As part of the questionnaire survey the respondents rated factors which cause reductions in business performance as well as factors that improve business performance, i.e. the potential value drivers. Based on the questionnaire survey, factors compromising business performance are “disregard of the customers’ requirements” and “incompetence of responsible employees”. A statistically significant relationship was, however, not established between these two factors. “Product quality”, “flexible meeting of customers’ requirements”, “product innovation” and “goodwill” are most often regarded by managers as the most important factors supporting the increase of performance in mechanical engineering companies. We compared the responses obtained with actual business performance, i.e. we tried to verify whether the evaluation of factors by managers corresponded to performance achieved. To this purpose we used the chi-square test of statistical independence. The tester evaluated 14 statistically significant factors. The factor rated as most significant was: “inadequately defined competences and responsibilities”.

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# IMPACT OF AGE OF THE ENTREPRENEUR ON THE EXPORT FINANCING. CASE STUDY FROM SLOVAKIA

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**Abstract:** *SMEs are frequently experiencing problems with obtaining capital for the expansion and cross-border activities due to their specific characteristics. Smaller enterprises owned or managed by younger entrepreneurs belong to the most vulnerable segment. The aim of this paper is to bring the statistical evidence whether the age of an entrepreneur is a significant factor with the relevant impact on export activities financing in case of SMEs in Slovakia. The presented results are based on the research carried out among Slovak SMEs in 2016 in comparison with the data from the international survey called TwinEntrepreneurs Regional Study that was performed by the Young Entrepreneurs Association of Slovakia and Vienna Business Agency in 2013. Application of Pearson's chi square statistical analysis of the results brings clear statistical evidence that while the age of the owner is not a significant factor in the export decision making process, it becomes a significant factor in case of the export financing.*

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**Keywords:** *SMEs, Young entrepreneurs, Age, Export, Financing export.*

**JEL Classification:** *G11, G32.*

## Introduction

The segment of small and medium-sized enterprises (SMEs) contains more than 565 000 companies, employs 72.7 % of active workforce in Slovakia and creates more than 53 % of added value in state economy (SBA, 2014). According to the statistical data their share on total export of the country reached nearly 30 % in 2014. 5.2 % of Slovak SMEs export products and services abroad. The obvious importance of the SMEs for the economy was declared by many authors (Badulescu, 2012; Belás et al. 2014a; Belás et al. 2014b; Doležal et al. 2015; Henderson and Weiler, 2010; Petr, 2016; Rajnoha et al. 2016; Sobeková Majková, 2011a; Sobeková Majková, 2016b; Ključnikov et al., 2016; Korcsmáros et al., 2016 etc.). According to the data from Slovak Statistical Bureau the share of young entrepreneurs (up to 34 years old) is currently exceeding 29 %, which makes them a negligible part of the market economy. Unfortunately a special type of problems occurs in this segment, and the lack of capital belongs to the most important ones (Jakubec et al., 2012).

The aim of this paper is to bring the statistical evidence that the age of an entrepreneur is a significant factor with relevant impact on export activities financing in case of SMEs in Slovakia. Presented results are based on the research carried out among Slovak SMEs in 2016 in comparison with the data from the international survey TwinEntrepreneurs Regional Study that was performed by the Young Entrepreneurs Association of Slovakia and Vienna Business Agency in 2013. Application of Pearson's chi square statistical analysis of the results brings clear statistical evidence that while the age of the owner is not a significant factor in export decision making process, it becomes the significant factor in case of the export financing. Younger entrepreneurs seem to be more acquainted with the

area of export financing than older, their level of application of specific financial tools (insurance claims, factoring, forfaiting, etc.) in export risk limitation is higher than in case of the older ones. On the other side they use the instruments of the state support of the export activities more rarely than older colleagues, even though their interest about this type of support is higher.

## **1 Statement of a problem**

Different types of private and state institutions, including banks, insurance or factoring and mezzanine companies, and state export support institutions provide products and instruments that can be used to finance export activities of the entrepreneurs (Sobeková Majková, 2011; Sozanov et al., 2016). Several studies, mentioned in this part of the paper, confirm the existence of difficulties in application of these products and instruments especially in case of the young entrepreneurs. Younger people usually have short company history, declare a lack of guarantees. These disadvantages force them to be more effective and informed in order to be successful on the global market.

The following studies declare that smaller and younger companies have different financial patterns than bigger and older ones also in export activities financing. Larger firms have fewer incentives to use export financing since they can use the internal financing sources, including internal cash flow (Casey and O'Tolle, 2014).

There was examined the behavior of 70.000 companies to determine the financial patterns of the younger ones. The study brings the evidence that younger exporting companies use the bank financing less than the older ones due to more intensive impact of the problem of asymmetric information. The authors argue that trade credit as a source of financing can be a substitute for the bank financing in case of younger firms (Chavis et al., 2011). The next study of Cassar (2004) presents quite similar findings at the example of young Australian companies. According to the research the formal financial sources scares the companies more than the trade finance. The results also suggest that small companies are more dependent on the export financing as a result of a lower availability of bank financing. It was also found that manufacturing firms are dominantly using bank financing, whereas service firms more rely on the export or trade financing due to the lower level of physical assets. Also next research of the authors Huyghebaert et al. (2007) declares similar findings. The paper brings the results of the empirical examination of the use of trade credit in case of 328 young Belgian firms at the stage of business start-up. According to this study young companies are facing more obstacles in getting financing from the formal sources of finance, and are more intensively using trade credit due to worse relationships with the banks. It was also found that young firms apply the instruments of the management of the current assets and receivables, including trade credit more intensively in case of the increase of the credit constraints from the formal sources due to higher interest rates as well as shorter maturity period. This study suggests that trade financing plays a pivotal role in the early stages of the business start-ups as a result of high credit constrains and also due to worse relationships with the banks.

Other research was focused on trade credit contracts. It brings evidence that the trade credit is mainly based on the negotiations which are highly dependent on the relationships between the exporter and importer or suppliers and buyers. The strong relationship between the parties can reduce the interest rates on the trade credit as well as it can increase the maturity period of the contract. It is found that most of the trade credit contracts are cheaper than the formal bank loans and buyers are more comfortable to use the financing from the

suppliers. Cheaper trade credit helps the younger firms to overcome the credit constraint problem and as result they can grow faster. Hence, trade credit helps the firms to grow more rapidly in the period of credit rationing from the banks (Gianetti et al., 2008). The author Cole (2010) brings the evidence from the US. It states that the companies that are using trade credits are usually smaller and younger, and consequently having shorter credit history and credit information for bank financing.

Other study examined financing of newly established SMEs in the South Africa. The authors Fatoki and Odeyemi (2010) state that the relationships with the suppliers are positively associated with the usage of trade finance, while closer relationships increase the level of the trade credit, provided by the exporter. They did not find any significant difference between the male and female entrepreneurs in terms of use of trade financing. But, they argue that the level of education and entrepreneurial experience can minimize the effect of gender in terms of use of trade financing. Next research was focused on the use of trade credit as a mean of export financing among 47 197 small companies in seven European countries, namely, Belgium, Finland, France, Greece, Spain, Sweden and the UK. It brings the evidence the export financing is significantly positively associated with the growth of the firm, which is more appealing for the small firms than the medium or larger firms. The results suggest that firms that have higher costs associated with the external financing use trade credit more than the firms with the access to the cheaper forms of bank financing (Garcia-Teruel and Martinez-Solano, 2010). This fact was declared also in case of the Spanish companies (Martinez-Sola et al., 2014). Other finding confirms that small companies managed by young entrepreneurs more intensively use trade financing in the financing of their export activities than larger companies (Huyghebaert et al. 2007).

The author Atanasova (2012) examined the impact of the age and size of the company, and riskiness in the context of export financing of the UK companies. The paper presents the finding that young and small firms are more dependent on the trade credit due to the immediate shortage of funds. The reason is that they do not have enough assets to pledge as collateral as well as they do not have audited financial statements to ask for bank loans. The author argues the trade credit cannot be a substitute to bank financing rather it can be a complementary for the small and young firms. She says that at the time when a small firm can renegotiate its credit terms with the supplier it becomes a positive signal about borrower's situation for the bank. Experience of French companies shows that financially solvent buyers often pay for their products in advance to the financially weak suppliers. That means that in order to make the production process smoother, financially weak exporters receive the money in advance from their international buyers. The author Mateut (2014) also strongly supports the thesis that advance export financing can replace the bank financing for the small firms as they are more informationally opaque. In the Germany, there was proved statistically positive impact of advance in export financing (Eck et al., 2014).

Banks loans belong to the most important sources of finances for export operations. Italian authors examined whether the bank support of SMEs can increase their exporting activities in Italy. They found that long-term relationship with the main bank can reduce the financial constraint for the small firms and can facilitate them to sell more products to the global market. Intensive credit support can help SMEs to export on more than one foreign market. The authors Bartoli et al. (2014) found that bigger companies have more export activities than smaller due to the fact that they are more financially solvent and can accept more risk due to their international business activities. Other study of the authors Jinjarak

and Wiganraja (2016) investigated the effect of the increase of SMEs export activities on getting the access to bank financing. It founds that the increase of the share of SMEs production being sold abroad helps the firm to build a reputation on the market, and as a result the company can get the easier access to the bank financing. The authors also suggested that when a company becomes actively involved in export, it has to maintain clear financial statements in order to get a smoother access to the bank loans. They have found the evidence that SMEs export activities increase their financial flexibility, because they have a possibility to ask their international buyers for the upfront payments and, hence they can rely on the export financing instruments in their financial management.

Presented studies confirm that smaller and younger companies in comparison with the bigger and older ones usually have a different financial pattern, which is also valid for the export financing. The data, further presented in this paper, confirm this statement only partially. Several identified differences may be a benefit for economic theory of export financing. Our study identifies which age group of the entrepreneurs is better oriented in the issue of export financing, measures the perception of the state support of export activities in Slovakia, provided through the special state agencies like EXIM bank (Export-import bank), Slovak Guarantee and Development Bank (SGDB) and Slovak Business Agency (SBA).

## 2 Methods

### 2.1 Data collection and character of the sample

The background data of this paper were gained at the researches carried out among Slovak SMEs in 2016 and the international survey called TwinEntrepreneurs Regional Study that was performed by the Association of Young Entrepreneurs of Slovakia and Vienna Business Agency in 2013 among Slovak and Austrian young entrepreneurs.

The research focused on the actual situation in Slovak business environment was carried out in 2016 by the method of questionnaire survey. The total number of the respondents was 438, while 93.8 % of them belonged to the group of SMEs. According to the calculated sample the research team assumes that our data are representative, and have reliability of 95 %. The sampling error of +/- 5 % should be considered. The minimum size of the sample should be calculated according to the formula:

$$n = (1.96)^2 \times \sqrt{p \times (1 - p) / 0.05^2} \quad (1)$$

where:  $p$  is the share of the sample. The size of the minimum sample was 310, while the real size of our sample was 438. The number of the respondents fulfills the requirements for stochastic selection.

Comparison of the different characteristics of the basic data set and our selected sample indicates striking similarities, while the differences between them are insignificant. For instance, the basic data set contains 99.8 % of SMEs, while our sample contains 93.8 % of them (the difference is only 6 %); the data about the regional structure and the area of economic activity of the selected companies are also close to each other.

TwinEntrepreneurs Regional Study (Šrenkel et al., 2013) is the result of the comparative research in the area of start-ups and financing of young entrepreneurs in Slovakia and Austria. The research in Slovakia was realized by Slovak Association of Young Entrepreneurs. The sample consists of 180 respondents, while 37 of them claimed that they export their products and services, 127 of the respondents planned to export in the future,

and 16 neither realized nor planned the export activities in the future. The share of the female respondents was 66 %, and 34 % of them were males. The Austrian part of the research was carried out by Vienna Business Agency.

Research data were analyzed by the tools of descriptive statistics (averages and percentage), using Microsoft Excel (Office 2007) software as an important tool for data analysis due to its possibilities in data processing using pivot tables, and by the methods of comparison and deduction in data analysis. Statistical method of Pearson's chi-square was also applied, while the results were calculated through the online statistical software available at [www.socstatistics.com](http://www.socstatistics.com).

## 2.2 Formulation hypotheses of the survey

Formulation of the null hypothesis was as follows: *There are not statistically significant dependencies between the age of the entrepreneur and the chosen factors of export financing on the Slovak market.*

$$\text{Null hypothesis } \pi_1 = \pi_2 \text{ so } \pi_1 - \pi_2 = 0 \quad (2)$$

$$\text{Alternative hypothesis } \pi_1 - \pi_2 \neq 0 \quad (3)$$

Alternative hypotheses were formulated as follows:

H1: The age of the entrepreneur has a significant impact on the realization of expanding or exporting activities.

H2: The age of the entrepreneur has a significant impact on the level of their orientation in the area of export financing.

H3: The age of the entrepreneur has a significant impact on the usage of the financial tools reducing the risks in export activities.

H4: The age of the entrepreneur has a significant impact on the usage of the products of EXIM bank.

H5: The age of the entrepreneur has a significant impact on the opinion that the level of the state support of export of goods and services is satisfactory.

## 3 Problem solving

As the first we examined the impact of the age on the export activities. We assumed that young entrepreneurs and owners (or managers) of the start-ups have more courage and more global ambitions than older entrepreneurs, but the results did not confirm this assumption. The age of an entrepreneur does not have a significant impact on the company's decision to whether to start the export activities. The value of chi-square statistic is  $\chi^2 = 5.0396 = \chi^2_{0,05 \text{ with } 2 \text{ dgf.}}$ . *P*-value of 0.080476 indicates that the result is not significant at  $p < 0.05$  (Tab. 1). This result allows us to reject the *alternative hypothesis H1*. In this one case it was proved that there is no connection between the age of the entrepreneur and the fact that the firm does or does not perform the exports activities.

**Tab. 1: Impact of age on the decision to start a cross border expansion**

Cross-border orientation	Cross-border expansion AV* (%)	Non-cross border expansion AV (%)
Up to 35 y/o	70 (42.94)	93 (57.06)
36 – 45 y/o	62 (54.39)	52 (45.61)
46 + y/o	67(41.61)	94 (58.39)
Total	199 (45.43)	239 (54.47)
Average value	66.33 (46.31)	79.66 (53.69)
<i>p-value</i> /** $\chi^2$	0.080476 > 0.05	5.0396

\*absolute values, \*\* value of chi-square calculation

Source: Authors

The data presented in Tab. 2 indicate that the alternative hypotheses H2 – H5 were verified at the base of the chi-square calculation. These findings allow us to state that while the age of the owner does not have a significant impact on the decision making in relation to the realization of export activities, it is a significant factor in relation to export financing.

Younger entrepreneurs are better oriented in the field of export financing than older ones. This statement was confirmed by the results of chi-square  $\chi^2 = 23.9894 = \chi^2_{0,01}$  with 4 dgf. *H2 was verified* at 99 % level of probability, while the biggest differences were identified between the groups of entrepreneurs younger (27.4 %) and older (9.94 %) than 45.

**Tab. 2: Impact of the age on the financing of export activities**

	PR/NR	Data of descriptive statistic according age groups AV (%)				
		35-	36-45	46+	Total	Average
H2	PR	35 (21.47)	38 (33.33)	16 (9.94)	89 (20.32)	29.66 (21.58)
	NR	44 (26.99)	29 (25.44)	59 (36.65)	132 (30.14)	44 (29.63)
	<i>p-value</i> / $\chi^2$ /dgf	0.00008 < 0.01/23.9894/4				
H3	PR	36 (22.09)	32 (28.07)	20 (12.42)	88 (20.09)	29.33 (20.86)
	NR	57 (34.97)	43 (37.72)	76 (47.20)	176 (40.18)	58.66 (39.96)
	<i>p-value</i> / $\chi^2$ /dgf	0.010279 < 0.05/13.2134/4				
H4	PR	15 (9.20)	25 (21.93)	8 (4.97)	48 (10.96)	16 (12.03)
	NR	148 (90.8)	89 (78.07)	153 (95.03)	390 (89.04)	130 (87.96)
	<i>p-value</i> / $\chi^2$ /dgf	0.00035 < 0.01/20.4968/2				
H5	PR	25 (15.34)	21 (18.42)	11 (6.83)	57 (13.01)	19 (13.53)
	NR	69 (42.33)	50 (43.86)	74 (45.96)	193 (44.06)	64.33 (44.05)
	<i>p-value</i> / $\chi^2$ /dgf	0.047164 < 0.05/9.629/4				

\*absolute values, \*\* value of chi-square calculation, PR – positive responses, NR – negative responses, dgf – degrees of freedom.

Source: Authors

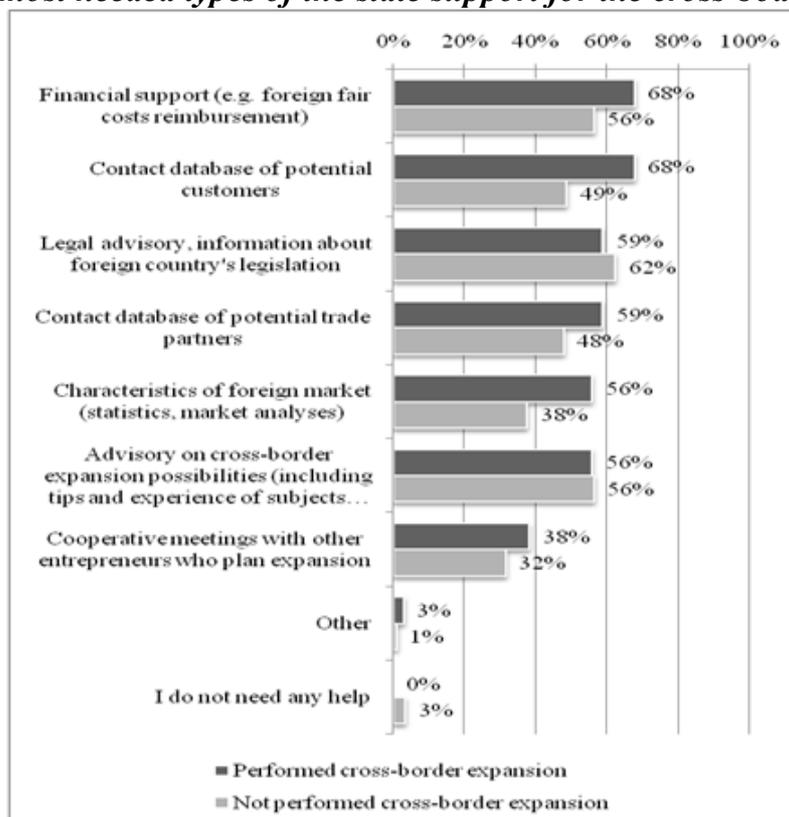
Younger entrepreneurs are more acquainted and apply the financial tools (insurance claims, factoring, forfeiting, etc.) in order to reduce the risks from export more often than the older ones. Alternative hypothesis H3 was verified at 95 % level of probability, value

of chi-square calculation was  $\chi^2 = 13.2134 = \chi^2_{0,05 \text{ with } 4 \text{ dgf.}}$ . Again the biggest differences were between the groups of entrepreneurs younger (25.08 %) and older (12.42 %) than 45.

In case of the alternative hypothesis H4 younger entrepreneurs presented a different behavior in comparison to the entrepreneurs in the age between 36 and 45. Only 9.20 % of the younger entrepreneurs had ever used the financial export products of the EXIM bank. In the age group between 36 and 45 the share was 21.93 %. This finding is corresponding with the studies of others authors [26], [17], [21] and confirms that the majority of the Slovak entrepreneurs have no information about the existence of the special export supporting financial institutions like the EXIM bank or SGDB. The value of chi-square calculation  $\chi^2 = 20.4968 = \chi^2_{0,01 \text{ with } 2 \text{ dgf.}}$  confirms this statement. *Alternative hypothesis H4 was verified at 99 % level of probability.*

The data obtained in the international research TwinEntrepreneurs Regional Study brought interesting findings for comparison. It examined what were the barriers of the cross-border expansion of young entrepreneurs too. It brought an interesting finding that in the group of companies who do not export abroad, the most sufficient problem connecting with export was the lack of finance (65%). This finding brings the better understanding of this type of companies, and relates to H4, stating that young entrepreneurs rarely use supporting products of export financing. Our research team implies, that more developed state support in this field may therefore bring substantial results in the development of the export based entrepreneurship in the country. TwinEntrepreneurs' results indicate 45 % of the respondents who plan to export or do export their products and services abroad did not know that the state institutions support cross-border expansion activities. 17.77 % of them planned to use the financial support of SBA, 11.11 % planned to inquire the agency called Sario, and only 4.4 % of them planned to use the support of EXIM bank, and the rest of 21.48 % claimed that they were planning to use the support of foreign institutions.

**Fig. 1: The most needed types of the state support for the cross-board expansion**



Source: Authors, Šrenkel et al. 2013

The last hypothesis H5 stating that the age of the entrepreneur has a significant impact on the opinion that the level of the state support of export of goods and services is satisfactory was also confirmed to be true, because the calculated value of chi-square was  $\chi^2 = 9,629 = \chi^2_{0,05 \text{ with } 4 \text{ dgf.}}$ . The alternative *hypothesis H5 was verified* at 95 % level of probability. The entrepreneurs of age groups up to 35 (15.34 %) and in between 36 and 45 (18.42 %) perceive that the level of the state support of export of goods and services is satisfactory to a significantly higher extent than older ones. These results are closely related with the outcomes of the survey from TwinEntrepreneurs Regional Study, presented in Fig 1, what revealed the types of the state support, that are perceived as the most valuable among the young Slovak entrepreneurs. The entrepreneurs who export their goods and/or services abroad pointed out the financial support and the provision of the contact databases of the potential customers (in both cases it was 68 %) as the most important. The entrepreneurs who do not export abroad featured the legal advisory, provision of the information about the foreign country's legislation (62%) and the support in the field of financing (56 %) as the most important forms of the state support.

#### **4 Discussion**

Pearson's chi square statistical analysis of the data from the survey allows us to confirm that the age of the entrepreneur should be considered as a relevant factor with the significant impact on the financing of the export activities. We brought statistical evidence that the biggest differences between the monitored groups appear between the entrepreneurs with the age beyond or above 45 years. In all cases except for the H4 the replies of these two groups of respondents were statistically close to each other.

It is obvious that younger companies do not have sufficient financial resources and internal cash flow for the export financing. This fact was also confirmed by the many international (Cassey and O'Tolle, 2014; Cassar, 2004; Cole, 2010; Fatoki and Odeyemi, 2010; Garcia Teruel and Martinez Solano, 2014; Giannetti et al., 2008; Huyghebaert, 2006; Huyghebaert et al., 2007; Chavis et al., 2011; Mateut, 2014) and Slovak studies (Sobeková Majková, 2011; Simo et al. 2016; Jakubec et al. 2012). We presented their findings in the first part of the article. Although the results of our research show that young entrepreneurs are in a disadvantaged position in this field, they are better oriented in the export financing in comparison with their older colleagues. Despite the fact that they are better informed in this field, they still perceive the lack of the state support in the export activities through the EXIM bank, Slovak Business Agency, Sario and Slovak Guarantee and Development Bank (SGDB). Lack of the financial sources for the development of the export operations is one of the biggest barriers for the expansion of export activities in case of young entrepreneurs. This finding may be an interesting clue for the government, which should pay some attention to the arrangement of the information campaigns about the supportive activities in the field of export, and meet the demand of the young entrepreneurs for this type of support.

#### **Conclusion**

The aim of this paper is to bring the statistical evidence whether the age of an entrepreneur is a significant factor with relevant impact on export activities financing in case of SMEs in Slovakia. Application of Pearson's chi square statistical analysis of the results brings clear statistical evidence that while the age of the owner is not a significant factor in export decision making process, it becomes the significant factor in case of the

export financing. Younger entrepreneurs declare significantly greater interest about the state financial support of the export activities than their older colleagues, but are rarely using them. Younger entrepreneurs are also more informed about this type of the state financial supportive activities, and about the instruments of the reduction or limitation of the business risks in the field of export. The presented findings indicate that the state should focus its attention on the needs of young entrepreneurs, that are better informed and have a significant interest in the support of the export activities. An effective state financial support of the export activities might bring the economic growth and make the economy of the country stronger, more competitive and diversified.

In order to help the older entrepreneurs to get better informed about the export financing, the state may prepare an information campaign about the means of export financing and the usage of these instruments.

While the biggest strength of this research was in the size and the homogeneity of the selection sample, the most important weaknesses are related with the fact that the respondents fulfilled the questionnaire online, and that the research team was unable to organize a more detailed face to face interview with the respondents. The future direction of the presented research will be focused on a comparative analysis of the entrepreneurial perception of the financial and credit risk in a wider geographical area of the V4 countries – the Czech Republic, Slovakia, Hungary and Poland.

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# TENDENCIES OF IMPROVEMENT OF LOCAL SELF-GOVERNMENT IN POLITICAL PARTIES' PROGRAMMES AND THEIR IMPLEMENTATION

**Diana Šaparnienė, Audronė Meškytė, Iveta Reinholde**

***Abstract:** Having performed literary analysis, the aspects of improvement of local self-government in the context of new public governance have been theoretically substantiated. Referring to theoretical insights, the provisions of programmes of the biggest political parties of the Republic of Lithuania related to local self-government have been analysed covering period from December 12, 2012 to March 31, 2014. In addition, the agendas and reports of the meetings of the Government of the Republic of Lithuania have been analysed in order to determine main tendencies of improvement of local self-government that receive biggest attention from the political parties in decision making process. The research has shown that improvement of local self-government in the programmes of political parties is oriented to 4 tendencies: 1) independence/autonomy; 2) strengthening of democracy and civil society; 3) improvement of governance; 4) quality of public sector services. In the agendas of the meetings of Government of the Republic of Lithuania mainly the issues related to efficiency, effectiveness, legitimacy of local self-government, strengthening of abilities of civil servants have been analysed.*

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***Keywords:** Local self-government, New public governance (NPG), Political parties, Programmes of political parties, Republic of Lithuania (LT).*

***JEL Classification:** L38.*

## **Introduction**

Local self-government being close to the citizens, their needs, representing their interests takes especially important part in state's political system. Being a territorial link of political system and civil society, through local citizens are able to express their interests, control how they are being implemented and influence state's governance as well. The New public governance (NPG) became a conceptual background for local self-government democracy expression (Torfing, Triantafyllou, 2013). According Osborne (2010), the nature of NPG paradigm supposes a strong link between polycentric democracy and government efficiency, emphasis pluralism, attached great importance to the links between citizens in governance. NPG highlight such governmental values as transparency, responsibility, accountability and other moral-ethical features.

Improvement of local self-government in Lithuania as well as in other European countries is a topic of interest of political parties stating in their programmes that they will pay quite much attention to solve various issues of local self-government. Political parties in their programmes not only express citizens' political will, but also try to implement programmes' provisions in the sphere of local self-government. Consequently, the provisions declared in the programmes of political parties and their implementation are an important issue at state level as well as at the level of local (self-government) governance.

# 1 Statement of a problem

## 1.1 Problem of the research

There is a lack of empirical researches investigating the issues of improvement of local self-government in the programmes of political parties in the context of NPG. In scientific literature mainly the issues of efficiency of local self-government (Wollman, 2010, 2012; Kuhlmann, 2010; Sanderson, 2001; Astrauskas, 2013, et al.), the problem of policy implemented by political parties in local government (Back, 2003; Kjaer, Elklit, 2010, Buchmann, 2013) are being analysed. Provisions of political parties' programmes regarding the issues of improvement of local self-government were analysed quite poorly.

In the programmes of political parties of Lithuania usually the aim to improve local self-government taking essential reform actions (change of the system of municipalities and subdistricts, expansion of municipalities' functions, citizens' involvement in institutions' activities, etc.) that will help to implement constitutional obligation of state institutions and organisations to serve people and to gain stronger society's trust is emphasised. However, researches and practice show that relatively insufficient attention is paid to the implementation of provisions of reform of local self-government declared in the programmes of political parties.

**The problem of this research** might be defined by the following questions: 1) What tendencies of improvement of local self-government are foreseen in the programmes of political parties that at present are in power? 2) How are the provisions of programmes of political parties related to improvement of local self-government implemented?

Object of the research – tendencies of improvement of local self-government and their implementation in political parties' programmes.

Aim of the research – having carried out the analysis of provisions declared in the programmes of selected Lithuanian political parties in the aspect of improvement of local self-government to investigate practical implementation of these provisions.

Tasks of the research:

1. With the reference to literary analysis to examine the aspects of improvement of local self-government in the context of NPG and the impact of local policy on the improvement of local self-government.
2. To analyse political parties' programmes and to determine what tendencies of improvement of local self-government they define.
3. When analysing the agendas and reports of the meetings of the Government of the LT to determine the main tendencies of improvement of local self-government that receive the greatest attention of political parties when making decisions.

## 1.2 Conceptual Background

Democratic states pursue to develop effective, transparent and accountable institutions of local self-government corresponding to society's needs and aims. Political parties are the link of local self-government that aggregate the expectations of different society's groups and articulate public policy options to respond to them (Torfing, Triantafillou, 2013). Therefore, elections provide an opportunity to the electors to vote for the parties which programmes correspond their needs and expectations and political parties while being

in power and forming public policy pursue the implementation of programmes. In modern democracies elected political parties actually formulate and implement public policy.

Since political parties implement not only the set values and ideals, however, first of all while being in power they represent public interest, their formed and implemented policy is inseparable from the paradigm of NPG which emphasises the stimulation of citizens to participate in political decision making processes, increase of cooperation of government stakeholders, assurance of openness, transparency, stimulation of public spirit and pluralism (Peters, Savoie, 2012). Having in mind that public policy is implemented through various symbolic forms (programmes, reports, laws, decrees, etc. of parties and Government), their content and practical expression acquires an important role. As the formers and implementers of public policy – political parties/politicians – are concerned about improvement of state and local self-government, the principles of NPG are emphasised in their programmes, agendas of the meetings and other activities. The latter contribute while corresponding society's needs and expectations in the period of globalisation, the newest information technologies and evaluation of rationality and efficiency.

In the context of NPG local self-government institutions pay more attention to improvement of service structure, to teaching and educating employees, to managing the newest procedures and activities' methods of planning, management and coordination (Buškevičiūtė, Raipa, 2011). NPG presents a certain alternative to the previous models of public administration (traditional public administration, public management, new public management) due to its social engagement, social quality. Particular significance of this model is noticed when forming and developing communities when real rather than formal local self-government is created (Guogis, Šilinskytė, 2013). NPG covers many governance processes and is perceived as networking of political elite (Osborne, 2010), therefore, in theoretical and practical aspects the influence of formers and implementers of state policy upon improvement of local self-government acquire wider discourse. In addition, NPG links together policy design and public service delivery as well as offers to look on cooperation of public and private sector through a glasses of interdependence and networking (Peters, Savoie, 2012).

## 2 Methods

Trying to determine the tendencies of improvement of Lithuanian<sup>4</sup> local self-government in political parties' programmes and analyse their implementation qualitative research has been carried out. The following methods have been used in the research: scientific literary analysis; content analysis of the documents.

The parties that received the majority of votes during the elections<sup>5</sup> to the Government of the Republic of Lithuania (LT) (in 2012 were selected for the research: Social Democratic Party of Lithuania (SDPL), Labour party (hereinafter LP), Homeland Union – Lithuanian Christian Democrats (hereinafter HU-LCD), Liberal Movement of the

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<sup>4</sup> Lithuania is a unitary state, administratively divided in to 60 municipalities. There is one level of self-government in Lithuania. The right to self-government for municipalities is guaranteed by the Constitution of Lithuania. The functions of local government are based on the principle of subsidiarity. By territory and number of inhabitants the average population in municipalities is 57 000. The municipal councils range in size from 15 to 51 members, depending on their population. Municipalities' revenues come mostly from central government's grants and a share of the general income tax. Property incomes and local taxes, on which municipalities have some leeway, account of only 6% of municipalities' revenues.

<sup>5</sup> The voter turn-out in parliamentary election in 2012 was 52,93%. The Social Democrats became the largest party in the Seimas.

LT (hereinafter LMRL), Order and Justice Party (OJP). Due to the biggest number of obtained mandates these parties form the majority in the Seimas, in addition, they have an opportunity to form the Government and implement their political provisions. The selected parties participate in adopting laws and making political decisions.

Using documents' content analysis, political parties' programmes have been analysed following the provisions that it is a document which defines party's responsibility, ability to foresee local governance in the future. It is worth to mention that in order to supplement research data, the election programmes of selected political parties that participated in the elections to the Seimas in 2012 have been analysed. This analysis of programmes' provisions helped to find out what tendencies of improvement of local self-government different political parties define.

Trying to determine the implementation of provisions of political parties' programmes related to local self-government, the agendas and activities' reports of the meetings of the Government of the LT have been analysed since Government is the main character agglomerating political promises and creating the programmes for implementation of political "promises". Government is responsible for implementation of state's policy. It should be noted that the agenda of Government's meetings was analysed for the period from December 12, 2012 (when the elections to the Seimas of the LT were held and the 16<sup>th</sup> Government was formed) to March 31, 2014.

### 3 Problem solving

#### 3.1 Content analysis of political parties' programmes

Referring to inductive access of content analysis the programmes of selected political parties have been analysed. Their provisions related to improvement of local self-government were grouped according to formed categories and subcategories (see Tab. 1) that have been distinguished referring not only to provisions of programmes of political parties, but also to principles distinguished in the conception of NPG.

**Tab. 1: Categories and subcategories**

Category	Subcategory
Independence/autonomy of self-government	Financial autonomy of municipalities
	Autonomy of municipalities' economic activities
	Autonomy of municipalities' activities
	Financial autonomy of subdistricts
	Autonomy of subdistricts' activities
Democracy and strengthening of civil society	Citizens' participation/involvement in decision making
	Change of election system of local self-government
Improvement of governance	Responsibility
	Accountability
	Openness
	Transparency
	Efficiency
	Legitimacy
	Competences/leadership
	Inter-sectoral cooperation
	Service to society
Structural changes	
Quality and governance of public sector services	-

*Source: (Authors of the article)*

During the analysis of political parties' programmes, 4 main categories have been distinguished related to autonomy of subjects of self-government, strengthening of civil society, improvement of governance and provision of public services. 17 subcategories have been distinguished in order to supplement categories and to present provisions of political parties' programmes in a structured manner.

### 3.2 Implementation of provisions of political parties' programmes

#### 3.2.1 Conformity of agendas of Government's sessions to provisions of political parties' programmes

Since political parties are active participants of making agenda, operating ideological provisions, the agenda of sessions of the Government of the LT (see Tab. 2) has been analysed following the provision that the Government is an institution participating in the process of formation of agenda of public policy at state's level and is responsible for implementation of state's policy.

**Tab. 2: Conformity of agendas of Government's sessions to provisions of political parties' programmes**

Category/subcategory	Number of questions
Autonomy of municipalities' economic activities	70
Quality and governance of services of public sector	3
Efficiency/effectiveness	2
Citizens' participation/involvement in decision making	2
Legitimacy	2
Autonomy of municipalities' activities	2
Financial autonomy of municipalities	1
Change of election system of local self-government	1
Competences/leadership	1
Structural changes	1
Accountability	1
Transparency	1
Publicity	1
Improvement of governance	1
<b>Total:</b>	<b>89</b>

*Source: (Authors of the article)*

After carrying out analysis of agendas of sessions of the Government of the LT it appeared that majority of discussed questions were related to autonomy of municipalities' economic activities. It is worth mentioning that "autonomy of economic activities" is related to transfer of multipurpose assets to municipalities, for instance, "Regarding the transfer of a piece of state land for other purposes to the municipality of Palanga city to manage, use and dispose under the trust law", "Regarding the transfer of tangible fixed assets to municipalities", "Regarding the transfer of real estate to the ownership of municipality of Raseiniai district". It should be emphasised that tasks of Commission of Improvement of Public Governance (hereinafter referred to as Commission) indicated in paragraph 3.1.6 which states that Commission will be able to provide suggestions regarding "more efficient management of state and **municipal** assets" have been revised, however, during the meeting held after a week this initiative was changed rejecting the management of municipal assets.

In the agendas of the Government of the LT priority is given not only to autonomy of municipalities' economic activities but also to activities related to implemented functions. During the analysis, two questions related to **autonomy of municipal activities** have been found: 1) Article 33 of the Law on Local Self-Government has been supplemented by Part 7

which indicates that all office, post, transport and other expenses related to elder's activities are paid by allowance determined by the Municipal Council. 2) Part 1 of the Article 4 of the Law on Financial Social Support for Disadvantaged People of the LT has been changed stating that "Municipalities provide social support while implementing independent municipal function". This means that from 2014 payment of social benefits became municipality's independent (not delegated) function what provides municipalities with more rights to control reasonable usage of funds.

Having changed Part 3 of the Article 4 of the Law on Financial Social Support for Disadvantaged People of the LT the increase of municipal financial autonomy was noticed, when the Government assigns financial resources following actual costs of 2012 that municipality was able to use upon its own discretion.

In the agendas of sessions of the Government of the LT attention is paid to the issues of **quality and governance of services of public sector**. For example, Paragraph 11.2.1 of the Programme of Improvement of Public Governance in 2012-2020 was supplemented trying "to create united electronic system of communication of public management institutions and citizens". With this issue it is tried to ensure high level of transfer of services to cyberspace that are important to citizens.

In the sphere of **effectiveness and efficiency** several questions have been discussed corresponding provisions of political parties' programmes: 1) The paragraph 13.2.2 of the Programme of Improvement of Public Governance in 2012-2020 has been supplemented by the following statement: "Trying to increase the efficiency of aldermen's activities, the procedures of planning of aldermen's activities will be improved". 2) In priority means of implementation of Government's programme of 2012-2013 the chapter "Development of self-government and enlargement of municipalities' responsibility" has been distinguished. Paragraph 313 states that amendments of the Law on Local Self-government will be prepared that will distribute aldermen's functions more precisely. This initiative will contribute to efficiency and effectiveness of governance of local self-government.

In political parties' programmes (considering frequency of repetitive provisions) **citizens' participation and involvement into decision making** is emphasised most, however, in the agenda of the Government of the LT only two questions related to strengthening of civil society were discussed. In the approved action plan for the year 2013-2015 of implementation of the Programme of Improvement of Public Governance in 2012-2020 the task 1.2 has been emphasised – "to motivate society especially nongovernmental organisations and local communities to participate in the processes of public governance". To achieve the task, measure 1.2.1 has been determined that ensures consulting with society and increasing the opportunities of its participation in the processes of public governance. It is worth to mention several actions of implementation of this measure: creation of internet access to people, preparation of methods of public consultations (practical manual), organisation of public consultations with youth organisations, etc. In addition, the measure 1.2.2 was distinguished that implements and determines the measures that would stimulate people and local communities to participate in solving public local matters, for instance, to prepare practical manual of elders' activities that would contain necessary information for elders' activities, to determine and evaluate legal and practical problems of elders' activities and to present them to the representatives of municipal institutions (mayors, administration directors, aldermen) and elders.

One more principle of NPG – **legitimacy** – is also emphasised in agendas of the Government of the LT. Referring to it, paragraph 9.2.2 of the Programme of Improvement of Public Governance in 2012-2020 has been supplemented trying to improve legal regulation of aldermen’s activities, i.e. clearly defined functions of aldermen and subdistricts, distinctly determined rights and duties of aldermen. Analogous actions of implementation of direction of improvement of local self-government are revealed also in Paragraph 313 of implementation of priority measures of the Government’s Programme of 2012-2013, whereas Paragraph 314 emphasises formation of legal presumptions for more effective activities of representatives of local people and communities preparing amendments of the Law on Local Self-Government and regulating more clearly elders’ status and relations with local government.

In the **changes of the system of elections of local self-government** some reform actions were implemented. In the agenda of the Government of the LT it has been determined to revise and amend Part 5, Article 33 of the Law on Local Self-Government where it is indicated that the elder will be elected not for 2, but for 4 years.

In the provisions of political parties’ programmes attention is paid to improvement of **competences and abilities** of civil servants. In the agenda of the Government of the LT the issue regarding approval of description of order of organisation of civil servants’ training has been discussed which determines “procedures of preparation, evaluation, approval, invalidating of programmes of civil servants’ training, procedures of organisation of trainings and the system of evaluation of education quality”.

Principles of NPG such as **accountability** and **transparency** dominate not only in political parties’ programmes but also in agendas of sessions of the Government of the LT. In the paragraph 9.2.2 of the Programme of Improvement of Public Governance in 2012-2020, the improvement of legal regulation of aldermen’s functions is implemented trying to increase aldermen’s accountability to subdistrict’s community. The tasks of Commission of Improvement of Public Governance were revised referring to the Provisions of Programme 2012-2016 of the 16<sup>th</sup> Government of the LT pursuing effective and transparent public management oriented towards satisfaction of society’s needs and social justice. This statement reflects not only the principle of transparency but also principles of efficiency, serving society, justice that belong to the paradigm of public management.

While analysing agenda of Government’s sessions, revision of the Law on Local Self-Government (hereinafter referred to as Law) has been noticed that does not have an equivalent to the provisions distinguished by political parties’ programmes, however, corresponds (considering its content) to the category of **improvement of Public Governance**. There was an attempt to supplement Article 3 of the Law with Part 3: “3. If survey results are related to the spheres of competences and responsibility of state institutions or their implementation requires participation of these institutions, municipal Council presents survey results to respective state institutions”. However, such Government’s position has been rejected due to a doubtful necessity.

Generalising the analysis of sessions’ agendas, we may state that main issues discussed in the agendas have relations with principles of public governance: satisfaction of society’s needs, efficiency, effectiveness, development of servants’ abilities, etc. Main tendencies of development of local self-government are implemented in the Programme of Improvement of Public Governance in 2012-2020 as well as in the Law on Local

Self-Government. Besides, the development of self-government implemented in 2012-2014 transferred not only financing but also functions. Although this autonomy is not related to big opportunities to implement projects, however, the fact that Government agreed to provide certain autonomy is very important to municipalities. In general context of analysis of political parties' programmes and agendas of sessions of the Government of the LT we may notice that the Government of the LT tends to adopt resolutions and suggest amendments of various programmes and laws corresponding the provisions of programmes. It is worth to mention that during the sessions of the Government 3 proposals have been made that contradict the principals/provisions declared by political parties' programmes. In addition, there is lack of questions related to the development of subdistricts' autonomy, the emphasis of principle of higher responsibility and inter-sectoral cooperation.

### ***3.2.2 Conformity of reports of the Government of the LT to provisions of political parties' programmes***

Pursuing supplement of implemented analysis of agenda of Government's sessions, two main reports have been analysed: Report of the progress of I-III quarters of implementation of activities' priorities of the year 2013 of the Government of the LT and Report of activities of the year 2013 of the Government of the LT. Table 3 presents systemised information of the reports corresponding provisions of political parties' programmes

***Tab. 3: Conformity of reports of the Government of the LT to provisions of political parties' programmes***

<b>Report</b>	<b>Category/subcategory</b>	<b>Number of equivalents to category/subcategory</b>
Report of the progress of I-III quarters of implementation of activities' priorities of the year 2013 of the Government of the Republic of Lithuania	Autonomy of municipal activities	1
	Efficiency/effectiveness	1
Report of activities of the year 2013 of the Government of the Republic of Lithuania	Quality and management of services of public sector	3
	Financial autonomy of subdistricts	2
	Democracy and strengthening of civil society	1
	Citizens' participation and involvement in decision making	1
	Competences/leadership	1
	Openness	1

*Source: (Authors of the article)*

While performing the analysis of Report of the progress of I-III quarters of implementation of activities' priorities of the year 2013 of the Government of the LT it has been revealed that new version of the Law on Territorial Planning of the LT has been adopted which changes the regulation of territorial planning i.e. citizens do not need to prepare detailed plans, they are prepared by municipalities. Revision of this law conditions not only additional functions transferred to municipalities, but also contributes to implementation of efficiency and effectiveness principles as the number of documents necessary to prepare for territorial planning decreased and the process of preparation of planning was reduced by more than 30%.

In the Report of activities of the year 2013 of the Government of the LT main implemented works related to increase of financial autonomy of the lowest level of local

self-government – subdistricts and local communities have been emphasised. 8 million Litas have been allocated to encourage self-government of local communities, so during 2013 in Lithuania communities were stimulated to participate in decision making regarding usage of funds to satisfy public needs of local community. In such manner it was tried to preserve specific role of communities' organisations and to ensure their sustainable development. It should be emphasised that while strengthening of communities' organisations 81 project of social activities of communities' organisations were financed, regional communities' forums and training events were organised that helped to improve abilities of social activities and entrepreneurship of heads of communities' organisations.

Continuing analysis of subdistricts' financial autonomy, in the report of the Government of the LT it has been noticed that the part (average) of municipal budget given to finance subdistricts is growing. Referring to the data of research of municipal activities, in 2012, 3% of the part of municipal budget were allocated to subdistricts, in 2013 – 3,23%. This shows that municipalities are concerned about strengthening subdistricts and increasing their financial autonomy.

In the sphere of quality and management of public sector services some reform actions started related to implementation of electronic services. Essential changes have been noticed in development of e-health System while preparing model of project activities: development of e-health services and communication infrastructure; development of e-services, E-prescription; creation of national information system of archiving and exchange of medical images and execution of electronic services based on that system.

In 2013 installation works of ESPBIS IS (Electronic Information System of Health Service and Cooperation Infrastructure) started and in 2015 after installation of ESPBI IS patients are able to get more efficient and better quality health services and data exchange among health care institutions is ensured.

In the sphere of services public management institutions using EU structural support in 2013 implemented projects which aim is to improve management of activities of these institutions and internal administration, to apply methods of quality management, to improve citizens' service and effectively apply one-stop-shop principle. 96 such projects were implemented (35 projects were finished; 40 new projects were started).

In the Report of activities of the Government of the LT relatively little information is provided about citizens' participation and involvement in decision making. It is worth mentioning new version of Description of Order of Land Numbers and Description of Order of Names of Streets, Buildings and other Constructions. One of the essential changes – municipalities must inform in advance people about changing addresses, besides, people will be informed about adopted decisions to change street names or house numbers. In such manner it is tried to ensure citizens' right to know and the right to participate while solving important local matters, to determine clear procedure of address allocation referring to arising problems. It has been noticed that in the process of revision of descriptions besides citizens' participation, implementation of openness principle is pursued that is based on informing people about adopted decisions as well as ensuring the right to know essential local matters.

#### **4 Discussion**

Initiatives of the Government of the LT have relations with provisions of political parties' programmes related to development of competences and abilities of civil servants.

In 2014 proposals were provided to the Seimas to strengthen body of senior heads, to implement competence-based management of human resources, to determine new conditions of payment and motivation. Having evaluated these changes, it is possible to make a conclusion that it is pursued to determine a simpler and less resources demanding legal regulation of civil service. At the same time, it is path to implement NPG towards responsibility and accountability of central and local levels of governance.

Data reveals that the governmental agenda of the sessions is different as the government reports. The sessions are more devoted to discuss municipal economic activities while the government reports cover the whole spectrum of municipal activities. However, issues of public service delivery and financial autonomy of local governments are relevant for both: the government sessions and reports since any amendments or changes in the legal acts related to public service delivery might have impact on municipal economy and finances.

Meanwhile, there are some empirical evidence identified regarding public participation. Trying to determine the changes of participation of local people in managing local affairs, monitoring of organisation and implementation of surveys of local people has been started. Primary results of monitoring provide a conclusion that municipalities do not often consult with the people regarding important local matters even when legal conditions are created. However, it is ordinary to consult with the community regarding territorial matters. This creates evidence that NPG is a more empirical phenomenon rather a well-defined and structured theoretical paradigm (Torfig et all 2014).

As it was found out that improvement of local self-government in political parties' programmes is concentrated around fields like strengthening of democracy and civil society; improvement of governance as well quality and governance of public sector services. In order to achieve improvements in all above mentioned fields cooperation between public, private sectors and local communities are essential. However, Torfig (et all 2014) emphasised that a cooperation might be hindered by standard operating procedures in bureaucratic bodies, profit making drivers in business and multi-identity of community members. Anyway, interest of political parties in issues of local governance reflects important tendency towards polycentric governance where local municipalities has been accepted as political actors not only service providers.

## **Conclusions**

1. The analysis of programmes' provisions of LP, LMRL, SDPL, HU-LCD, OJP revealed that improvement of local self-government in political parties' programmes is oriented towards 4 tendencies: 1) independence/autonomy of self-government; 2) strengthening of democracy and civil society; 3) improvement of governance; 4) quality and governance of public sector services.

2. The analysis of agendas of the meetings of the Government of the LT revealed that during the analysed period the issues of improvement of local self-government were analysed that correspond the principles of NPG, mainly oriented to assurance of efficiency, effectiveness and legitimacy of local self-government, strengthening of abilities of civil servants.

3. In general context of analysis of political parties' programmes and agendas of the meetings of the Government of the LT it has been determined that the Government tends to make decisions and present amendments of various programmes and laws corresponding the provisions of parties' programmes. However, there is a lack of practically

investigated issues defined in the programmes that are related to emphasising of principles of higher responsibility and inter-sectoral cooperation, essential changes in modification of election system and optimisation of the structure of apparatus of local government's institutions/governance. In addition, citizens' involvement and participation in decision making was highly emphasised in political parties' programmes, however, only several questions related to this sphere were found in the agendas of the meetings of the Government of the LT.

4. Conformity of reports of the Government of the LT with political parties' programmes let us state that the main tendencies of improvement of local self-government during the period 2012-2014 were oriented towards the increase of quality of public sector's services and financial independence of subdistricts. In addition, the following tendencies of local self-government emphasised in political parties' programmes are being implemented: strengthening of civil society, strengthening of civil servants' competencies, pursuit of openness, effectiveness and efficiency, expansion of municipalities' functions.

5. The analysis of reports of the Government of the LT let us state that there is a lack of attention when implementing the provisions of political parties' programmes related to implementation of principles of responsibility, accountability, transparency and cooperation in local self-government that are the main principles of improvement of local self-government in the context of theories of NPG.

6. There are some practical implications for practitioners like citizen's participation in the decision making process that might request resources and skills for e-communication. The segmented approach for consultations and communication with different groups of citizen's should be included in municipal marketing and communication activities. Thus, local governments might be encouraging to review their own public consultation and communication strategies and approaches.

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# DECOMPOSITION OF TECHNICAL EFFICIENCY OF SELECTED CITY LIBRARIES FROM THE CZECH REPUBLIC

Iveta Vrabková

**Abstract:** *The aim of this article is the determination of the gaps of efficiency of 33 city libraries using decomposition of technical efficiency to pure technical efficiency and scale efficiency. The first model estimates the technical efficiency of city libraries from the perspective of the traditional mix of inputs and outputs that are applied in the DEA models; the inputs are represented by the so-called production and technological resources, and the output is represented by the actual demand given by the number of customers. The second model estimates the technical efficiency of operating conditions of selected city libraries against the actual number of visitors, whilst it is based on the assumption that a city library shall have an appropriate space, optimal access in the form of operating time, and optimal number of places for studying. The results depend on the input or output orientation of models and on the expected returns to scale. As the key gaps of efficiency, the models marked – non-topical and large library collection, number of readers and visitors, and also unutilized spaces of city libraries.*

*The document can be downloaded at <http://hdl.handle.net/10195/67940>.*

**Keywords:** *City libraries, DEA models, Pure technical efficiency, Scale efficiency, Total technical efficiency.*

**JEL Classification:** *H10, C67.*

## Introduction

Public libraries are the most numerous cultural facilities in the Czech Republic providing public services. According to the National Information and Consulting Centre for Culture (NIPOS), there were, to the date of 31. 12. 2015, 5,354 public libraries in the Czech Republic, of which 5,338 were established by municipalities (it is the case of municipal and city libraries). Public libraries provide public services according to the Library Act (a. n. 257/2001 Coll.), concerning library and information services, but also cultural-educational services.

Public libraries established by municipalities depend on the limited resources of public budgets, and subsequently on the amount of interest of citizens in their services. Comparable experience is shown by professional foreign researches. Stenström and Haycock (2014) researched the factors that influence political decision making on funding of public libraries in Canada, and they point out the strong position of good-quality relationships of libraries with the local community. According to Michnik (2015), public libraries usually have low political priority; nevertheless, specific local approaches of politicians towards libraries in Sweden are mostly given by the political composition, library's plan, and by the number of population.

Thus, it is no surprise that efficiency belongs to the key issues of municipal libraries. Efficiency is from the biggest part influenced by the amount of demand, which is represented by visitors and readers of libraries, especially among citizens of a given

municipality, but also among people working or studying in the given municipality. On the other hand, the amount of demand is determined by the modernity and topicality of the supply, which means the library collection and the educational and cultural events.

Considering that it is difficult to express efficiency by financial inputs and outputs in case of public services, and that due to the absence of direct payments for provided services by customers, the technical efficiency can be used to express it. Technical efficiency belongs to the set of so-called input-output models of performance. Theoretical basis of the input-output model consists of works by Debreu (1951) and Farrell (1957). In the conception of the above-mentioned authors, the technical efficiency of a decision-making unit can be measured by the ratio of its inputs and outputs, nevertheless, always considering the differences in technology of production, production process, and in environment of assessed decision-making units (Lovell, 1993). Abdourahmane, Bravo-Ureta and Rivas (2001) determine the technical efficiency as an ability of an organization to produce the maximal amount of output with the given amount of inputs, and by the given technology.

The measurement of technical efficiency is a very urgent topic of many theoretical and research works during last fifty years. During this period, a group of various methods was developed for the measurement of efficiency. To main, and outstanding in popularity, methods, which are based on the estimation of production frontier while calculating the efficiency, belong – Stochastic Frontier Analysis and Data Envelopment Analysis (DEA), (Čechura, 2009). For the needs of the modelling of technical efficiency of city libraries, the non-parametric DEA model was chosen. It uses the tools of mathematical linear programming.

**The aim of this article is to determine the gaps of efficiency of city libraries using the decomposition of technical efficiency to pure technical efficiency and to scale efficiency.**

The decomposition of technical efficiency is estimated using the basic DEA models, by two models that are determined by specific input and output variables of selected 33 city libraries, corresponding to the number of population served in the range of 15-35 thousand of inhabitants.

The first model estimates the technical efficiency of city libraries from the perspective of the traditional mix of inputs and outputs that are applied in the DEA models; inputs are represented by the so-called production and technological resources, and the output is represented by the actual demand given by the number of customers. The second model estimates the technical efficiency of operating conditions of the selected city libraries towards the actual number of visitors, while it follows the Standard for a Good Library (2015), according to which a library shall have an appropriate space, optimal access in the form of operating time, and optimal number of places for studying.

Within the article, two research questions are being traced:

RQ1: Are basic production resources of city libraries, with regard to the amount of demand, being used in an efficient way?

RQ2: Are technical conditions of city libraries, with regard to the actual number of visitors, being used in an efficient way?

The basic DEA models and their modifications represent a relatively popular tool of estimating efficiency under conditions of libraries, especially of university and public libraries. Vitaliano (1998) modelled efficiency of 184 public libraries in New York; his

work is based on the assumption that the production of public libraries has an exogenous nature, i.e. it is determined by the demand of users on services of libraries (a library cannot decide on the number of loans, or a reading room on the number of visits). Sharma, Leunh and Zane (1999) modelled efficiency of 47 public libraries in Hawaii, and they added the so-called inputs that cannot be influenced by management to conventional variables. Hammond (2002) subjected 99 public libraries in the UK to a research, and he modelled the total and net technical efficiency using the basic DEA models. Miidla and Kikas (2009) modelled technical efficiency of 20 public libraries in Estonia (established by the state) using the DEA models. De Witte and Geyes (2011) published the results of evaluation of technical efficiency using the DEA models on the example of 290 Flemish public libraries. Stroobants and Bouckaert (2014) evaluated efficiency of 79 public libraries in Flanders using the DEA and FHD models. Li and Yang (2014) defined efficiency of public libraries in the USA according to aggregate indicators under conditions of 51 states of the USA also using the DEA model.

## 1 Technical efficiency: basic models

From the perspective of application, the DEA model is considered to be a universal assessing tool, which means that it can be used, on condition of homogeneity of decision-making units, in the production sector as well as in the sector of services of profit-making and non-profit-making nature. Homogenous decision-making units (DMUs) are created by such set of units that are occupied with the production of identical or equivalent effects, which are denoted as outputs of these units, Jablonský, Dlouhý (2015).

Cooper et al. (2007) and Toloo (2014) consider the CCR model (name by surnames of model's authors – Charnes, Cooper and Rhodes) as the basic DEA model, which assumes the constant returns to scale (CRS). And also, the BCC model (name by surnames of model's authors – Banker, Charnes and Cooper), which assumes variable returns to scale (VRS).

The calculation of efficiency according to the CCR model is performed using the Charnes-Cooper's transformation and converted from linear-fractional programming into a standard programming task. The CCR model assumes constant returns to scale (CRS). In case of the CCR model oriented on the inputs, the calculation is formulated as follows:

$$\begin{aligned}
 &\text{maximize} && z = \sum_i^r u_i y_{iq}, && (1) \\
 &\text{on conditions} && \sum_i^r u_i y_{ik} \leq \sum_j^m v_j x_{jk}, && k = 1, 2, \dots, n, \\
 &&& \sum_i^r u_i y_{iq} = 1, \\
 &u_i \geq \varepsilon && i = 1, 2, \dots, r, \\
 &&& v_j \geq \varepsilon, && j = 1, 2, \dots, m.
 \end{aligned}$$

If the  $z$  value equals one, the  $U_q$  unit is efficient. For inefficient units, it applies that their degree of efficiency is lower than one, i.e.  $z < 1$  (Coelli et al., 2005).

The CCR model oriented on the outputs (2) follows the same assumptions as the above-mentioned model (1). Again, in this model, the coefficient of efficiency is determined by the ratio of weighted sum of inputs and weighted sum of outputs; however, such weights are being looked for, so that the  $g$  coefficient's value is higher or equal to one. So, for an efficient unit  $U_q$ , it applies that the coefficient  $g = 1$ , and for an inefficient unit that  $g > 1$ .

The primary CCR model oriented on the outputs is formulated this way:

$$\begin{aligned}
 &\text{minimize} && g = \sum_j^m v_j x_{jq}, && (2) \\
 &\text{on conditions} && \sum_i^r u_i y_{ik} \leq \sum_j^m v_j x_{jk}, && k = 1, 2, \dots, n, \\
 &&& \sum_i^r u_i y_{iq} = 1, \\
 &u_i \geq \varepsilon && i = 1, 2, \dots, r, \\
 &&& v_j \geq \varepsilon, && j = 1, 2, \dots, m.
 \end{aligned}$$

The calculation of efficiency according to the BCC model has one additional variable in its objective function (in comparison with the CCR), which corresponds with the restricting condition – condition of convexity, and which will not be restricted by conditions of non-negativity. The BCC model assumes variable returns to scale (VRS).

The on the inputs oriented BCC model's calculation has the following form (3):

$$\begin{aligned}
 &\text{maximize} && z = \sum_i^r u_i y_{iq} + \mu, && (3) \\
 &\text{on conditions} && \sum_i^r u_i y_{ik} + \mu \leq \sum_j^m v_j x_{jk}, && k = 1, 2, \dots, n \\
 &&& \sum_j^m v_j x_{jq} = 1, \\
 &u_i \geq \varepsilon, && k = 1, 2, \dots, r \\
 &v_j \geq \varepsilon, && k = 1, 2, \dots, m, \\
 &\mu - \text{free}.
 \end{aligned}$$

The on the outputs oriented BCC model's calculation has the following form (4):

$$\begin{aligned}
 &\text{minimize} && g = \sum_i^m v_j x_{jq} + v, && (4) \\
 &\text{on conditions} && \sum_i^r u_i y_{ik} \leq \sum_j^m v_j x_{jk} + v, && k = 1, 2, \dots, n, \\
 &&& \sum_i^r u_i x_{iq} = 1, \\
 &u_i \geq \varepsilon, && i = 1, 2, \dots, r, \\
 &v - \text{free}.
 \end{aligned}$$

The degree of technical efficiency, which is calculated according to the CCR and BCC models, is a basis for the calculation of the so-called scale efficiency (SE) according to the formula (5). Cooper et al. (2007) define the scale efficiency as the ratio of the degree of efficiency of a decision-making unit gained by the CCR  $\theta_{CCR}^*$  and the BCC  $\theta_{BCC}^*$  model, where the degree of the decision-making unit's SE is lower or equal to one. The formula (5) stated below, considers the orientation on the inputs, whilst the same indicator and procedure can be applied in case of the orientation on the outputs.

$$SE = \frac{\theta_{CCR}^*}{\theta_{BCC}^*} \quad (5)$$

The decomposition of the technical efficiency (6) allows to express the so-called pure technical efficiency (PTE) and the scale efficiency (SE).

$$CCR \theta_{CCR}^* = \theta_{BCC}^* \times SE, \quad (6)$$

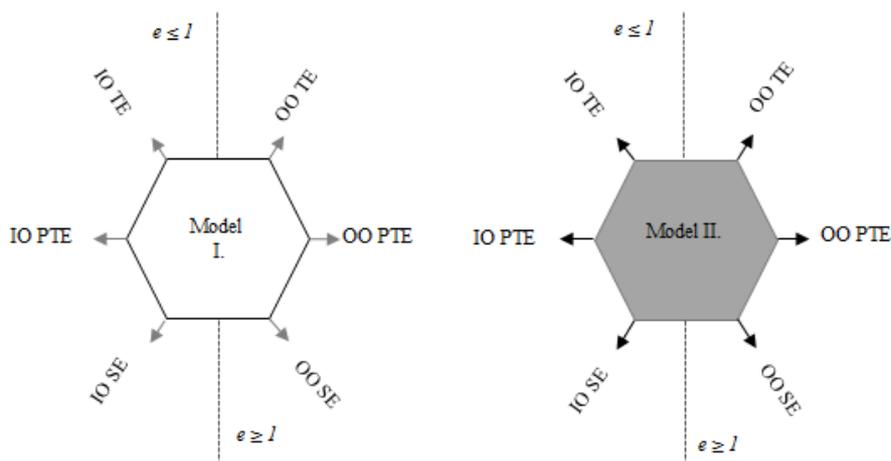
The above-stated facts show that the degree of efficiency calculated by the CCR model is being noted as the total technical efficiency (TE), and the degree of efficiency calculated by the BCC model as the pure technical efficiency (PTE). This specific decomposition explains the sources of inefficiency, thus whether the cause of inefficiency lies in the operation (pure technical efficiency), or in unfavourable conditions (scale efficiency), or in both.

## 2 Construction of models of technical efficiency of city libraries

The object of the modelling of the technical efficiency, and of its decomposition according to the formulation (6), consists of 33 public libraries from the Czech Republic that correspond to the number of population served in the range of 15-35 thousand of inhabitants. Thus, it is the case of the city libraries. For the needs of the modelling of the efficiency of city libraries, and that according to the basic CCR and BCC of the DEA models, six input variables ( $x_1 - x_6$ ) and two output variables ( $y_1$  and  $y_2$ ) were selected; their combinations create two models: Model I. ( $x_1, x_2, x_3; y_1, y_2$ ) and Model II. ( $x_4, x_5, x_6; y_1$ ). Both models take the input orientation (IO) as well as the output orientation (OO) into account. The schemes of both models are shown in the Fig. 1. In the input-oriented models, an assessed unit (city library) is efficient when  $e = 1$ , and it is inefficient when  $e < 1$ . In the output-oriented models, an assessed unit (city library) is efficient when  $e = 1$ , and it is inefficient when  $e > 1$ .

The further characteristics of variables (inputs and outputs) are as follows:  $x_1$  the number of library units (books, pieces of periodical literature, documents): represents the range of library's collection;  $x_2$  the number of employees: expresses the re-calculated number of professional employees of a library to eight-hour employment;  $x_3$  educational and cultural events for the public: represents the number of activities organized by a city library for the public during a year;  $x_4$  area for users in  $m^2$ : includes the total usable area of a library intended for visitors (in the main building and in subsidiaries), for example the free choice, study halls, reading rooms including summer reading rooms, lecture (theatre) halls, and so on;  $x_5$  the number of places for studying: represents places for studying for adults, children and for youths, where users can work with library documents and information sources, and that individually or in a group;  $x_6$  the number of hours for the public weekly: represents weekly operating hours of city libraries;  $y_1$  the visitors (persons): indicates the number of physical visits, thus registered and unregistered users of library's services per year;  $y_2$  the number of loans in total: represents the number of loans of library units per year.

**Fig. 1: Schemes of Model I. and Model II.**



Source: Own processing.

The data for modelling of the technical efficiency were provided from the internal (non-public) database of the Benchmarking of Libraries Project, and that with the agreement of the engaged libraries. Therefore, the selected city libraries are not unequivocally identified; for the needs of the research, they were marked as k1 – k33. The modelling of the efficiency was performed based on the data for the year of 2015, according to the methodology stated below, in the DEA Frontier Add-In for Microsoft Excel program.

### 3 Results

The results of Model I. and Model II. are described according to the decomposition to the technical efficiency (TE), pure technical efficiency (PTE), and the scale efficiency (SE). Both models follow the input orientation (IO) and the output orientation (OO), and that according to the schemes in the Fig. 1.

#### 3.1 Results: Model I.

The results of Model I. give the answer to the first research question: RQ1 “Are basic production resources of city libraries, with regard to the amount of demand, being used in an efficient way?”

Model I. estimates the efficient production frontier of three inputs and two outputs. The case of inputs is represented by the traditional mix of inputs used in models of technical efficiency; those are: the capacity (capital) – the number of library units; human resources – the number of employees; supply of services – in the form of educational and cultural events. Outputs are represented by the demand, that is the utilization of services of city libraries by their users, and that in the form of the number of loans carried out per year, and the number of visitors of city libraries per year.

The results show that in the models assuming constant returns to scale (TE), the results of efficiency of city libraries are worse than in the models assuming variable returns to scale (PTE), and that both by input- and output-oriented models. In the TE models, 24% of city libraries are efficient (respectively 76% are inefficient), in case of the PTE models, 39% of city libraries are efficient (i.e. 61% are inefficient). By the scale efficiency model (SE), the results are comparable to those in the TE model. Thus, the presented results show that the basic production resources of city libraries, with regard to the amount of demand, are being used in a rather inefficient way.

**Tab. 1: Summary results of Model I.**

k = 33	Input-oriented models			Output-oriented models		
	TE	PTE	SE	TE	PTE	SE
	<i>a</i>	<i>b</i>	<i>a/b</i>	<i>c</i>	<i>d</i>	<i>c/d</i>
average	0.831	0.906	0.919	1.246	1.143	1.096
number of efficient	8	13	8	8	13	8
standard deviation	0.141	0.129	0.098	0.264	0.236	0.139

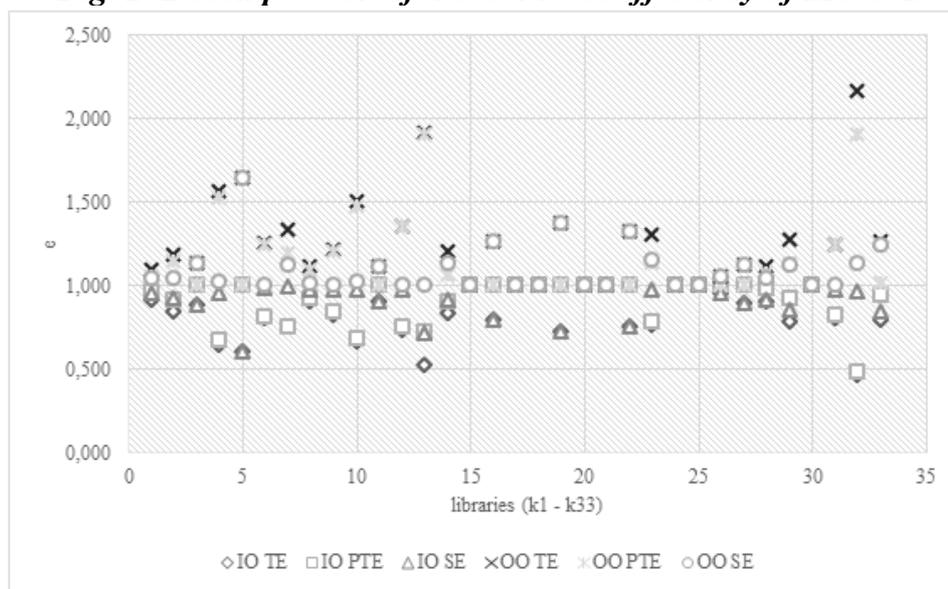
*Source: Own calculations.*

City libraries that are inefficient in the input-oriented models, should reduce their inputs – so in the case of Model I., it is about reducing the number of library units in the library collection, the number of employees, and also the number of cultural and educational events, because they are not being sufficiently used (productive), regarding the number of visitors of city libraries and the number of loans carried out. City libraries that are inefficient in the output-oriented models, should increase the number of registered readers

and the number of loans carried out, if they want to keep the original values of inputs. The solution lies in the changes on both sides simultaneously, and that by the adequate reduction of inputs and increase of outputs.

The decomposition of the technical efficiency of Model I. is shown in the Fig. 2. This specific decomposition explains the sources of inefficiency, that is whether the operation is the cause (pure technical efficiency), or whether it is about unfavourable conditions (scale efficiency), or both. By the input-oriented model, the source of inefficiency consists of operating resources as well as of operating conditions.

**Fig. 2: Decomposition of the technical efficiency of Model I.**



*Source: Own processing.*

The reduction of the number of employees of city libraries has to be approached wisely, and it has to be based on the deeper analysis. Library staff, especially those professionally qualified (librarians), are the key asset, but also the limiting factor of public library and information services. The National Library of the Czech Republic has been monitoring changes in staff in libraries in the Czech Republic in a long term, especially from the perspective of qualification, age, and salary of librarians. The last published research is from the year of 2011, and for example, it follows that the number of employees in libraries has the decreasing trend, although the requirements for quality and quantity of demanded and provided services of libraries rise.

### 3.2 Results: Model II.

The results of Model II. give the answer to the second research question: RQ2 “Are technical conditions of city libraries, with regard to the actual number of visitors, being used in an efficient way?”

Model II. estimates the efficient production frontier of three inputs and one output. Selected inputs follow the operating background (technical conditions) of city libraries – the area for users, the number of hours for the public, and the number of places for studying. These inputs were set also considering their presence within the Standard for a Good Library (2015).

There is only one output, and that the number of visitors using traditional services of a city library (loans and information) as well as other services, such as cultural and educational events, and others. Tab. 2 presents summary results. Again, they show that

in the models assuming constant returns to scale (TE), the results of efficiency of city libraries are worse (only 15% of efficient units) than in the models assuming variable returns to scale (PTE), and that both in the input- and output-oriented models (24% of efficient units). Scale efficiency (SE) in case of the input-oriented model is approaching results of the TE, and in case of the output-oriented model it is approaching results of the PTE. Thus, the presented results show that technical conditions of city libraries, with regard to the actual number of visitors, are being used in an inefficient way.

**Tab. 2: Summary results of Model II.**

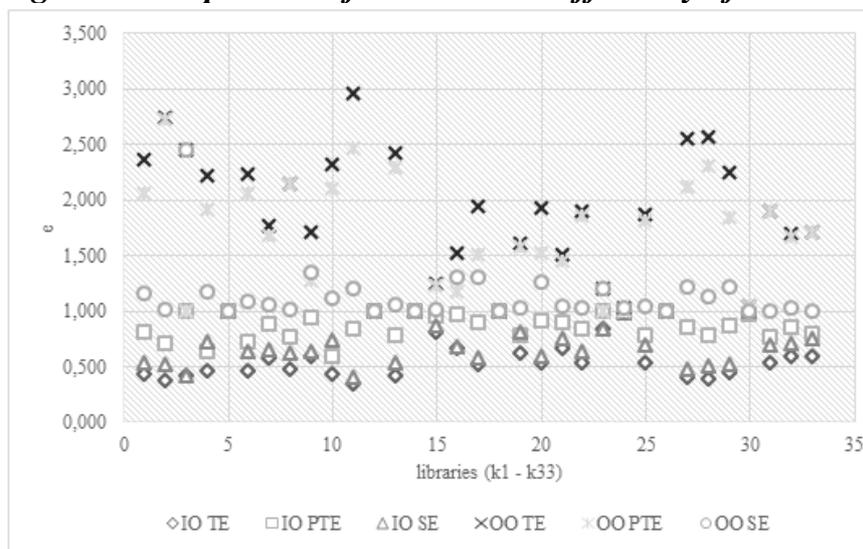
k = 33	Input-oriented models			Output-oriented models		
	TE	PTE	SE	TE	PTE	SE
	a	b	a/b	c	d	c/d
average	0.621	0.863	0.708	1.807	1.614	1.132
number of efficient	5	8	5	5	8	8
standard deviation	0.222	0.113	0.184	0.570	0.496	0.255

Source: Own calculations.

Inefficient units in the input models do not use the area of city libraries, the number of hours for the public, and the number of places for studying, regarding the reached number of visitors, in a sufficiently efficient way. Nevertheless, reduction of the area intended for visitors cannot be easily influenced by the management of public libraries. More possibilities for the management are represented by the changes of operating time (number of hours for the public), and the number of places for studying, but it does not mean to restrict the operation and services of a library. The increase of efficiency in Model II. can be implemented by the increase of attendance, i.e. the output – as it is shown by the output-oriented model.

The decomposition of the technical efficiency is shown in the Figure 3, where a significant variance of efficiency results is obvious in case of the output-oriented models in comparison with the input-oriented models. Based on this, it can be concluded that the operating background of city libraries is being used by visitors with various intensity, whilst city libraries that have smaller operating area and lower number of places for studying, are able to provide services for a comparable and higher number of visitors than city libraries with larger operating backgrounds.

**Fig. 3: Decomposition of the technical efficiency of Model II.**



Source: Own processing.

## 4 Discussion

Estimating the technical efficiency according to the basic DEA models and its subsequent decomposition show that basic production resources of city libraries – library collection, employees, and educational and cultural events, regarding the amount of demand – loans and visitors, are being used inefficiently by the majority of city libraries. The results of Model I. show that the library collection fulfils the current needs of readers and visitors of city libraries insufficiently. Notwithstanding that making library documents accessible by a public library, from the perspective of law as well as the visitors of library services, can be considered as the key service, especially by public libraries. The stated facts are also supported by the research of library services of public libraries, which revealed that readers consider the loan service to be the most important service of every library, Stejskal et al. (2013). The example of city libraries from the Czech Republic also confirms the theses of authors Stroobants and Bouckaert (2014), who state that library collection is the main and the key source and tool of provision of library services. The range, content, diversity, topicality and accessibility of the library collection predetermines the supply of services, as well as it limits the demand of services of libraries. In general, it can be stated that the gained knowledge is in unity with the knowledge of Richter (2015), who states that public libraries in the Czech Republic, in comparison with libraries in Germany, have large but non-topical library collections at their disposal, and they experience lower attendance. German public libraries renew their library collections usually three times faster than libraries in the Czech Republic.

Also, the operating background – the area for users, the number of hours for the public, and the number of places for studying of city libraries, regarding the actual number of visitors, are not being used efficiently by most libraries. Nevertheless, the Standard for a Good Library (2015), intended also for city libraries, states that (a) “A library shall have an adequate space, so that it can provide services to the full extent, in compliance with its strategic plan, and local, regional or national standards or directives. A library shall have space for services for the adults, children (including infants and toddlers) and youths, and also for using by the whole families.”; (b) “The optimal approach to library services requires that a library is open in the time that is maximally suitable for those living, working, and studying in the place of its operation. This approach should be spread to maintaining telephone connection 24 hours a day, or to assure the access to web pages of selected services.”; (c) “A library offers places for studying for the adults, children and youths, where users can work with library documents and information sources, and that individually or in a group. Where it is possible, regarding local conditions, it is appropriate to create reading rooms, studying rooms, and places for a focused studying.”

In case of the results of Model II., it can be taken into consideration that the results of the technical efficiency are also influenced by the fact that classic services of public libraries (loans and provision of information) are being moved into online space; paper form of documents is being replaced by the electronic one. This phenomenon is exhibiting also by the lower interest of visitors in using places for studying that are equipped with PCs with the Internet connection. Regarding this, the gained knowledge is in compliance with an international comparison of authors Quick et al. (2013), which confirms that even though the Czech Republic has an above-standard, dense network of municipal libraries, their attendance is lower than the average attendance of municipal libraries in the whole Europe. According to authors Dickinson and Smit (2016), accessibility of library collection is in these days still more an issue of online conditions, and that considering the fact that

online and offline worlds are becoming still more and more interconnected. Memory institutions – libraries are an important source of information, nevertheless they are rarely an initial point for searching for information, as it is shown by the research under conditions of Canadian public libraries.

Based on the results gained from both models, it can be stated that selected city libraries react, within the studied inputs, on the requirements of their customers (readers, visitors) in an inflexible manner and with a delay. Although this research was not tracking qualitative parameters of selected input and output variables, it can be deduced that the causes of inefficiency of a city library consists of not topical library collection, unmodern equipment of public libraries, inappropriately focused educational and cultural events, and inflexible opening hours of libraries. The recommendation for the management of libraries is at least to seek also for the support and interest of the public and communities in the city, beside active communication and cooperation with their establishers. The management of city libraries should apply and develop at least two sources of information as well. The first source should be permanently focused on the needs, wishes and opinions of customers of a city library (readers and visitors). The second approach should be focused on maintaining active partnership with other public libraries in the form of benchmarking. Information gained from both these sources and its correct analysis is the best foundation not only for strategic planning of development of a city library, but also for the needs of communication and negotiation on financial and material support from the involved parties, including the establisher.

## **Conclusion**

This article presents the results of the research that was focused on the determination of efficiency gaps of city libraries using the decomposition of the technical efficiency. The results show that among the key efficiency gaps, affecting achieving efficiency on the example of 33 city libraries, there are too large and non-topical library collection, large and by visitors not sufficiently used spaces, and the studying background of city libraries.

The evaluation of efficiency of 33 city libraries, according to the basic DEA models, clearly shows that the explanatory power of the results depends on the right and justified choice of the input and the output variables. Focusing on a specific variable (e.g. the library collection or the area of a library) changes not only the point of view, but also the results of the efficiency of city libraries. Specific selection of the input variables has to be supported by arguments in relation to the outputs, and vice versa. Selected input and output variables are the limiting factors of the evaluation of efficiency at the same time, and that has to be taken into account in the description and assessment of the results.

The article brings new perspectives for the evaluation of technical efficiency of city libraries, whilst it uses real, non-public data of selected city libraries. Regarding this, the results are valuable not only for academic readers, but above all for the management of municipal libraries, and also for political bodies at the level of municipalities.

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# BARRIERS AND POTENTIAL CHALLENGES IN THE DEVELOPMENT OF SOCIAL BUSINESSES IN THE CZECH REPUBLIC

**Mirka Wildmannová**

***Abstract:** Social entrepreneurship is characterised by a high degree of innovation and creativity. The topic of social entrepreneurship is currently often discussed and it is one of the trends of contemporary social economy in the CR. The Czech Republic is one of the countries that start discovering the benefits of social business, especially at the regional level. Experience from abroad clearly identifies the positive impacts of social entrepreneurship on the national economy. Social enterprises are one of the major stakeholders in the labour market employing socially disadvantaged people. This paper aims to identify the main barriers to the activities of social enterprises. To identify those barriers, use was made of a questionnaire survey in social businesses. Based on the results of the survey it was identified that the current main barriers include the non-existence of the social entrepreneurship act, insufficient definition of criteria for social enterprises and inadequate inter-departmental coordination. Potential future challenges appear to be legislative and systematic state financial support and preparation of the environment for social activities within the framework of regional cooperation including the establishment of social incubators.*

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***Keywords:** Social economy, Social policy, Public administration, Social enterprise, Social cooperatives.*

***JEL Classification:** L31, M14.*

## **Introduction**

Structural unemployment, social exclusion, wage differentiation and other issues related to social policy and the urgency to establish a more active integration policy - these are problems that the society is forced to react to and find a solution in expert discussions. One of the alternatives to deal with the social problems of unemployment is social economy and social entrepreneurship. It is an alternative and a complementary option to handling social issues - social exclusion, exclusion from the society, economic problems - unemployment, low purchasing power of some groups of inhabitants, environmental problems - sustainable and regionally balanced development. The concept of social entrepreneurship is supported by the in a number of countries. The Czech social entrepreneurship act is now commented on. Above all, it is about the recognition by the society itself in the form of support, regulation and legislation on the part of public authorities.

This paper aims to identify the main barriers to the activities of social enterprises. The paper examines mutual relations and the role of social entrepreneurship in the segment of social economy and public policy. To obtain answers, use was made of a standardised questionnaire in social enterprises.

## **1 Statement of a problem**

The Czech Republic is one of the countries that are discovering the potential benefits of social enterprises. As mentioned above, the social entrepreneurship act is now in the comment process. Non-profit sector has not been transformed to other legal entities yet. The experience with a well developed social economy sector from abroad (Italy, Sweden, France, Finland etc.) clearly identifies positive impacts of social entrepreneurship on national economies, public economy and the society as such.

### **1.1 Theoretical definition of the subject matter**

Defourny, Pestoff (2008) suggest that the importance of the third sector and its differentiation from the private and public sectors has been highly topical recently. Its economic importance is associated primarily with productivity and employment and growth can also be observed in the services sector. The importance of the third sector in the countries of Central and Eastern Europe is underrated. In contrast, in developed countries, such as France, Belgium and Ireland, the social economy contributes to 10% of employment.

In their publication “Social Enterprise and the Third Sector” Defourny, Hulgard, Pestoff (2014) show that social economy and social entrepreneurship do not bring innovation associated with ownership of companies. Social economy emphasises responsibility of the social enterprise owners related to changes in the society by introducing innovation in the field of new products and their quality, new methods of organisation and production, new production factors and relationships in the market and new forms of enterprises and entrepreneurship.

The values and starting points for social economy and social entrepreneurship are inspired by the ideas of solidarity and humanism advocated by Owen and King, Leon Walras and John Stuart Mill (Defourny, Develter, Fonteneau, 1999). Dohnalová, Deverová, Šloufová (2012) among contemporary economists include, for example, Jacques Defourny, Jean-Louis Laville and others who combine the ideas of social, solidarity, ethical or humane economy and thus emphasise the importance of local social enterprises and social entrepreneurship..

### **1.2 Social entrepreneurship**

The definitions of social enterprise and social entrepreneurship are not uniform. According to Hunčová (2007), the concept of social enterprise is built upon on partnerships between the public and private sectors in providing public services and promoting public employment policy.

Danish Technological Institute (2002), which is actively involved in social innovation, defines social business as "a business with primarily social objectives where economic profit is primarily reinvested in the business for the same purpose or in the development of the local community and therefore is not intended to maximise profits for owners and shareholders”.

Kurková, Franková (2012) draw attention to the fact that the social enterprise is a business that wants to do things in a different way, with other motivation values. Social enterprise is not automatically every employer identified as such. Neither is it every socially responsible company as it is often established for profit, nor socio-therapeutic workplaces which primarily focus on services for their clients.

The Chamber of Social Enterprises (2016) states, that social enterprises try to meet the local needs using local sources, they enter into local partnership initiatives and contribute to local development.

The stability of social enterprises is considered in two dimensions, namely, whether the business is able to survive in the long term and whether it can maintain the intended balance between social contribution and success in the market over time. The survival and growth are key motivators for each organisation. The focus and nature of social enterprises is continuously affected by the financial possibilities and environmental pressure. Gidron, Yekeskel (2012) emphasize that social enterprises are organisations which are driven by social tasks and apply marketing strategies in order to achieve social or environmental purposes.

The social enterprises are on the one hand required to achieve business success and on the other hand they are supposed to meet the determined social objectives with democratic involvement while it is necessary to maintain their stability over time and respect boundaries where the business is social and at the same time capable of surviving in the market.

Furthermore, Gidron, Yekeskel (2012) highlight that the incorporation of a social enterprise is conditioned by funds. Funds to support social entrepreneurship may be various and require a specific level of skills of the social entrepreneur, mainly organisational, administrative and methodical SKILLS. Social enterprises are usually funded commercially, through philanthropy and by government, these three resources are called "tri-value organisations".

The funds can be raised by approaching sponsors, private donors, trustees of public funds or it is possible to develop their own complementary activities. Social enterprise activities can be funded through one own as well extraneous finance. Own resources include investments made by partners, members and shareholders (Dolejšová, 2008). The entrepreneurs may also start up the business through deposits forming the legal capital. Own resources also include generated profits, with the priority being to invest most of that profit back to develop the business because this meets one of the principles of social enterprise (at least 51% of profits must be reinvested in further development of the company).

Social enterprises which are limited companies, joint-stock companies or cooperatives are legally required to create a statutory reserve fund, other businesses may voluntarily established funds designated for specific purposes. Other financing options for social enterprises are external funding sources, which include bank and commercial loans, financial and operating leasing, grants, franchising and venture capital. However, such resources result in higher debt rate which is not desirable for social entrepreneurship, as indicated by Kalouda (2011). In 2014, the Business Corporations Act came into force, which defines social cooperatives. The act on the activities of social cooperatives, however, contains very strict limitations and it is therefore not a suitable form for entrepreneurship. Social enterprises choose their legal form of business for their activities according to their personal preferences and available resources.

### **1.3 Legal environment**

In the individual EU countries there is no uniform model of European social economy law. Social economy is legally recognised in selected EU countries (Chorum, 2014).

**Tab. 1: Overview of countries with social economy and social entrepreneurship legislation**

Country	Legislation adopted in	Name of law
<b>Finland</b>	2003	Act on social entrepreneurship
<b>Lithuania</b>	2004	Act on social entrepreneurship
<b>Slovakia</b>	2004	Definition of social enterprises under Act No. 5/2004 Sb, on services in employment
<b>Italy</b>	2005	Act on social entrepreneurship
<b>Poland</b>	2006	Act on social cooperatives
<b>Belgium</b>	2008	Regional decree on social economy
<b>Spain</b>	2011	Act on social economy
<b>Greece</b>	2011	Act on social economy and social enterprises
<b>Slovenia</b>	2011	Act on social entrepreneurship
<b>Portugal</b>	2013	Act on social economy
<b>France</b>	2014	Act on social and solidary economy

*Source: (Monzon, Chaves, 2008)*

Social enterprises are subject to regulations introduced by a number of laws; however, none of them defines the term social entrepreneurship. Trčka (2014) states that social enterprises are mainly focused on creating jobs for disadvantaged people. Once the Czech Republic was established, the law took over regulation concerning non-profit sector entities (civic associations, foundations, churches) and the conditions for doing business and manage assets underwent only partial changes. It can be stated that the law of the Czech Republic does not prevent from social enterprises but does not promote them either. People, Planet, Profit (2016) point out that there are no rules set for social entrepreneurship such as the rules of profit.

## **2 Methods**

This paper aims at identifying the main barriers to the activities of social enterprises. The paper investigates mutual relations and the role of social entrepreneurship in the segment of social economy and public policy.

The paper answers mainly the following questions:

- What role it played by public administration in social entrepreneurship?
- What are the main barriers to the social business operations?
- What are the possible challenges in the future to the development of social entrepreneurship?

To identify the main barriers to the activities of social enterprises a questionnaire survey was used. The form was distributed to 100 social enterprises, the selection was random and use was made of the Directory of social enterprises on the České sociální podnikání.cz website registering 230 social enterprises (as of 31st August 2016). Registration in the Directory of social enterprises is voluntary and therefore the exact number of social enterprises in the Czech Republic currently operating can not be determined.

The questionnaire survey was carried out in spring 2016, response rate was 30%. The online questionnaire contained 10 questions, of which some questions were open. The questions concerned mainly the legal form of the enterprise, reasons for selecting the legal form, strengths of social entrepreneurship, problems with entrepreneurship, funds used for business operations (various loans, operating subsidies, grants, donations etc.), opinions on the legislation, employment of disadvantaged groups and support by public administration and the state.

Based on the questionnaire survey evaluation we will be able to identify the main barriers that impede the effective functioning of social enterprises in the Czech Republic and to formulate possible future challenges to the promotion and development of social entrepreneurship.

We are aware that the research sample is not too large (we draw on the answers from about 13% of all registered enterprises in the database). Therefore, in the subsequent discussion, we base also on other research surveys, which were conducted in the years 2015 - 2016, so that we can generate results from these additional data that reflect the current state of social enterprises in order to formulate recommendations.

### **3 Problem solving**

For the purposes of this survey, use was made of a standardised questionnaire, which was developed by the author. Questions asked in the questionnaire survey were answered by the businesses anonymously.

As regards the interviewed entities, the prevailing legal form was commercial company (48%). The respondents indicated that they wish to be a "normal" business which means that they prefer the legal form of commercial companies. The second most important legal form was represented by cooperatives and social cooperatives. Then there were institutes, self-employed and civil associations. Those responded to the question focused on the choice of legal form mostly as follows: the closest to the idea of social entrepreneurship, simple establishment, public trust, business experience with this legal form, the possibility to apply for grants and the possibility to take care of people with disabilities.

As regards employment, they clearly indicated that they employ disadvantaged groups (this was the response provided by over 70% of respondents), mainly people with disabilities and the long-term unemployed. To the most cited disability type belonged the physical and mental handicap, followed by visual and hearing impairments. The respondents identified the social dimension of their business, employment of marginalized groups and publicly beneficial goal as a strength.

In their businesses, the respondents were mainly engaged in the following activities: horticultural services (24%), sales (18%), followed by activities in the field of hospitality industry, accommodation, farming and food production.

As regards financing, the answers were identical: most of the social enterprises receive contributions for their employees (45%), which explains the answer to the question about the strong aspect of social entrepreneurship - employment of disadvantaged people. Other major funds are in the form of their own resources. The respondents often mentioned the discrepancy between operating and investment subsidies. As the main source of funding they reported EU funds (54%) and grants from other entities (24%) – the social entrepreneurship is mostly supported by regions, followed by municipalities, whereas the

last place belongs to the State (only 3% of respondents were subsidized by the State). The subsidies to organizations and contributions to employees may accumulate.

As regards the profit over the past year of doing business a total of 70% of all respondents answered positively. This indicates that social entrepreneurship develops in a positive direction and it proves viability of this kind of business.

Another question concerned the non-existent law on social entrepreneurship. 58% of respondents said that it is necessary to adopt a law on social entrepreneurship, the others could not comment.

The respondents most often apply the Employment Act, tax law, hygiene regulations, Trade Licensing Act, Civil Code, Business Corporations Act and standards concerning the physically handicapped.

The question of what change or support from the government the respondents would appreciate was answered as follows:

- clear definition of social entrepreneurship,
- better financial support, tax incentives,
- changes in public procurement,
- public awareness raising and promotion of social entrepreneurship.

According to the questionnaire survey the social enterprises would like to have adopted a clear and precise definition of social entrepreneurship and a better financial support from the State. The reason for the better financial support was provided by one of the respondents: "*also the volunteering costs something.*" Two respondents would welcome a discrete advisory assistance for aspiring social entrepreneurs in the form of a helpdesk, where they could send their questions regarding the legislative, taxation or financial support.

#### **4 Discussion**

What role is played by public administration in social entrepreneurship?

As part of the theoretical definition of social entrepreneurship the following definition was adopted by Hunčová (2007) "the concept of social enterprise is built upon the partnership between the public and private sectors in providing public services and promoting public employment policies" [10]. This indicates that the process of social entrepreneurship must be implemented in partnerships between social business and public administration. This was confirmed in the questionnaire survey where the most employed group was disabled people. This is also confirmed by another survey conducted at the Faculty of Economics and Administration in spring 2014 where the respondents were beneficiaries - social enterprises within Call 30 "Social Economy". The respondents here most frequently employed people with disabilities. The businesses receive contributions for these people from the labour offices. There is a clear line of cooperation with labour offices and search for suitable job seekers. The most commonly employed group of people with disabilities is people with physical disabilities.

Another role of social entrepreneurship is the social dimension. It's not only about employing the excluded people in the labour market, but mainly about redistribution of profits back into the organisation. Here the social enterprises may redistribute their profits into investment processes or into staff training.

A concrete example of cooperation between social enterprises and public administration is the development strategy of the South Moravian Region. The short implementation plan titled "Human Resources Development Strategy of the South Moravian Region 2016 - 2017" (2016) states that incubators for social enterprises will be established with this activity managed by the Chamber of Social Enterprises (association of legal entities) and the co-operating entities being the South Moravian Region and municipalities. Further cooperation is envisaged with the South Moravian Innovation Centre, which is a Europe-wide recognised authority in the field of innovation and incubation processes in the Czech Republic and the Brno university.

The main stakeholders affecting social enterprises are public administration, the European Union and the non-profit sector. The most engaged entity is the public administration. The problem is on the part of the state as social economy is not defined and what is also missing is allocation to a respective government department. Currently, the social economy and social entrepreneurship falls under the Ministry of Labour and Social Affairs - social benefits, under the Ministry of Industry and Trade-economic benefits and the Ministry for Regional Development - local benefits. Bednářiková, Francová (2011) observe that this issue is also handled by the Government Council for Non-Governmental Non-Profit Organisations and the Agency for Social Inclusion. As stated by Wildmannová (2016), in terms of the concept of setting up the social entrepreneurship, the main role must be played by the state and public administration, which will define legal criteria for social enterprises. All this must respect the socio-economic trends resulting from the development in Europe. Consequently, the public sector will establish the environment for social activities within the context of regional and local policies - for the establishment, support and development of social entrepreneurship.

McNeill (2013) points out other important stakeholders who can contribute to the development of social entrepreneurship include educational system, especially secondary schools and universities. The future graduates must be prepared for this possibility of this type of innovative business. Currently, social entrepreneurship is taught at a large number of universities and interest in this topic in the academic environment is on the rise. Given that social entrepreneurship is more specific than traditional business, it is necessary to adapt the curricula accordingly. The weakness of the Czech educational system is interdisciplinary collaboration, inadequate legislation, complexity and the slow accreditation of new subjects.

Another outstanding issue related to social entrepreneurship is the very absence of a social entrepreneurship act. Most of the respondents in our survey confirmed the need for statutory regulation of social entrepreneurship associated with better systematic financial support, tax reliefs, etc. The same results were obtained from the questionnaire survey conducted by P3 in 2015 (Questionnaire survey evaluation, 2016): 80% of respondents expressed a positive attitude to the adoption of the social entrepreneurship act.

Currently, the act is being drafted in the Czech Republic. Along with the preparation of the social entrepreneurship act, the development strategy of social entrepreneurship in the Czech Republic is being drawn up by the Ministry of Industry and Trade. The future social entrepreneurship act applies especially to SMEs. This was also confirmed by the survey where the respondents were mainly small businesses. The social entrepreneurship act has also impacts both on public budgets and business environment. The social entrepreneurship act should not create a new legal form, it only sets the characterisation to be met by the

natural or legal business entities that wish to enjoy the status of a social enterprise, or the integration social enterprise, and benefits arising from such a status.

Ministry for human rights and equal opportunities legislation (2016) states that the development of the legal environment for social entrepreneurship will contribute to the development of social economy. The legal regulation of social enterprises and the subsequent definition of specific benefits for these businesses will encourage the initiative of individuals and communities related to the establishment of social enterprises in order to actively address problems in their municipalities and regions. The development of social enterprises will also contribute to the employment of disadvantaged people in the labour market and will address problems associated with poverty and social exclusion. Last but not least, the clear legislative basis for the characterisation of social enterprises can also facilitate decision-making of financial institutions whether these enterprises should receive financial support, e.g. loans and credits under certain favourable conditions. Financial institutions tend to be immature in this respect and start-up social businesses without any track record and guarantees are risky clients for the banks.

## **Conclusion**

The paper focused on identifying the main barriers to the activities of social enterprises. These barriers were identified on the basis of a questionnaire survey in a group of social enterprises. Based on the responses we examined mutual relationships between social enterprises and public administration and potential challenges for the development of social businesses.

The main barriers to the development of social enterprises are the non-existence of the social entrepreneurship act – the organisations are primarily business corporations (predominantly limited companies), insufficient determination of whether the business is an integration social enterprise and what criteria should be fulfilled. Social enterprises are not supported by public processes - such as socially responsible public procurement. What is also missing is a system of financial support for social enterprises. It must not be ignored that social entrepreneurship needs to have quality criteria defined, as is the case of social services. A certain legislative definition of social enterprises has been established in several countries, examples of good practice come from Poland and Slovakia. As no legislative definition has been made in the Czech Republic, these countries might be an inspiration. In Italy, Great Britain, USA, Belgium and Finland there are also political initiatives supporting this type of business.

The discussion shows that this does not concern only the social sphere but social entrepreneurship consists mainly of business environment and support for local initiatives. All this should be reflected in the drafted social entrepreneurship act that would be appreciated by a majority of the survey respondents. One of the possible challenges in the future may be the formation of an interconnected network of social entrepreneurship stakeholders: public administration, businesses and local stakeholders. One possible recommendation is the implementation and the emergence of social incubators providing methodical advice on the formation, business plan, risk identification and target groups of employees and funding. This intention is one of the sub-questions that can be followed up by additional surveys.

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# THE ROLE OF CROSS-BORDER COOPERATION INITIATIVES IN RESPECT OF REGIONAL DEVELOPMENT: CASE STUDY OF EUROREGION NEISSE

Pavel Zdražil, Grażyna Kozuń-Cieślak

**Abstract:** *The paper seeks to examine the importance of cross-border cooperation on regional development. It focuses on the euroregion Neisse since it fits some important assumptions that need to be matched to overcome limitations that are connected to examination of any cooperation initiatives. Its objective is to find whether regions of euroregion, Neisse, experience different development patterns in economic performance compared against the neighbouring regions in their country. We employed a two-step analysis of volumes, where the correlation analysis is extended by testing for Granger causality. To check the non-stationary issue, the analysis runs the ADF unit root test. The analysis found that the initiatives of the cross-border cooperation appear to be an important instrument of the European Union cohesion policy in the case of the euroregion, Neisse, but at the same time, are very ambiguous as well. In our case, even some significant relations have been identified in both correlation and causality sense; no provable promotion of economic performance has been measured. In summary, we may suggest that some linkages within the euroregion, Neisse, do exist, but we may ask whether their existence is unfavourable or whether their potential is or is not used in the best way possible.*

*The document can be downloaded at <http://hdl.handle.net/10195/67942>.*

**Keywords:** *Cross-border cooperation, Neisse, Granger causality, Euroregions, Regional development, Economic performance.*

**JEL Classification:** *R11, O47.*

## Introduction and statement of a problem

Cross-border cooperation among different regions is influenced by the long-term and ongoing goals of the European regional policy since it falls under the European Territorial Cooperation objective. It follows the strategic aims of the European Union (EU) cohesion policy while it seeks to “*promote a harmonious economic, social and territorial development of the Union as a whole*” (European Commission, 2016a). To reach this goal, it is focusing on reducing national borders within EU, and between EU and some adjacent countries, by supporting joint actions and policy exchanges between national, regional and local actors involving at least two countries (European Commission, 2016b). Even though its importance is considerably lower than the main objectives (currently, investment for growth and jobs) within EU regional policy budget (for the period of 2014-2020, it is about 2.5% of the total amount) (European Commission, 2016c), the EU still provides a wide range of tools to support this kind of regional development. Since the European Commission estimates that ca 38% of EU citizens live in border areas it operates 60 programmes for the period of 2014-2020 likewise for the period of 2007-2013, where over 6,000 projects have been supported (European Commission, 2016b).

The well-known instruments of cross-border cooperation are, probably, the euroregions and European Groupings of Territorial Cooperation (EGTC) which enable extending

of support to local initiatives, i.e., shifting the aim of a policy of cohesion from territorial unit NUTS 2 to a lower regional level. The cross-border cooperation is important especially for the field of spatial planning in border areas (Duhr et al., 2010; Haselsberger and Benneworth, 2010) and also security issues (Brunnet-Jailly, 2011), but some studies argue that, in particular, small-sized cross-border initiatives do influence regional development significantly (Perkmann, 2003). Today, the Association of European Border Regions lists about 200 euroregions, and the Committee of Regions lists about 60 that exist under EGTC, and about 10 EGTC under construction (Association of European Border Regions, 2016; Committee of Regions, 2016). Furthermore, many of those regional groupings are situated in the 'new' member states from Central and Eastern Europe that joined the EU in 2004 or thereafter. Since the regions of these countries usually belong to the less developed areas in the EU (Zdražil and Applová, 2016), we may ask whether the factor of euroregion, or EGTC, is able to significantly impact the development of the regions involved in such groupings, and contribute to the European cohesion. In this paper we try to find an answer to this question.

Keeping all of the above in mind, this paper seeks to examine the importance of cross-border cooperation on regional development, laying heavy focus on economic performance. Being limited from many angles, namely: (I) the cross-border initiatives being based on a very large range of reasons and motivations, moreover, there are no rigid criteria to define the platforms for cooperation, e.g., 'euroregions' (Medeiros, 2011); (II) the shift towards a lower regional level enables the possibility of involvement of small districts and municipalities, where economic performance statistics are unavailable; (III) the initiatives for cooperation are founded continuously, i.e., the large time bias can occur by comparison of results; (IV) cross-border cooperation initiatives are founded on a voluntary basis, hence, the range of cooperating area is often unstable (changing in time), etc., we decided to reduce our analysis only to one cross-border cooperation initiative, where none of the above issues are of any significance. Since we found a case where the assumptions of insignificance fit fairly well, our attention is now drawn toward the euroregion, Neisse, which is the oldest euroregion in Central and Eastern Europe, established in 1991 (Euroregion Nisa, 2016), whereas, we can employ NUTS 3 regions data as an analysis input.

There is large literature on cross-border cooperation grouping and euroregions in respect of regional development but there are many limitations of its research (Perkmann, 2003), some of that most important have been pointed above. For this reason, the existing studies are usually focused on surveying of specific issues from both economic and non-economic areas (e.g. business conditions, networking, culture events, tourism, evaluation of specific projects, etc.). Some studies compare the characteristics of population and employment, which are well explored, harmonized and regularly disclosed by national statistical offices. In the case of euroregion Neisse, there are some recent economic studies focusing the competitiveness and business environment (Dědková and Blažková, 2014; Dědková and Folprecht, 2013) as well as studies of cooperation between companies (Honzáková and Ungerman, 2014). Moreover, Piwowar (2013) tried to analyse the issue of unemployment, while Poštoľka and Branda (2009) focused the issue of population structure. A study of some economic inequalities and political differences has been introduced by Kepka (2004). The issue of socio-economic networks and its importance for development has been described by Burdack et al. (2016; 2015); furthermore, Herrschel (2011) tried to explain some reasons of existence of euroregion Neisse and the ways of how the public management should behave to promote its functioning.

The above listed studies focused, perhaps even compared, particular parts of Neisse. However, there is a lack of economic performance research in the field of euroregions (in general, not only Neisse). We have found no studies that are examining the issue of economic performance among the parts of cross-border cooperation initiatives or euroregions, and try to find causalities or other kinds of relationships involved. The aim of this paper is then to examine whether the parts (regions) of euroregion, Neisse, experience different development patterns in economic performance, compared with the neighbouring regions in their country. Because if so, one can assume that the cross-border cooperation initiatives are very critical instruments of EU cohesion policy, even down to its modest budget; and, hence, its growing share within the budget (European Commission, 2016a) is fully justified.

To fulfil the goal, we employ a two-step analysis of volumes, where the correlation analysis is extended by testing for Granger causality. Firstly, we check the non-stationary issue, via the ADF unit root test. After resolving the non-stationary issue, we employ the correlation analysis of volumes to examine relationships between the regions. And finally, we test for Granger causality between the regions which helps to specify the results. Statistical and econometric software package Gretl is used to calculate the results below.

## 1 Methods

This analysis has been conducted using the application of following assumptions and methods. We examine parts of the cross-border euroregion, Neisse, on all sides of the borders. Neisse covers the area of two territorial units NUTS 3 on the German side (DED2C - Bautzen and DED2D - Görlitz), but on the Czech and Polish sides, the euroregion is formed by municipalities that do not reflect borders of any region wherefrom data for our analysis can be collected. Hence, we substituted the Czech part of Neisse with a NUTS 3 region CZ051 - Liberec Region, and the Polish part with a NUTS 3 region PL515 - Jeleniogorski. One can say that both substituted regions cover most of the area and population of municipalities involved during the period under study, therefore, the bias may be acceptable for our study. Besides, a similar approximation is pretty logical by examinations of the euroregion's development. To compare the development of the regions of Neisse, we use the neighbouring NUTS 3 regions within the same country as a benchmark (CZ020 - Central Bohemian Region, CZ042 - Usti nad Labem Region, CZ052 - Hradec Kralove Region; DE40B - Oberspreewald-Lausitz, DE40G - Spree-Neiße, DED21 - Dresden, Kreisfreie Stadt, DED2E - Meißen, DED2F - Sächsische Schweiz-Osterzgebirge; PL432 - Zielonogorski, PL516 - Legnicko-Glogowski, PL517 - Walbrzyski, PL518 - Wroclawski).

We study relationships in per capita gross domestic product (GDP), expressed in purchasing power standard, between pairs of regions. The data have been linked from the Eurostat database (2016) and cover the period of 2000-2013. Firstly, we employ the correlation analysis of volumes, based on Pearson's R, to examine direction and significance of the relationships between regions. Afterwards, we test for Granger causality in our data, to specify the results. The Granger causality (Granger, 1969; Granger, 1988) is based on simple principle that we assume causality between two volumes, let us say  $x$  and  $y$ , if past values of  $x$  can improve the explanation of current  $y$ . Then, whether adding lagged values of  $x$  help to explain the current  $y$ , one can say  $x$  Granger causes  $y$ . Following the Granger's approach (1969), we used regression model to examine the Granger causality of volumes (1). The null hypothesis is that no causal relation between volumes exists,

and therefore its rejection refers to Granger causality. The optimal lag-length has been estimated via data dependent procedure – the Akaike information criterion (AIC).

$$Y_{(t)} = \alpha_0 + \alpha_1 Y_{(t-1)} + \dots + \alpha_i Y_{(t-i)} + \beta_1 X_{(t-1)} + \dots + \beta_i X_{(t-i)} + \epsilon_t \quad (1)$$

where  $Y_{(t)}$  and  $X_{(t)}$  are values in time  $(t)$  and  $(t-n)$ , respectively;  $(i)$  refers to the number of lags;  $\alpha$  and  $\beta$  are model parameters and  $\epsilon$  refers to error term.

As long as we are using correlation analysis of volumes and the Granger causality approach, we have to deal with the issue of non-stationary to avoid the spurious results. We used the augmented Dickey-Fuller (ADF) test (Dickey and Fuller, 1979; Said and Dickey, 1988) that examines the null of a unit root, i.e., non-stationary; which found that our data are non-stationary. Furthermore, we found that the non-stationary issue can be overcome by conventional series transformation in its 2<sup>nd</sup> logarithmic difference (2). This transformation helped us to stabilize the variance and mean of examined time series for one side, and on the other side to eliminate the trend.

$$\ln dd X_{(t)} = [\ln X_{(t-2)} - \ln X_{(t-1)}] - [\ln X_{(t-1)} - \ln X_{(t)}] \quad (2)$$

where  $\ln dd X_{(t)}$  is 2<sup>nd</sup> logarithmic difference of value in time  $(t)$ ;  $X_{(t)}$  and  $X_{(t-n)}$  are values in time  $(t)$  and  $(t-n)$ , respectively.

As one can see from Table 1, all the transformed volumes are stationary at the significance level of 0.05. In addition, Table 1 shows Durbin-Watson statistics (DW) of transformed volumes which found the DW are around 2 in all cases, and hence there are no serial correlation problems in our data. Based on these findings one can assume that data transformed via the formula (2) are not burden for any more distortions and may be used as an input for following computation. Even though the null of non-stationary cannot be rejected at the significance level of 0.05, we have to point out that our required significance level is 0.10.

**Tab. 1: ADF test results of series transformed in its 2<sup>nd</sup> logarithmic difference**

<b>reg.</b>	CZ051	DED2C	DED2D	PL515		PL432	PL516	PL517	PL518
<b>p-v.</b>	0.03	0.02	0.01	0.00		0.03	0.05	0.01	0.02
<b>DW</b>	2.09	2.40	2.03	1.84		1.43	1.89	2.13	2.15
<b>reg.</b>	CZ020	CZ042	CZ052		DE40B	DE40G	DED21	DED2E	DED2F
<b>p-v.</b>	0.02	0.01	0.01		0.03	0.00	0.01	0.00	0.00
<b>DW</b>	2.15	1.93	2.24		2.27	1.88	2.05	2.23	2.64

Notes: reg. = region; p-v. = probability of null of non-stationary; the parts of euroregion, Neisse, highlighted in grey. DW critical values at the significance level of 0.05: dL = 0.93; dU = 1.32.

Source: authors' own work based on Eurostat (2016)

## 2 Problem solving

The analysis part is divided into two main sections. Firstly, we proceed to examination of regions that create the cross-border cooperation initiative, Neisse. Afterwards, we focus on relationships between Neisse and non-Neisse regions or connections between sample regions and their intranational neighbours, respectively.

We always start with the correlation analysis of volumes that is followed by testing for Granger causality relationships between the developments of per capita GDP of Neisse regions. This analysis part proceeds due to our effort to specify the results of correlation analysis. We examine both directions of causality i.e. whether region  $x$  Granger causes region  $y$  and whether region  $y$  Granger causes region  $x$ . The following discussion part joins results of both sections to draw some more comprehensive conclusions.

## 2.1 Regions of Neisse

Now, after dealing with the non-stationary issue, the examination may lead to being processed by the correlation analysis of volumes. First of all, we focus on relationships between the regions within Neisse. The results shown in Table 2 suggest that the development of per capita GDP correlate between the Czech and German regions of Neisse, and between German regions. However, the Polish region does not match these conclusions when no relationship was found to be significant between PL515 and the other regions of Neisse. In addition, all the significant relationships were positively correlated, which one can interpret as direct impacts of development.

**Tab. 2: Correlation analysis results - regions of Neisse**

Relationship	R	p-v.	DW
CZ051 - DED2C	0.67	<b>0.02</b>	1.68
CZ051 - DED2D	0.55	<b>0.06</b>	1.37
CZ051 - PL515	0.33	0.30	1.81
DED2C - DED2D	0.49	<b>0.10</b>	2.28
DED2C - PL515	0.28	0.38	2.68
DED2D - PL515	0.43	0.17	2.48

Notes: R = correlation coefficient; p-v. = probability of null of no relationship; bolded figures = rejection of null, i.e., significant relationship; the parts of euroregion, Neisse, highlighted in grey. DW critical values at the significance level of 0.05: dL = 0.93; dU = 1.32.

Source: authors' own work based on Eurostat (2016)

Table 3 shows that Granger causality has been found between German regions in both directions. In addition, the Czech region Granger causes one of the Germany (DED2C) but no relationship has been found to another German region (DED2D). The Polish region (PL515) follows the results of correlation analysis i.e. no relationships with other regions have found to be significant. These findings help to understand why some significant correlation relationships between regions of Neisse have been found. The results of Granger causality between the regions within Neisse follow the results of correlation analysis i.e. significant correlation relationships have been explained by at least one significant relationship in Granger sense. There has been found only one exception from this (CZ051 - DED2D). Hence, one can assume that the correlation is spurious in this case but it should likely be result of some "train of events" or indirect causality, respectively; since CZ051 Granger causes DED2C and that causes DED2D.

**Tab. 3: Granger causality results - regions of Neisse**

Relationship	F-stat.	p-v.	Relationship	F-stat.	p-v.
CZ051 => DED2C	4.32	<b>0.07</b>	DED2C => CZ051	3.11	0.12
CZ051 => DED2D	0.70	0.43	DED2D => CZ051	1.54	0.25
CZ051 => PL515	2.14	0.18	PL515 => CZ051	0.31	0.60
DED2C => DED2D	7.18	<b>0.03</b>	DED2D => DED2C	4.32	<b>0.08</b>
DED2C => PL515	0.44	0.75	PL515 => DED2C	0.80	0.60
DED2D => PL515	1.77	0.38	PL515 => DED2D	0.24	0.86

Notes: F-stat. = F-statistic; p-v. = probability of null of no causal relationship in the Granger sense; bolded figures = rejection of null, i.e., Granger causality; => means the direction of examined relationship; the parts of euroregion, Neisse, highlighted in grey.

Source: authors' own work based on Eurostat (2016)

## 2.2 Regions and their intranational neighbours

At the next step, we focus our attention on relationships between the regions of Neisse and their neighbouring areas. With the summary of results shown in Table 4, one can draw some very interesting conclusions. On the Czech side, the Neisse region, CZ051, does not correlate with the neighbouring regions, except CZ052; but at the same time we found significant correlation relationships among the non-Neisse regions. Very similar results have been found in Poland, where the Neisse region, PL515, does not correlate significantly with the neighbouring areas, while most of non-Neisse regions do, one with another (in 4 of 6 cases). Nevertheless, the situation among the German regions differs, since significant relationships of correlation unambiguously prevail in both the Neisse and non-Neisse regions. In particular, 7 of 10 relationships have found to be significant in interactions between the Neisse and non-Neisse regions, and 8 of 10 only between the non-Neisse regions. Another important finding is that the analysis found all the significant relationships to be positive. This means that development of any region in our sample seems not to be to the detriment of anyone (region) else.

Keeping the above-mentioned findings in mind, we suggest that the German regions of Neisse, i.e., DED2C and DED2D, experience no noticeable difference in per capita GDP development compared with their neighbouring German regions. On the other hand, the Czech and Polish regions of Neisse mostly differ from their neighbouring regions in economic performance (measured in per capita GDP). These simple facts lead us to the conclusion that involvement in the euroregion, Neisse, may influence the economic performance of the Czech and Polish regions, while the German regions remain rather uninfluenced by their Czech and Polish counterparts. This conclusion seems stronger for the Czech region since significant correlation relationships with both the German regions of Neisse have been found. Moreover, even though the per capita GDP of the Polish region does not correlate with that of the other Neisse members, the Polish region differs very unambiguously from its benchmarks on the Polish side of the border i.e. neighbouring regions.

**Tab. 4: Correlation analysis results - regions and their intranational neighbours**

Relationship	R	p-v.	DW
CZ051 - CZ020	0.49	0.11	2.01
CZ051 - CZ042	0.31	0.32	2.89
CZ051 - CZ052	0.58	<b>0.05</b>	2.63
CZ042 - CZ020	0.53	<b>0.08</b>	1.51
CZ052 - CZ020	0.69	<b>0.01</b>	3.06
CZ052 - CZ042	0.68	<b>0.02</b>	2.88
DED2C - DE40B	0.86	<b>0.00</b>	2.48
DED2C - DE40G	0.07	0.83	3.28
DED2C - DED21	0.40	0.20	2.72
DED2C - DED2E	0.51	<b>0.09</b>	2.64
DED2C - DED2F	0.67	<b>0.02</b>	2.60
DED2D - DE40B	0.53	<b>0.08</b>	2.19
DED2D - DE40G	0.66	<b>0.02</b>	2.40
DED2D - DED21	0.76	<b>0.00</b>	2.80
DED2D - DED2E	0.46	0.13	3.18
DED2D - DED2F	0.66	<b>0.02</b>	2.79
DE40B - DED2E	0.51	<b>0.09</b>	3.40
DE40B - DED2F	0.59	<b>0.04</b>	2.77
DE40G - DED21	0.62	<b>0.03</b>	2.52
DE40G - DED2E	0.66	<b>0.02</b>	2.39
DE40G - DED2F	0.53	<b>0.08</b>	2.28
DED21 - DED2E	0.72	<b>0.01</b>	2.39
DED21 - DED2F	0.78	<b>0.00</b>	2.32
DED2E - DED2F	0.81	<b>0.00</b>	2.06
PL515 - PL432	0.44	0.15	2.63
PL515 - PL516	0.23	0.47	1.92
PL515 - PL517	0.43	0.16	2.68
PL515 - PL518	0.48	0.12	2.68
PL432 - PL516	0.71	<b>0.01</b>	2.59
PL432 - PL517	0.56	<b>0.06</b>	2.22
PL432 - PL518	0.72	<b>0.01</b>	1.84
PL516 - PL517	0.49	0.11	1.96

Relationship	R	p-v.	DW
DE40B - DE40G	0.26	0.41	2.80
DE40B - DED21	0.49	0.11	2.92

Relationship	R	p-v.	DW
PL516 - PL518	0.55	<b>0.07</b>	2.34
PL517 - PL518	0.44	0.15	2.40

Notes: R = correlation coefficient; p-v. = probability of null of no relationship; bolded figures = rejection of null, i.e., significant relationship; the parts of euroregion, Neisse, highlighted in grey. DW critical values at the significance level of 0.05: dL = 0.93; dU = 1.32.

Source: authors' own work based on Eurostat (2016)

Now, we approach to testing for Granger causality in relationships between the regions of Neisse and their neighbouring areas that results are shown in Table 5. No Granger causalities have been measured among the Czech region of our sample. This result can take anyone to surprise since 4 of 6 correlation relationships have been found to be significant for the Czech Republic. Of course, correlation is not in any way a condition for causality but one can expect that some correlation relationships should be supported by that causality. Since no signs of Granger causality found among Czech regions one can assume the examined regions should be interconnected through other that are not involved in our sample. However, we have to point out that this is only speculation which calls for further deeper analysis; certainly, it can be an effect of many other factors, that we are not able to catch by this simple analysis, likewise.

**Tab. 5: Granger causality results - regions and their intranational neighbours**

Relationship	F-stat.	p-v.
CZ051 => CZ020	1.67	0.23
CZ051 => CZ042	1.08	0.33
CZ051 => CZ052	0.01	0.94
CZ042 => CZ020	0.66	0.44
CZ052 => CZ020	0.13	0.72
CZ052 => CZ042	0.20	0.67

Relationship	F-stat.	p-v.
CZ020 => CZ051	0.14	0.71
CZ042 => CZ051	0.05	0.83
CZ052 => CZ051	0.75	0.52
CZ020 => CZ042	1.24	0.30
CZ020 => CZ052	0.75	0.41
CZ042 => CZ052	0.66	0.44

DED2C => DE40B	0.08	0.79
DED2C => DE40G	0.04	0.97
DED2C => DED21	0.06	0.94
DED2C => DED2E	2.70	0.16
DED2C => DED2F	0.80	0.50
DED2D => DE40B	5.43	<b>0.06</b>
DED2D => DE40G	29.12	<b>0.03</b>
DED2D => DED21	0.09	0.78
DED2D => DED2E	2.06	0.19
DED2D => DED2F	4.03	<b>0.08</b>
DE40B => DE40G	0.08	0.92
DE40B => DED21	0.14	0.87
DE40B => DED2E	1.40	0.27
DE40B => DED2F	2.10	0.19
DE40G => DED21	35.80	<b>0.03</b>
DE40G => DED2E	9.67	<b>0.10</b>
DE40G => DED2F	0.03	0.86
DED21 => DED2E	1.92	0.20
DED21 => DED2F	5.28	<b>0.05</b>
DED2E => DED2F	3.30	0.12

DE40B => DED2C	0.05	0.95
DE40G => DED2C	0.88	0.38
DED21 => DED2C	1.94	0.24
DED2E => DED2C	0.89	0.47
DED2F => DED2C	3.92	<b>0.09</b>
DE40B => DED2D	6.93	<b>0.04</b>
DE40G => DED2D	0.83	0.58
DED21 => DED2D	0.00	0.97
DED2E => DED2D	0.16	0.70
DED2F => DED2D	1.70	0.23
DE40G => DE40B	1.21	0.37
DED21 => DE40B	0.71	0.53
DED2E => DE40B	0.08	0.79
DED2F => DE40B	0.33	0.58
DED21 => DE40G	0.36	0.79
DED2E => DE40G	3.57	0.23
DED2F => DE40G	0.89	0.37
DED2E => DED21	4.36	<b>0.07</b>
DED2F => DED21	8.68	<b>0.02</b>
DED2F => DED2E	2.82	0.15

PL515 => PL432	1.19	0.38
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PL432 => PL515	0.93	0.45
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Relationship	F-stat.	p-v.
PL515 => PL516	2.31	0.17
PL515 => PL517	1.62	0.29
PL515 => PL518	0.13	0.73
PL432 => PL516	1.07	0.41
PL432 => PL517	8.48	<b>0.02</b>
PL432 => PL518	0.52	0.49
PL516 => PL517	9.89	<b>0.02</b>
PL516 => PL518	4.21	<b>0.07</b>
PL517 => PL518	6.30	<b>0.04</b>

Relationship	F-stat.	p-v.
PL516 => PL515	5.06	<b>0.05</b>
PL517 => PL515	6.30	<b>0.04</b>
PL518 => PL515	0.55	0.48
PL516 => PL432	1.81	0.26
PL517 => PL432	7.95	<b>0.03</b>
PL518 => PL432	4.84	<b>0.06</b>
PL517 => PL516	9.26	<b>0.02</b>
PL518 => PL516	22.58	<b>0.00</b>
PL518 => PL517	0.48	0.64

Notes: F-stat. = F-statistic; p-v. = probability of null of no causal relationship in the Granger sense; bolded figures = rejection of null, i.e., Granger causality; => means the direction of examined relationship; the parts of euroregion, Neisse, highlighted in grey.

Source: authors' own work based on Eurostat (2016)

By focusing on regions of Germany, we can see ca one half of significant correlations (8 of 15) have been explained by at least one Granger causality relationship. One can conclude that situation among the German regions is very ambiguous again, since cases of null rejections are distributed equally in both the relationships with Neisse regions and that without. These findings explain about one half of correlation relationships that above analysis found to be significant. We can assume the other correlation relationships may be explained by networks of causal relations among the German regions, i.e. some pairs should correlate thanks to their indirect relationships through the other regions. By focusing on the Neisse regions we found that DED2C is less often involved in the Granger causality relationships vis-à-vis DED2D. Furthermore, DED2D influences the other regions more often than it is influenced by them.

Serious gaps between the results of correlation analysis and Granger causality analysis have been found by Polish regions. Even though we found no correlation relationship to be significant for the Neisse region (PL515), we found that 2 regions Granger cause that (PL516 and PL 517). Furthermore, we found all significant correlation relationships, except one (PL432 - PL 516), to be explained by at least one Granger causality. Besides, we found 2 other relationships in the Granger sense (PL516 - PL517 and PL517 - PL518) that has not been assumed due to the result of correlation analysis part. This result is really interesting since we found not even one such a case neither in the Czech Republic nor Germany. Another said, Granger causality relationships that are not supported by significant correlations have been found only among the regions of Poland. Based on these facts we can conclude that analysis found the ratio of causal relationships among Polish regions to be the highest but it is not well-reflected in the terms of common trends of GDP per capita development.

### 3 Discussion

The analysis of volumes found that development of per capita GDP correlates significantly in the cases of Czech and German regions of Neisse. These findings have been supported by causal relations in the Granger sense that have been identified. At the same time, the Polish region did correlate with none of the Neisse regions which have been followed by finding of not even one causal relationship from or to that. So, as long as we assume that the Czech and the German regions could be involved in some kind of interconnected economic network or system, the Polish region seems to be out of such structure.

In terms of correlation analysis, the other section showed us that the regions of Neisse differ significantly from its neighbouring areas in Poland and in the Czech Republic but no obvious differences in development have been found between the German Neisse and non-Neisse regions. The results of testing for Granger causality follow these findings to some extent since one can see obvious differences between the Neisse and non-Neisse regions in Poland while neither in Germany nor in the Czech Republic. In particular, the causality part confirms very ambiguous results among the German regions since there is no obvious difference between developments of Neisse and non-Neisse regions. Furthermore, the Polish region of Neisse was found different from its intranational neighbours since its neighbouring areas are interconnected by many causal relationships but the Neisse region creates relationship with only 2 other. In addition, it is interesting that some Polish regions are the only exceptions of the sample, where conclusions about causalities are not supported by correlation relationships that found to be significant. Moreover, the correlation analysis found the Czech region of Neisse to be significantly differing from its neighbouring regions vis-à-vis Granger causality tests, where we identified no significant causal relations.

With these findings in mind, one can probably generalise the results as follows: the cross-border cooperation initiative seems to be a very important instruments of EU cohesion policy in the case of euroregion Neisse, but very ambiguous as well. Owing to the findings of no obvious impacts of Neisse on German regions, along with some differences in development between the Neisse and non-Neisse regions, that may perhaps be seen as some signs of impact, in the Czech Republic and Poland, one could expect the relatively more developed regions of Germany would help to promote the economic performance of the less developed regions. However, the real figures do not confirm this assumption, since the benchmark entities' growth was faster between 2000 and 2013 than the regions of Neisse in both the Czech Republic and Poland (see Table 6). Besides, both regions grew less than all of their neighbouring areas and even less than their respective countries, i.e. the Czech Republic (CZ) and Poland (PL). In addition, the German regions of Neisse do not show any unambiguous deviations from their benchmarks. That implies that the cross-border initiative seems to provide any real benefits to their participants, actually it unites the less growing regions of the broader tri-border geographical area.

**Tab. 6: GDP growth between 2000 and 2013**

<b>reg.</b>	CZ051	DED2C	DED2D	PL515		CZ	CZ020	CZ042	CZ052	DE
<b>2013/2000</b>	1.34	1.56	2.07	1.82		1.57	1.40	1.47	1.46	1.42
<b>reg.</b>	DE40B	DE40G	DED21	DED2E	DED2F	PL	PL432	PL516	PL517	PL518
<b>2013/2000</b>	1.71	2.27	1.59	1.57	1.55	1.95	1.88	2.32	1.83	2.44

Notes: reg. = region; 2013/2000 is the ratio of per capita GDP of selected years; the parts of euroregion, Neisse, highlighted in grey.

Source: authors' own work based on Eurostat (2016)

## Conclusion

This paper sought to examine the importance of cross-border cooperation on regional development based on the evidence from the euroregion of Neisse. The two-step analysis based on testing for correlation and Granger causality has been proceeds to fulfil its goal. The analysis found that development of per capita GDP in the regions of Neisse differs significantly from its neighbouring areas in Poland while not in Germany. The situation of Czech region is less obvious since the correlation relationships haven't been supported by the Granger causality tests. Furthermore, the analysis thought that some relationships exists between the Czech and German regions of Neisse but don't to that Polish.

In summary, the factor of cross-border cooperation seems like an important instrument, but, in our case, this is without any provable promotion of economic performance in the less developed regions (Czech and Polish), as seen from a brief view on the growth figures. Hence, the eligibility of growing expenditures on cross-border cooperation is ambiguous, since its effectiveness has not been approved by our results. However, based on our analysis, we cannot evaluate whether the effect of Neisse is rather positive or negative, i.e., whether the regions would develop less favourably without the 'cross-border cooperation factor', respectively; since our analysis focused on other issues. We may only speculate whether the existence of connections found is unfavourable or whether their potential is or is not used in the best way possible.

We can probably say that this paper enlightened us with an important lesson which should be kept in mind, by shaping regional and developmental policies at both national and EU levels. Even though we examined only one example of cross-border cooperation initiatives, we may suggest that the findings will be relevant to many other initiatives as well. In addition, the paper presented a few important questions which call for further research. At the least, we have to point out that our analysis is limited, and should be extended, by examining more euroregions, or other kinds of cross-border cooperation initiatives.

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