

8<sup>th</sup> International Conference

*The Economies of Balkan and  
Eastern Europe Countries in the  
Changing World*

6 - 8 May 2016  
Split, Croatia



<http://ebeec.teiimt.gr>

organized by

**Eastern Macedonia and Thrace Institute of Technology, Department of  
Accountancy and Finance, Kavala, Greece**

**University of Split, Faculty of Economics, Split, Croatia**

# Proceedings

of the 8<sup>th</sup> International Conference ‘The Economies of

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EBEEC 2016 Split, Croatia May 6-8, 2016

Eastern Macedonia and Thrace Institute of Technology, Department of  
Accounting and Finance, Greece

University of Split, Faculty of Economics, Croatia

**Editors:** A. Karasavvoglou, S. Goic and P. Polychronidou

**ISBN: 978-960-363-065-4**

**ISSN: 1792-4383**

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# INSTITUTIONAL INVESTORS WITHIN FINANCIAL SECTOR OF BOSNIA AND HERZEGOVINA – CURRENT STATE AND DEVELOPMENT PERSPECTIVES

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## ABSTRACT

This paper analyses the structure of the financial sector of Bosnia and Herzegovina in order to identify existing and potential opportunities for stronger participation of institutional investors, which would lead to more efficient functioning of the capital market, creation of a more efficient financial system, which would thus significantly contribute to financing and development of the domestic economy. As the most important institutional investors in B&H we must consider investment funds and insurance companies, but for our domestic financial system to be more efficient and cease to be a purpose for itself, we need to create favourable conditions for business expansion of existing institutional investors and implement much needed reform of our pension system. This reform should contribute to the establishment of voluntary pension funds as new institutional investors with superior capacity as well as to significant change of the very structure of the domestic financial market.

## KEYWORDS

Institutional investors, financial sector, economic development

## JEL CLASSIFICATION CODES

G23, O11, O16

## 1. INTRODUCTION

This paper analyses the structure of the financial sector of Bosnia and Herzegovina in order to identify existing and potential opportunities for stronger participation of institutional investors of the non-banking sector, which would lead to more efficient functioning of the capital market, creation of a more efficient financial system, which would thus significantly contribute to financing and development of the domestic economy. Presence of the broad spectrum of problems within the real sector in B&H and a slow recovery from the economic crisis on one hand, with the highly-liquid, profitable and crisis-resilient domestic banking sector on the other hand, creates a legitimate confusion. Besides that, a long tradition of insurance business, much-needed reform of the pension system, the presence of investment companies and organized capital markets, with the value of household savings exceeding 8 billion BAM, indicate that certain reorganization of the domestic financial system is necessary. Also disturbing is the current figure of 2.5 billion BAM that local banks hold above the prescribed level of reserve even though most of these funds could be used for much-needed development projects. As the most important institutional investors in B&H we must consider investment funds (unlike other countries, in B&H closed-end funds still dominate) and insurance companies, but for our domestic financial system to be more efficient and cease to be a purpose for itself, we need to create favourable conditions for business expansion of existing institutional investors and implement much needed reform of our pension system. Finally, we will point out the experiences of other countries, appropriate statistical models and indicators that would confirm our view on the importance of a more diversified financial sector in B&H which would be reflected in the growth and development of the economic system.

## 2. FINANCIAL SECTOR OF BOSNIA AND HERZEGOVINA

In domestic terms, where the financial system in our country follows the so-called bank-based or continental model, which is dominated by conventional banks, gives the impression of well-developed financial sector in B&H, which should finance and intensify economic growth and development. However, existing banking sector

which has already reached the upper growth limit for the existing level of our economic development confirms that the restructuring of the financial system in our country is essential if we want to achieve a significant and more rapid recovery and growth of the domestic real sector.

## 2.1. Structure of assets of financial sector in B&H

During first several years of the 21st century, unlike the industrial sector and other economic sectors, the financial sector of Bosnia and Herzegovina was highly successful in all initiated reforms, especially in the banking sector, and the public perception of the financial system was very positive and it seemed that it would at least in the medium term represent an important factor of the country's economic development. Since the structure of the financial system in B&H is mainly based on the financial intermediates, participation of these institutions in the total assets of the financial sector is also an indicator of their size and importance, but also a confirmation of a bank-dominated financial system.

Table 1. Structure of assets of B&H financial sector 2005.-2014. (millions BAM)

	2005.	2006.	2007.	2008.	2009.	2010.	2011.	2012.	2013.	2014.
Commercial banks	11.875	14.698	19.520	21.048	20.707	20.452	20.995	21.186	22.026	22.781
Investment funds	1.792	1.553	1.764	1.242	885	898	810	796	762	786
Insurance companies	676	708	853	889	933	936	1.077	1.174	1.146	1.357
Microcredit organisations	344	522	916	1.210	1.087	856	742	676	667	647
Leasing companies	564	862	1.417	1.600	1.598	1.108	767	716	597	512
<b>Total</b>	<b>15.251</b>	<b>18.343</b>	<b>24.470</b>	<b>25.989</b>	<b>25.210</b>	<b>24.250</b>	<b>24.391</b>	<b>24.548</b>	<b>25.198</b>	<b>26.083</b>

Source: The Central Bank of Bosnia and Herzegovina, Annual Report 2006., 2009., Financial Stability Report 2014.; Insurance Agency of B&H Annual Report 2005., 2007., 2009., 2011., 2012., 2013., 2014., with the author's calculation and processing

The latest data indicate that the retained stability of the domestic financial system during 2014. gives a sufficient proof of its resistance to various risks both from the domestic and international environments. In addition to the growth in value of assets of the banking sector, non-banking financial sector assets also increased by 51.7 million BAM compared to 2013., which was largely the result of an increase in assets of insurance companies, and to a lesser extent of investment funds.<sup>1</sup>

The increase of capital of the banking sector in the bank-based financial system such as in B&H should have a positive effect on the domestic economy, ie. accelerate the development of the real sector through more intensive and favourable bank lending, which would lead to increase of investments and reduction of unemployment. Unfortunately, this is not the case in our country. On the other hand, the decline in the value of assets of non-banking sector is allegedly result of the low purchasing power, weak investment and economic activity, political disagreements, and materialized risks in leasing and microcredit sector. However, the lack of financial education of the population of B&H with dominant reliance on traditional "minimum risk" banking must be taken into consideration.

## 2.2. Insurance sector

Analyzing the available data for the year 2014. in Bosnia and Herzegovina, it was not difficult to conclude that precise economic recovery program for the B&H economy is still not implemented, but also that the current economic and political crisis did not significantly influence the domestic insurance sector, which recorded noticeable premium growth of 6.66%. Also, the value of the assets of B&H financial sector of 26.1 billion BAM, while the insurance and reinsurance sector accounted for 1.4 billion, or 5.19%, clearly indicates that it is a relatively small share given the importance insurance companies have as institutional investors in most

<sup>1</sup> Data available in: The Central Bank of Bosnia and Herzegovina, Financial Stability Report 2014., p. 50

countries.<sup>2</sup> Our financial services sector is dominated by banks (87.35% of the financial sector assets value) where the share of foreign capital (private and public) in 2014. reached to about 84%<sup>3</sup> in Federation of Bosnia and Herzegovina and around 78%<sup>4</sup> in Republic of Srpska. This means that our domestic banking sector is actually foreign owned. Consequently, increase in the share of the insurance sector in the total assets of the financial sector in B&H becomes even more necessary, especially when we know that in this sector the ratio of mostly domestic to mostly foreign owned companies is approximately 50:50. What is even more important is that we turn the ratio of non-life insurance premiums vs life insurance premium in favour of the latter. Present ratio is 79.6% to 20.4% in favour to the non-life sector. Positive trends are noticeable and show that life insurance premium recorded an increase as much as 14.77%, which was the highest ever growth in the B&H life insurance sector. Within the non-life insurance premium the biggest share still hold vehicle insurance with almost 47.75%. The share of insurance premiums in GDP in 2014. was only 2.1%, while premium "per capita" was approximately 140 BAM, which is the smallest amount in comparison to other countries in the region. On the other hand, the average value of the premiums in the EU is around 2.000 €. Unfortunately in our case all segments and relevant data that indicate the level of development of the insurance sector as one of the vital segments of the modern financial system show that we are also lagging behind other countries of the former Yugoslavia.

Table 2. Comparative indices for developed countries, countries from the region and B&H

Basic indicators; Year 2013.	USA	Japan	Great Britain	Germany	Slovenia	Croatia	Serbia	Montenegro	Bosnia - Herzegovina
Number of insurance companies	6.086	95	1.298	560	14	26	28	11	24
Total insurance premiums (mil. €)	942.030	385.150	236.60	187.22	0	1.906	1.190	559	73
Total insurance premiums (mil. €) life ins.	395.653	304.269	179.81	0	1.906	1.190	559	73	269
Total insurance premiums (mil. €) non-life ins.	395.653	304.269	179.81	0	1.906	1.190	559	73	269
Total insurance premiums per capita	2.976	3.025	3.305	2.311	927	279	78	117	70
Total life insurance premiums per capita	1.250	2.390	2.512	1.121	241	78	17	16	13
Total non-life insurance premiums per capita	1.726	635	793	1.190	686	201	61	101	57
Share of total premiums in GDP (%)	12,90%	11,00%	11,50%	6,70%	5,60%	2,70%	1,80%	2,18%	2,00%

Source: Insurance Supervisory Agency of Federation of Bosnia and Herzegovina, Insurance Agency of Republic of Srpska, Bosnia and Herzegovina Agency for Statistics, Insurance Supervision Agency of Montenegro, Croatian National Bank, Croatian Bureau of Statistics, National Bank of Serbia, Statistical Office of the Republic of Serbia, Swiss Re

### 2.3. Investment funds sector

Investment funds represent "par excellence" institutional investors without which the efficient operation of financial markets in each country is almost impossible, as well as in Bosnia and Herzegovina. The voucher privatization marked the beginning of the development of our capital market. The large share of public capital that was transformed into private equity (the process started in 1999.) was expected to result in a significant growth in sales of shares and other financial instruments. However, in B&H, which is a relatively small and underdeveloped country, there are two stock exchanges, one in Sarajevo, other in Banja Luka. Both have a low trading volume and that leads to insignificant level of capitalization and annual market turnover, especially compared to the institutionalized capital markets in developed countries. To change this we need strong institutional investors. Although the new law on investment funds, both in FB&H and RS, enables the establishment and business activities of different forms of investment funds, in terms of our domestic system, distinction of these institutional investors is essentially portaited in open-end and closed-end funds. In addition to all existing disadvantages, the investment funds sector in B&H retained an upward trend until effects of the

<sup>2</sup> Data available in: Statistics for Insurance Market in Bosnia and Herzegovina, Annual Report 2014., p. 15 and 40

<sup>3</sup> Report on the Condition of the Banking System of Republic of Srpska; Information on the banking system of the Federation of Bosnia and Herzegovina 2014.

<sup>4</sup> Ibidem

global financial crisis took toll on our domestic financial system. From that moment these institutional investors began to lose its previous power. Therefore, rapid transformation of existing closed-end funds and establishment of new open-end ones, with certain statutory amendments and legislative improvements must be among our priorities. Currently in the B&H there are 34 investment funds, 18 in FB&H and 16 in RS.<sup>5</sup>

## 2.4. Contribution of institutional investors to economic growth of Bosnia and Herzegovina

Although considered as new, modern generators of a faster recovery of the economy, privatization funds in B&H were largely unprofitable and partly slowed down our country's economic development, especially due to poor investment policy and the fact that there was a small number of companies which they could invest in that operated with profit. After conducting mass privatization in the FB&H it was clear that a small number of citizens became majority owners of most companies. When these funds became the most important domestic owners of privatized enterprises it was expected that it would improve corporate governance, but it did not happen. Although in the pre-crisis period, ie. from 2005. to 2008., these institutional investors achieved the best business results and regarding the non-banking sector had the largest share in the assets structure of the domestic financial sector and induced economic growth in B&H, the consequences of the recent global financial and economic crisis withheld the inadequate development of our capital market, slowed the transformation of the existing closed-end investment funds and maintained a relatively high fees for companies managing investment funds. This all led to a significant drop of the value of domestic investment funds. However, we cannot forget to emphasize the indisputable fact that privatization-investment funds have played an important role in the initial development activities of the capital market in B&H. In the period 2000. – 2002., the local agencies sent three public invitation for subscription of shares. The sale of public capital caused a lot of controversy since the privatization processes was mostly considered as unsuccessful, especially in terms of implemented procedures. The results of this process are evident from the following data:<sup>6</sup> from 1999. to 2011. in the Federation of Bosnia and Herzegovina 1079 companies were sold, partially privatized 94 companies, while in the Republic of Srpska 716 enterprises were privatized for 1.725 billion BAM in total. We emphasize again that problem was not in the privatization process since it was also applied in other transition countries, but in the implementation process itself, in inefficient control and audit requirements and methods that customers had to deal with because state-owned enterprises did not operate successfully. It was all at expense of the country and the investors. During the period of 2006. – 2007. a real zest was achieved in the business of B&H investment funds, which again was not at the level of other countries in transition. The fact that business expansion of these institutional investors was more than noticeable can be concluded from the data on referent stock exchange indices, ie. BIFX and FIRS.

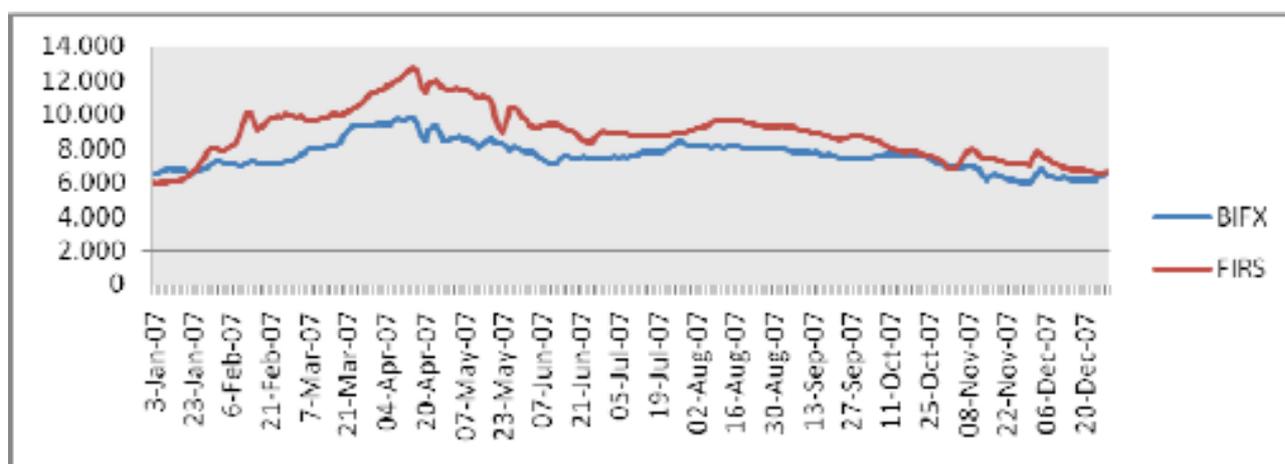


Figure 1 . Indices of investment funds on Sarajevo and Banja Luka Stock Exchanges (BIFX & FIRS). Source: B&H Directorate for Economic Planning – Economic Trends, Annual Report 2007., p. 41

Unfortunately the business expansion of investment funds stopped already in the following year due to unfavourable developments in global financial markets. The recent economic recession and reductions of investment activity in the world and South-Eastern Europe had negative effects on Sarajevo and Banja Luka stock exchanges and decreased purchase of shares (primarily in the privatization process) and caused the

<sup>5</sup> Data available at: [www.komvp.gov.ba](http://www.komvp.gov.ba), [www.secrs.gov.ba](http://www.secrs.gov.ba)

<sup>6</sup> Data available at: <http://www.noveinicijative.org/privatizacija-u-bosni-i-hercegovini-za-cni-pise-ilma-durak/>

withdrawal of capital from investment funds, especially by foreign investors. There was a drastic fall of domestic investment funds indices in the period from November 2007. to October 2009., when a certain stabilization occurred. The unsteadiness of our fund industry is evident and despite the economic recovery, the industry itself was not able to return to that level from the pre-crisis period.

On the other hand, current presence of local indices BIFX and SASX on the Istanbul Stock Exchange make them visible for foreign investors and confirms the importance of investment funds and capital markets for the development of the B&H economy. This partnership between SASE and Istanbul Stock Exchange domestic investment funds should also be used to enhance capital inflows from Muslim countries or through the introduction of some kind of Islamic marks for domestic indices, quotation of funds that exclusively buy securities and shares of companies whose businesses comply with the principles of Islam.

The introduction of Islamic indices on SASE with precisely defined companies which would enter into the composition of "SASE Islamic Index" would probably attract a large number of investors from Islamic funds and create needed prerequisites for the establishment of Islamic funds on the local market. Since the Islamic funds reported continuous business expansion, their arrival on the domestic financial market would certainly contribute to the strengthening of the financial sector, and thus the economic growth of Bosnia and Herzegovina.

The long tradition of insurance business in B&H with strong institutions, which are predominantly domestic owned, provides the ability to analyse and differentiate domestic companies and local branches of foreign companies. Namely, these subsidiaries will follow the business policy of the parent company and together with local insurance companies contribute to the development of domestic financial markets, but they also often become the dominant factor in some key segments of the insurance business, which is the case in B&H. Many analysis showed that powerful incentive to economic growth and development comes from complementary action of insurance and banking sector, which should definitely be considered in B&H. The link between the insurance sector and economic development is both causative-consequential and dynamic and depends on the degree of development of the entire financial and economic system. Since certain savings substitution in B&H is definitely important, in the context of insurance it would include those products that would imply investing of available funds in the long run with a wide range of investment opportunities that would contribute to the efficient transfer of funds, and thus affect the economic development.

In order to additionally point out the need for the reform of the fund industry and the insurance sector in B&H a linear regression model was applied. The model analysed the impact of these institutional investors on the value of GDP in our country.

Table 3. *Data for GDP, net assets of investment funds and insurance companies in B&H, 2005. – 2014., (millions of BAM)*<sup>7</sup>

Year	GDP	Investment funds	Insurance companies
2005.	17.127	1.792	676
2006.	19.252	1.553	708
2007.	21.760	1.764	853
2008.	24.702	1.242	889
2009.	24.004	885	933
2010.	24.879	898	936
2011.	25.772	810	1.077
2012.	25.734	796	1.174
2013.	26.123	762	1.146
2014.	26.934	786	1.357

Table 4. *Impact of the independent variables on B&H GDP*<sup>8</sup>

Independent variable	R <sup>2</sup>	β	Signif.
Investment funds net assets	0,805	-0,897	0,000
Insurance companies net assets	0,786	0,886	0,001

The results of SPSS model once again pointed out to the specifics of the functioning in the relation between financial and real sector in our country. Analysing the results one would say that the impact of investment funds is inversely proportional to GDP growth, and that the model indicates the presence of negative link ( $\beta = - 0,897$ ).

<sup>7</sup> Data collected form annual reports available on [www.cbbh.ba](http://www.cbbh.ba), [www.dep.gov.ba](http://www.dep.gov.ba), [www.azobih.gov.ba](http://www.azobih.gov.ba)

<sup>8</sup> The analysis was performed with the use of SPSS (Statistical Package for the Social Sciences) software package

The coefficient of determination of 80,5% and an absolute significance might lead to the conclusion that the fund industry in B&H is even harmful for the real sector. However, this can rightly be considered as a specific. Since our country's post-war economy redeveloped itself mainly through international aid and loans from international development and financial institutions, the true correlation between domestic financial and real sector could not instantly be realized. GDP growth rates indicate that they resulted from the reconstruction of the economy of Bosnia and Herzegovina, which was almost destroyed during the war, rather than from appropriate economic policies and from strong influence of the financial sector as a source of external financing for enterprises. Also, a relatively young investment funds industry which was initiated in the process of mass privatization, which unfortunately was not absolutely successful, current dominance of close-end funds, insufficient education of individual investors with prevailing commitment to traditional forms of savings with lower risk and yield, contributed to relatively high sensitivity of the domestic fund industry during the financial crisis which was confirmed by a sudden drop in the assets value of investment funds after 2007. Although investment funds in Republic of Srpska, due to a more active capital market, showed a slightly higher stability compared to those in the Federation of B&H, the share of investment funds in total assets of the financial sector in Bosnia and Herzegovina since the onset of the global crisis to date continued to decline (exception being the year 2014.), while the GDP "per capita", as one of the most important indicators of the increase in purchase of investment funds shares in developed countries, recorded a slight increase. Although the effects of the economic crisis are felt, they are not immediate nor automatically visible as those in the financial sector so the resulting reverse movements of GDP and net assets of investment funds and are not a big surprise. This can be considered as yet another evidence of the importance of necessary reforms within this industry, primarily in the transformation and opening of existing funds ie. strengthening of the mutual funds sector.

On the other hand, data for insurance companies which indicates that this sector strongly contributes to the growth of relevant macro-economic categories should also be taken with caution given the largest share of traditional ie. compulsory forms of insurance that dominate the portfolio of insurance companies in B&H. Since the insurance industry has a long tradition in our country it is understandable that clients have more reliance in it than in the fund industry. Besides that, legal obligation of certain types of insurance and a slight but continuous growth of non-binding ones, resulted in the growth of insurance companies assets in the post-war period. In this context, the results of statistical analysis ( $R^2 = 78,6\%$ ;  $\beta = 0,886$ , sig. = 0,001) would mean that growth within the insurance sector had a significant impact on GDP growth of Bosnia and Herzegovina, but this must be taken with caution. Of course, the growth and business expansion of insurance companies have a positive effect on the real sector, but insurance companies in B&H must improve their investment activity on the domestic markets, and what is highly important is that those companies with domestic (or at least predominantly domestic) ownership should be provided with long-term funds through the growth of the share of premium of optional forms of insurance.

### **3. PENSION SYSTEM REFORM**

Regarding the necessary reforms within the domestic pension system, it is clear that despite of identical problems of pensioners on both sides of the entity line they are not implemented equally, not in terms of time nor institutional actions. This is confirmed by drafted new laws, by existing laws, which are not in compliance in both entities, amendments to existing laws that are in conflict etc. We can conclude that some laws were passed several years ago in one entity, but reforms are not implemented, while in the other entity not even a draft of needed legislation has been submitted yet, even though that is essential if we want to implement and later regulate this indispensable and significant reform, which is definitely necessary for our domestic financial system, local pensioners, and B&H path to EU membership.

#### **3.1. Reform model best suited for B&H**

The introduction of so-called three-pillar system recommended by the World Bank, which has been implemented in many transition countries, including our neighbouring countries, would include the first pillar, which would represent a comprehensive scheme and mandatory public pension insurance based on current financing system, the second pillar would mean a comprehensive and mandatory private pension insurance system with the accumulation of capital, while the third pillar would include voluntary insurance based on payments of insurance premiums in private pension funds. According to the World Bank methodology, two ways of organization are foreseen, i.e. through insurance or accumulation. Regarding B&H as a country with undeveloped financial markets and financial instruments, the accumulation of funds represents a simpler and better option, since it determines the minimum premium and the amount of pension benefits which would accrue on the individual user account depending on the profitability of investments of such funds. In the system of accumulation funds,

pension funds are enabled to invest in long term, as well as in short-term securities, greater competition is encouraged because it does not require the investment of large amounts of capital, and with it also includes the state supervision over the investments made. Therefore, the pension system in B&H should be organized in order to implement a system of individual capitalized savings while maintaining the existing public "pay as you go" system that would eventually lose its importance. However, the problem regarding the introduction of the third pillar is primarily reflected in the underdeveloped financial markets, inefficient financial institutions, scarce financial instruments etc. However, we must point out recent considerations that private pension plans should initially be voluntary, i.e. such as life insurance offered by insurance companies<sup>9</sup>.

### **3.2. Importance of voluntary pension funds**

The establishment of voluntary pension funds as new institutional investors would have multiple positive effects, such as relieving of the public fund for pension and disability insurance, enabling alternatives for the state regarding borrowing from domestic sources at more favourable conditions, contribution to development of the domestic capital market, and better standard for the population after the retirement. Besides that, current financially unsustainable public pension system will not be capable to meet its basic objectives in the near future. It is important to mention that the pension funds are legally focused on investing in government securities, mainly government bonds, which is a clear indication of the positive impact on more dynamic functioning of the financial markets and faster flow of funds between surplus and deficient participants. These funds also invest in large capital projects of national importance, what gives a special contribution to the improvement of essential infrastructure without which the significant economic development in B&H would be very difficult to achieve.

## **4. PERSPECTIVES OF DEVELOPMENT OF INSTITUCIONAL INVESTORS SECTOR IN B&H**

Since our financial sector is extremely bank-centric with still the largest share of traditional deposit and credit activities, it is necessary to ensure the best possible conditions for the functioning of the various non-banking financial companies. This would lead to the intensification of financial flows through the capital market and to a significant arrival of new investors, both local and those from abroad. It is obvious that activities of institutional investors correlate positively with the volume of trading in the financial markets, so it would also have a positive effect on our domestic capital market.

Within its strategic action program FB&H Government made clear that "the implementation of pension reform, stabilization of insurance sector, particularly affirmation of life insurance, final solution of frozen portfolio and creation of conditions for opening of the transformed privatization investment funds, pose challenges and very important preconditions for development of different forms of institutional investors".<sup>10</sup> Since in developed countries, banking and non-banking institutions often complement each other in the functioning of modern financial systems, business expansion of non-bank financial institutions within our bank-based financial system becomes even more important for economic growth and development of B&H.

### **4.1. Removal of the existing limitations**

Political instability in Bosnia and Herzegovina is a significant limiting factor being that any inflow of foreign capital, but also investments from domestic savings certainly seek an adequate level of security along the perceived yield on their investments. In addition to political instability, capital flows can hardly reach the desired level because of our insufficiently consistent legal system. According to the existing laws in B&H, as well as to numerous trading regulations prescribed by domestic Commissions for Securities and Stock Exchange, domestic investment funds were obstructed to trade on foreign markets, which made them less attractive for domestic and foreign investors. As for the economic factors that can be treated as limiting factors we must certainly mention low purchasing power of a large number of residents as potential investors, fiscal system that does not stimulate investments in the domestic capital market and alternative forms of savings sufficiently. Existing bureaucracy of the administration which distorts the business environment in B&H because of a large number of permits and approvals for business start-ups and investments in our market is another aggravating circumstance. Although, emissions and trade of different types of securities are present and legally enabled in our country, which can be

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<sup>9</sup> <http://www.tv1.ba/vijesti/bosna-i-hercegovina/dogadjaji/23880-federacija-bih-do-kraja-godine-reformirani-penzioni-sistem-uvodi-se-obavezno-zivotno-osiguranje.html>

<sup>10</sup> Agenda of Government of Federation of Bosnia and Herzegovina 2011. – 2014. p. 12

confirmed by inspecting the types of financial instruments traded in different market segments<sup>11</sup> of Sarajevo and Banja Luka Stock Exchanges, trade of debt securities, Treasury and Commercial bills, financial derivatives etc. is not significantly developed which all contributed to a weaker development of certain types of investment funds in our country. On the other hand, a significant capital outflow from enterprises due to high founding costs, funding and promotion costs of their business activities, privatization of the majority stake in large companies through tender sales, a small free-float<sup>12</sup> of companies with higher market capitalization, lack of privatization of large domestic companies which are dominantly state-owned with a significant number of companies which are not listed on the official markets in B&H and with the absence of clear measures which would make domestic companies "more visible" for potential investors certainly represent a significant limiting factor for more active participation of domestic investment funds.

If we focus on the existing laws that regulate the insurance sector, we can conclude that this field is regulated by different laws in the entities with separately implemented supervision, i.e through the Insurance Agency of FB&H and through a special department of the Ministry of Finance in RS. Also, during past several years some new drafted laws were launched both in the FB&H and RS which are not harmonized with each other. All of this points out to the insufficiently strong legislative role of the B&H Insurance Agency, which with the current validity of the relevant systems that also form the core business of the domestic insurance sector that are dating back to the 1990s, the obligation of the liberalization of the insurance market which is included in the Stabilisation and Association Agreement, the obligation to develop new or more comprehensive treatment of the existing legislation in order to implement the EU directives, etc., clearly indicates that the existing supervisory and regulatory institutions deal with a highly complicated task which will require time and hard work if they want to resolve it. In addition, new amendments to the legislations should intensify life insurance sector. One of the ways to stimulate life insurance is to treat it as pension and social insurance. Also, it is particularly important to enable sanctioning of any illegal foreign competition, which has already entered all segments of the domestic financial system.

It is essential to consider a variety of options such as tax reliefs for various forms of long-term financial savings, primarily for life insurance, voluntary pension insurance, housing savings, etc. Small and insufficiently attractive domestic stock exchanges need to achieve a stronger regional cooperation and networking with major markets in Southeast Europe if they want to increase the demand and liquidity of the domestic market.

## 4.2. Application of the experiences of other countries

Regarding experiences of other countries it is important that we enable establishment of various types of investment funds with specific investment strategies like other countries in the region, where potential investors have at their disposal equity, bond, cash, mixed, index, as well as funds which invest in real estate and other forms of assets. Following the example of Croatia and other countries in the region stronger measures should be taken in our country in order to enable the primacy of the open-end funds both in numbers and in value within our fund industry. In order to address a wide range of potential investors in Slovenia, both traditional and contemporary marketing mechanisms (television, radio, newspapers, websites, web portals, social networks, etc.) were put in use together with numerous educational programs and seminars which should also be applied in Bosnia and Herzegovina, since the financial "literacy" of the local population is far below the European average. A noteworthy example in Serbia which contributed to the strengthening of private investors' eagerness to invest in the funds is the ability to use their shares in funds in combination with other products of banks and insurance companies. On the other hand, in order to continue the encouragement and acceleration of economic development of Montenegro, the Investment and Development Fund of Montenegro (IDF) was established, with a very similar kind of agenda of the European Investment Fund. As for the experiences related to the insurance sector it would be important to primarily intensify the harmonization of domestic legislation with the one in European Union, as our western neighbours did. Following the example of Croatia, our domestic legislation should categorize investments of insurance companies as the value of assets intended to cover technical and mathematical reserves, which also have to match the amount of the required coverage. Another interesting, but also a very important fact in the context of strengthening the B&H insurance sector points to the special treatment of flood insurance in the UK. Given the recent floods with catastrophic consequences in our country it would be useful to follow the same approach and develop a model that would make flood insurance available to the largest possible number of population at an acceptable cost. On the other hand, as one of the incentives for

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<sup>11</sup> Available on [www.sase.ba](http://www.sase.ba), [www.blberza.com](http://www.blberza.com), [www.cbbh.ba](http://www.cbbh.ba)

<sup>12</sup> Free-float market capitalization is the term that indicates the method for calculating the value of certain parts of the company, which is based on determining the value of shares that can be regularly traded on an organized market.

the popularization of life insurance authorities of Montenegro planned to pass certain tax reliefs for these products, as well as for supplementary and private health insurance. Pension system reform in Chile achieved a great success in a relatively short period of time. It achieved more stable and equitable social situation in the country, economic growth which is financed through the capital market, better standard and living conditions for pensioners etc. Chilean gradual transition from the public to the private pension system is probably the best model for our country as well, especially since this approach did not require a steady increase in income taxes in order to establish the financial structure of the pension reform itself, which is extremely important for both employers and workers, as well as for the state.<sup>13</sup>

## 5. CONCLUSION

Analyses have indicated indisputable fact that the privatization-investment funds played an important role in the initial development of the capital market in B&H. Although the new law on investment funds enables the establishment and business of different types of investment funds, in terms of our domestic system these institutional investors are essentially divided in open-end and closed-end funds. It is clear that the transformation of existing closed-end funds into new open-end ones is necessary regarding the establishment of various types of institutional investors. On the other hand, an incentive to economic growth and development often comes from complementary action of the insurance sector and the banking sector that makes business expansion of insurance companies in B&H even more important. It is thus evident that savings substitution in B&H is necessary and in the context of insurance it would involve products that would mean investing available funds in the longer term. Therefore, it is necessary to strengthen the share of various types of optional insurance products, especially life insurance, either through various incentives, reliefs, etc., in order to provide these significant institutional investors with long-term funds needed to finance domestic real sector. Financially unsustainable existing pension system cannot meet its basic long-term goals, and it is quite clear that the reform of the pension system is an issue of social transition that needs to be urgently and systematically implemented in the near future. Such existing pension system in B&H is an aggravating factor to the functioning of the financial system, but also in generating economic development. The new pension system as a combination of public and private pension insurance still gives hope for higher pension benefits in the future as well as for a long-term stability of the system. Of course, each country has its characteristics, however analysed experience in developed and transition countries, may not be best suited for our country, but those realistic and positive experiences should be implemented in our framework. Based on the above mentioned, it can be concluded that in terms of our financial sector, numerous and serious reforms are required, which will certainly include passing of new laws in the field of finance, and significant amendments to the existing ones.

## ACKNOWLEDGEMENT

The data for this paper was collected as part of the author's doctoral dissertation.

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# BIO-ECONOMY ENSURING SUSTAINABLE AGRICULTURAL PRODUCTION

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## ABSTRACT

Bioeconomy is a sector of the future. It is expected that in the coming years, investments in the bio-based economy will bring big profits. Aim of this paper is to identify the Bioeconomy in the concept of ensuring agricultural production. Bioeconomy is Europe's response to key environmental challenges the world is facing already today. It is meant to reduce the dependence on natural resources, transform manufacturing, promote sustainable production of renewable resources from land, fisheries and aquaculture and their conversion into food, feed, fibre, bio-based products and bio-energy, while growing new jobs and industries. Bio-economy is seen as a tool to cope with global challenges, especially population growth, climate change, and the increasing demand for materials and energy. Agriculture is a significant part of the sustainable socio-economic development. This is due to the fact that it plays a special role in the implementation of sustainable development because of the importance of natural resources management (land) and some features that do not allow to treat the agricultural activity as industrial one or as a service. Nowadays, primary production in Slovakia of renewable energies is quite diverse. New technologies bring new possibilities how to produce other types of renewable energies effectively. Authors presents production and use of biomass in Slovakia and analyze the effects of biomass production. The paper concludes by discussing SWOT analysis of Biomass production and energy utilization of biomass in Slovakia.

**KEYWORDS:** Bioeconomy, sustainable development, biomass, agriculture, renewable resources

**JEL CLASSIFICATION** Q01, Q10, Q20, Q57

## 1. INTRODUCTION

Agriculture belongs to the few economic sectors that use free solar energy for biomass production - a true value added to Earth. Despite the fact that agriculture plays a key role in implementing, the concept of sustainable development it is not clearly defined and therefore it is difficult to determine when agriculture is sustainable.

Bioeconomy and sustainable development is a little that covers the interactions of the natural environment with the economic process under the target of sustainable development. The concept of the Ecologically Sustainable Economic Development (ESED) is defined as "the development that meets the need of present generations without compromising the ability of the future generations to meet their own needs" or as "a pattern of social and structural economic transformations which increase the benefits available in the present without jeopardizing the likely potentials for similar benefits in the future".

### 1.1 The concept of sustainable development

In literature there are many terms which define what is covered by sustainable development. Generally, the concept of sustainable development includes economic (economic growth), environmental and social aspects. The following diagram shows the connection of these ideas:

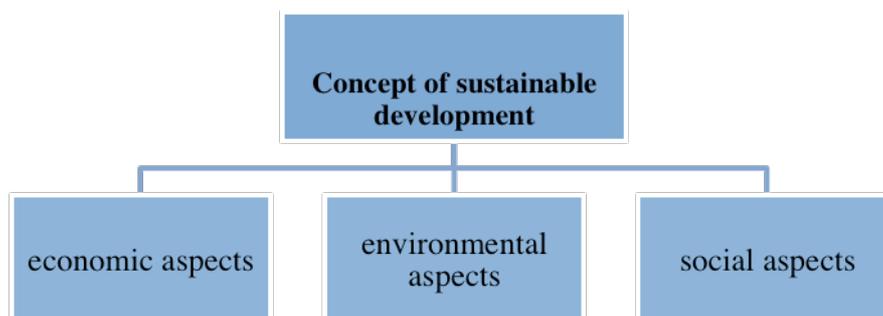


Figure 1 Concept of sustainable development. Source: self-study

The concept of sustainable development assumes the possibility of transforming society and its various spheres of functioning in such a way which would protect resources and allow successive generations the use the achievements of others. Its aim is to create a kind of symbiosis between man, the artificial environment and endangered biocenosis and biotope. This is to ensure harmony between economic growth, in purely economic terms, and environmental improvement.

The weak sustainability criterion states that the total value of natural capital, human capital and that of the man-made goods as capital cannot reduce over time. This idea assumes the unlimited mutual substitutability of capital goods and creates the necessity to financially assess nature which is reflected by the applied tools

The Bioeconomy is already making substantial contributions to sustainable development and this contribution will increase in the future: higher quality, renewable raw materials will be produced sustainably, and food security and a healthy environment will continue to be assured.

## 2. DATA AND METHODS

To fulfill goal we used the methods: analysis, deduction, induction, synthesis. Analysis consisted of acquaintance with Bioeconomy and field of sustainable production. Deduction and induction was used after collecting enough materials, articles about Slovakia in this field. The use of synthesis consisted of summarizing the knowledge and defining the pros and cons of analysed Bioeconomy and sustainable production.

## 3. RESULTS

### 3.1 Energy production in the European Union from renewable sources

Effects on renewable energy source to the EU grew last years rapidly. European Union as one large association must make great efforts to meet the target in 2030. Many of member states will have to make great efforts to fulfill the main goal for the share of energy from a renewable sources in final EU consumption.

Period up to 2011, which was difficult for renewables sources, due to the strong impact of warm weather the country has caused the stagnation of the country's progress in implementation of Directive Plan for a renewable energy sources as well as economically situation in the EU resulted in the sinking of energy from a renewable resource in 2012. Part of a renewable sources in total energy consumption actually increased. It resulted in the consumption of fossil fuels, which fell as multiple consumption of renewable resources. In 2014 the share of a renewable sources in final energy consumption of the EU enhanced to 17 percent.

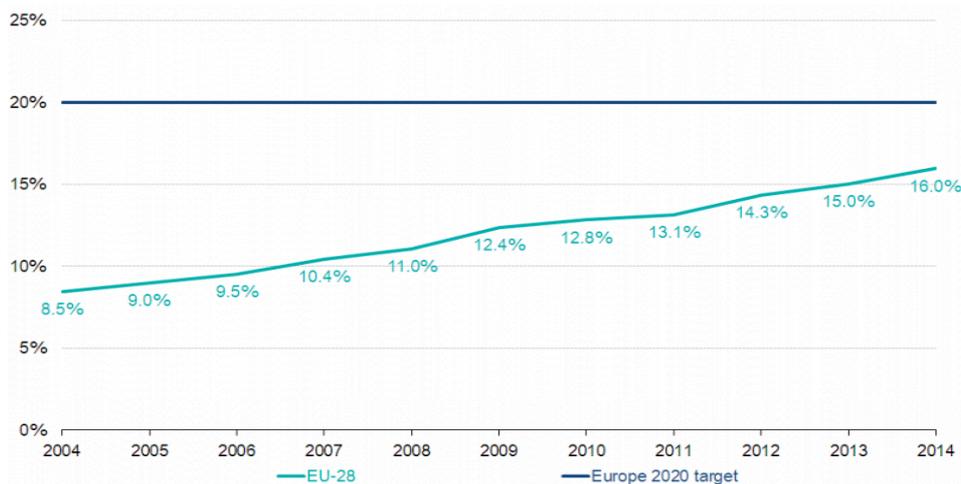


Figure 2 Share of energy from renewable sources , EU-28. Source: Own processing, data from Eurostat

Primary production of energy from a renewable resource is in the long term rising trend of production. Production begins in 90 th years and to the present day has increased by 180 percent. The year 2012 meant for the production of renewable resources diminishing by 1.9 percent. This reduction mainly caused a reduction in biomass combustion. For the entire period were only two drops products. First decline in 2003 was due to the lack of water during the summer season.

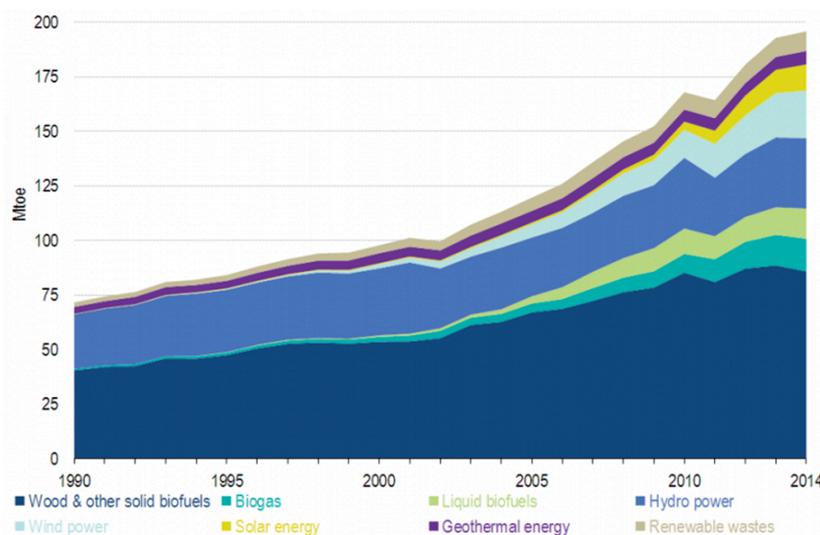


Figure 3 Production of energy from RS, EU-28. Source: Own processing, data from Eurostat

The largest share of electricity from renewable energy sources are hydropower plants. Production and electricity from hydropower plants over the last ten years increased by 32 percent, but the share of total electricity production in the EU was reduced to half. Wind energy quadrupled the share of electricity production for the last five years. Since the beginning of 2002, wind energy has become one of largest contributor and replaced from first place the wood burning biomass. Solar energy develops the last 4 years and now accounts 10 percent of all electricity from a renewable resource. The new special thermal power plants are used for burning and create energy from biomass. Share of total energy production is around 25 percent. Use of biogas is the least widespread and production represents only 6 percent of the total energy production.

### 3.2 BIO fuels in EU-28

Production of biofuels is in the European Union new theme. Production started after 2001 and subsequent increase in this sector reported up to two years. Increase in production of biofuels in the last ten years has been

34 percent. EU biofuel consumption should continue to grow. After a slight stagnation in 2011 until 2022 it is expected to gradually increase the use of biofuels to double the current situation. The production of biofuels from cereals should rise from the current 11.3 million tons to 21.7 million tons in 2022.

Production of energy from renewable sources is different from the geographical situation of the country. Each EU country has a different potential for the production of energy from a renewable source of energy. Decides geography and climate of the country. For example, Germany used to produce energy the largest number of hydroelectric power plants. Austria used to produce energy wind farms, wind farms are high in this country, 45 percent share of the production of electricity from a renewable resource.

Slovak Republic used for producing energy from a renewable source has two main sources of biogas and biomass most widespread. Due to the size of the EU it is possible to use all kinds of energy, each country is characterized by the production of the one that has the greatest capacity.

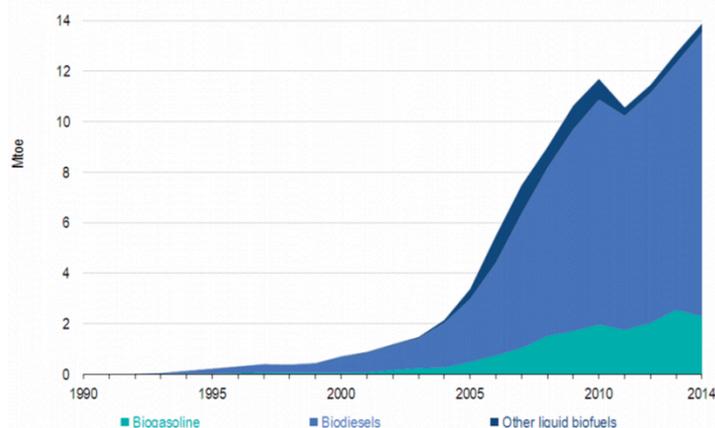


Figure 4 BIO fuels produced from renewable sources, EU-28. Source: Own processing, data from Eurostat

The intensive use of biomass in the energy sector creates conditions for the development of new sciences industries. Energetic potential based on renewable energy carriers must focus on long-term considerations and global solutions. The long term goal for research and development of biomass energy use is primarily to ensure its competitiveness with fossil fuels - without subsidies and open conditions for the comparison of full costs of production. It is desirable to increase the share of biomass in the provision of annual energy consumption in the EU is in line with long-term concept and strategy of the EU Commission, in the period 2030. In various studies demonstrated the feasibility of these goals if they are properly applied policies and decisions. It is essential that the gradual increase in the energy share of biomass in the annual balance realized exclusively environmentally and economically sustainable practices.

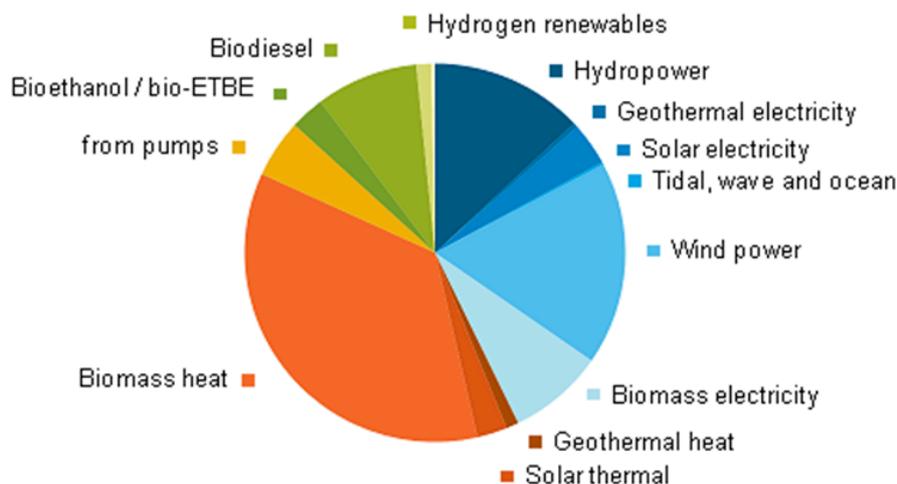


Figure 5 Parts of renewable energy in Europe. Source: Own processing, data from Eurostat

### 3.3 Biomass in Slovakia

Biomass is derived from all organic material as agricultural and urban waste and trees, plants. It is used mainly for heating and cooling production, electricity generation, and transport fuels. The biggest portion of biomass in European Union has wood and wood waste and it is about 50% of the share of the energy from renewable sources (EUROSTAT, 2013).

Growing usage of biomass in the European Union may help to diversify Europe's supply of energy, create growth and workplaces, and decrease greenhouse gas emissions. Sustainable manner of usage of biomass can play significant role in helping to address concerns about climate change and security of energy supply, along with contributing to economic growth and employment, particularly in rural areas.

Agriculture is the largest source of green energy and is important use alternative resources responsibly. Finding alternatives for energy production is one of the most important priorities of all countries of the world. Even though are urgent needs for renewable energy, Slovakia participates only 8.2% for its use. But they adopted a series of measures, which by 2020 should provide 16% share, according to set national targets for renewable energy. We lag behind in the use of natural resources compared with another European Union countries. National targets are steps to increase use of green energy and energy independence. The importance of using renewable energy sources is gradually increasing, but not at the level of technically exploitable potential. The farms on the Slovakia using agricultural production for energy purposes but is still not enough.

#### 3.3.1 Production and use of biomass have positive effects

From the view of production:

- Improving the agriculture competitiveness by alternative land management,
- Development of economic activities in rural areas, production of fuel wood biomass on unused agricultural and other lands,
- Improving the competitiveness of sustainable forestry production growth of wood biomass as a fuel chips, also to improve the state of forest ecosystems,
- Improving the efficiency of use of biomass, such as waste or by-product in wood processing industry, food industry, municipal and other industries,
- Developing economic activities related to biomass production (technology, services, etc.).
- From the view of energy production:
  - The replacement of fossil fuels with biomass and increasing energy independence of the country,
  - The stabilization of production costs for energy and increasing of energy supply security,
  - The improvement in the trade balance as a result reduce the need for imported energy and fuels,
  - Reduce the production of emissions, particular greenhouse gas generated in the production of energy from fossil fuels and transportation.

Nowadays, primary production in Slovakia of renewable energies is quite diverse. New technologies bring new possibilities how to produce other types of renewable energies effectively. In Figure 1 is shown portions of different sources of renewable energy produce in Slovakia. The largest share has biomass and biomass waste. It is due to the fact that Slovakia is agriculture country and has large part of area covered by forests and arable land. Next large part of share has hydro power. In Slovakia we have good water system conditions to produce such energy source. Another sources of renewable energy have quite small share on production, just liquid biofuels have small-bigger portion.

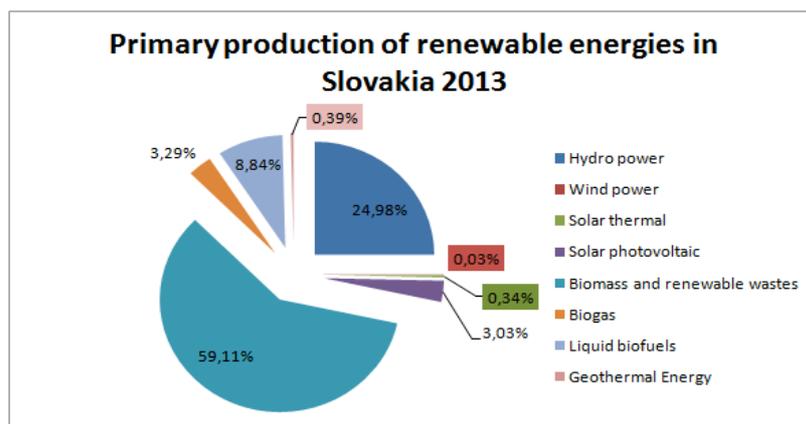


Figure 6 Primary production in Slovakia. Source: Own processing, data from Eurostat

### 3.4 Biomass resources

The main sources of solid biofuels in Slovakia are wood biomass from forest, non-forest land and wood waste, due to the natural conditions and the structure of land use. Agricultural non-wood biomass is also used. The proportion of wood biomass to the current total annual consumption of biomass for energy is 88%, while agriculture provides 12% of biomass for energy use.

#### 3.4.1 Forest biomass

The total supply of wood for Slovakia reach 472.2 million m<sup>3</sup>, equivalent to 244m<sup>3</sup>/ha. Broad-leaved woods have 55% of the stocks, while 45% are coniferous. The annual growth is 12.1 million m<sup>3</sup> in total or 6.3m<sup>3</sup>/ha. About 55% of the stocks in Slovakia are standing in state forests and 45% in private forests.

*Main trends of forest research related to biomass production*

- The impact of climate change on the development of the wood structure and production possibilities of forest,
- Production and non-production function of forests and increase biodiversity in forest ecosystems,
- Procedures for forest stands tending to increase the quantity and quality timber production, to improve the stability and forest health condition,
- Intensification of wood biomass production in intensive plantations of fast-growing tree species,
- Economically efficient and environmentally beneficial technologies of extraction and complex processing of wood biomass,
- Optimization of forest roads availability and transportation of biomass logistics,
- Storage of biomass in order to improve their energy characteristics,
- The impact of growth in production of wood biomass for landscape environment, stability, employment, compared to alternative solutions.

#### 3.4.2 Agricultural biomass

Solid or liquid agricultural biomass is currently used for the production of energy, especially in biogas and the production of liquid fuels.

*Main trends of agricultural research related to biomass production:*

- Optimizing the use of cultivated agricultural land in ensuring food safety and alternative production,
- The impact of climate change on the production capacity of agricultural land,
- The impact of alternative use of agricultural land for landscape environmental stability,
- Production potential of energy types and other industrial crops,
- Cost-effective technologies for the establishment of forest plantations and industrial energy harvesting crops, processing and storage,
- Logistics of agricultural biomass,
- Optimization of benefits and costs in respect of the production and use of agricultural crops,
- The development of innovative new products from agricultural biomass.

### 3.5 Energetic use of biomass

The total annual net consumption of forest enterprises in 2014 was 20 000 tons of wood chips and 30 000 tons of firewood. 1 280 000 tons of solid and liquid residues was total yearly self-consumption woodworking industry, including pulp and paper industries were Annual consumption of black liquor was 148 000 tons of solid and liquid residues. Annual consumption of black liquor was 480 000 tons and 830 000 tons of solid residues in the form of chips and sawdust. Biomass is mainly used to produce technological heat and power.

Especially in rural areas, Slovak households are directly heated by firewood, which are about 230 000 households (30%) and only about 1,000 households heated pellets. In 2014 total annual consumption wood biomass households amounted to 1.064 million tons. Actually, in Slovakia exist 237 district heating systems. Nine of them are supplied from heating or power woodworking and paper industry. The next seven district heating systems have heat distribution from regional power plants that use coal, natural gas and biomass plants. Total annual district heating systems based on a wood use is 104.

In 2014 yearly consumption of wood biomass was 1 360 000 tons in heating or power plants which are producing heat for district heating system, without supplier of woodworking and pulp industry. 136 000 tons was consumption of wood biomass in other industrial sectors.

In 2014 total wood biomass usage for energy purposes was 3 890 000 tons. This number includes all sectors and households in Slovakia. In Figure 2 is exactly shown use of each sector in percentage. The biggest part takes district heating plants 35%, than there is 33% which belongs to wood processing industry. Households make portion of 27% and industry just 4% and forest enterprises only 1%.

### 3.6 SWOT analysis of biomass production and energy utilization of biomass in Slovakia

To increase production of biomass produced from the tree-tops and tree trunks in a sustainable way, whose quality do not correspond with the requirement for other use options and other wastes following the timber felling and handling in forestry on forest land. To optimize the waste utilization following the mechanical biomass processing and to use raw material for energy purposes, of quality that do not correspond with the requirement for other use options or the use is not economically profitable.

To create or stimulate the creation of the network of energy producers in the region, with heat production or heat and electricity production and related consumption of fuel wood biomass that do not corresponds to its available sources in terms of supply. In table X there is SWOT analysis of biomass production and energy utilization of biomass in Slovakia.

Table 1. SWOT analysis of biomass production and energy utilization of biomass in Slovakia. Source: Oravec M., Slamka M., Biomass production and energy utilisation of biomass in Slovakia [online]. Moscow, 2013, Available on: <http://iet.jrc.ec.europa.eu/remea/sites/remea/files/files/documents/events/oravec.pdf>

Strengths	Opportunities
<ul style="list-style-type: none"> <li>• High forest cover region, combined with rising stocks, high quality timber.</li> <li>• Great potential for the production of biomass fuel for forest and non-forest land, covered by tree vegetation.</li> <li>• The well-established infrastructure is suitable for timber transport in the region and outside the region.</li> <li>• Significantly high levels of centralized production of heat, especially in cities and medium-sized cities.</li> <li>• Regional availability of research capacity in the area of biomass production and its energy consumption.</li> </ul>	<ul style="list-style-type: none"> <li>• Improving the efficiency of forest management on forest land</li> <li>• Assumptions for the development and stabilization of wood processing industry in the region and beyond.</li> <li>• Substitution of fossil fuels in the region, particularly natural gas by wood biomass fuel.</li> <li>• Support activities and utilization of research and development is one of the conditions for developments in this area.</li> <li>• The development of a viable strategy.</li> </ul>
Weaknesses	Threats
<ul style="list-style-type: none"> <li>• Financial constraints are limiting the wider use of modern technologies of felling.</li> <li>• A large percentage of random felling due to wind throw</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of interest of ministries in the development of a viable strategy for the development of the production and use wood biomass fuel.</li> </ul>

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| <ul style="list-style-type: none"><li>and outbreaks of bark beetles.</li><li>• Lack of network density forests, especially in mountainous areas</li><li>• Lack of co-operation and exchange of information between the forestry and wood processors and lack of influence of component institutions</li><li>• Lack of funds for investment in technologies from wood biomass</li></ul> | <ul style="list-style-type: none"><li>• Permanent the situation for the promotion and production of biomass.</li><li>• Lack of support and exploitation of research and development in the field of wood use.</li><li>• Lack of funds for the implementation of development activities in forestry, agriculture, pulp and paper industry, energy and other related sectors.</li></ul> |
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## 4. CONCLUSION

The developing bio-economy is a dynamic complex phenomenon influenced by various global mega-trends. For better understanding the roots of this complexity and identifying instruments properly to its evaluation is therefore a prerequisite for effective policy formulation.

First question is how to best characterize the bio-economy's structure and relationships to the rest of the economy. The bio-economy underscores major differences between these two concepts. Especially when they refer to a subset of similar economic sectors they have totally different goals. As the eco-industries are defined according to their potential for reducing the negative impact on the environment, the concept of bio-economy instead tackles innovation, and how to maximize the efficient use and value-added of bio-resources.

Drivers processes for bio-economy, the environmental, economic and social nature. These drivers affect the flows of biomass, inputs required for biomass production and distribution of output and its use. In order to solve the multidimensional feedback and synergies of bio-economy, coordinated management of renewable biological resources in agriculture, food production, bio-based industries, climate change and rural development appears to be the most appropriate policy approach.

In addition to the many environmental benefits, biomass offers many economic and energy security benefits. By growing our fuel at home, reducing the need for imported oil and reduce our exposure to disruptions in that supply. Biomass is the most important fuel and energy sources in the Slovakian condition, which could easily replace fossil and nuclear energy. Due to 42% of Slovakia surface is covered with forests, more than 73% of the biomass from waste wood. However, we do not give sufficient attention to matter of environment, because the constant conventional energy sources decreasing and deterioration of the environment. At the time of the transition to sustainable energy and efforts on environmental awareness, it is also necessary to solve the problem of lack of information of people on the feasibility of using biomass at all.

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# PRIVATE OVER-INDEBTEDNES IN SELECTED CENTRAL AND EASTERN EUROPE COUNTRIES

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## ABSTRACT

The private indebtedness comprised of both households' and non-financial corporations' debt levels, is a significant factor of social exclusion and it attracts considerable public interest. This is partially caused by insufficient financial literacy of the population but also with an increased demand for new products and services that often exceeds personal financial capabilities of majority of people. A main difference among economies in Central and South East Europe is the housing credit which was facilitated in many of them by state-subsidised financing schemes, denominated in some cases in foreign currencies, particularly Swiss Francs. The article explains the situation and encompasses the selected Central and Eastern Europe Countries where adequate surveys have been performed: Bulgaria, Bosnia and Herzegovina, Croatia, Czech Republic, Hungary and Poland. The robust growth in household debt in pre-crisis period coincided with real growth in household disposable income, large economic expansion and a considerable fall in banks' interest rates. However, household debt indicators deteriorated markedly as total household debt grew faster than income. This raised concerns about potential implications of an additional increase in the debt burden on financial stability. Although there are significant variations between mentioned countries, there are some similar causes and possible solution for amelioration of the situation.

## KEY WORDS

Over-indebtedness, personal finance, financial literacy, Central, Eastern Europe Countries

## JEL CLASSIFICATION CODES

D14, D22, G33, H31

## 1. INTRODUCTION

The growing interest in over-indebtedness in Central and South East Europe (CSEE) is in part a response to the upsurge in personal debt and the concern that the combination of rising unemployment, falling household income and the ruin of housing bubble, could lead to an increasing number of households being unable to repay their debts. While there was a significant expansion in credit and in financial services during the boom period, the various analysis and surveys show that at the end of the boom in 2008, many households in CSEE did not possess adequate financial literacy. No doubt that private indebtedness impacts considerably on households' behavior. Whereas the financial deepening in the majority of old member states of the European Union (EU) is based on a long experience on behalf of financial institutions and consumers of their services as well, in the new EU members this process exceeds the average financial literacy in most of the countries where consumers' demand for new products and services often outpaces the financial resources available and disregards the expected incomes (Georgiev and Zagorski, 2014).

A common European operational definition of household over-indebtedness does not exist. According to Gloukoviezzoff (2007) conventional definitions of over-indebtedness state is the inability of people to meet their household's obligations (i.e. to pay their households bills including rent and mortgage) and meet the repayments on any consumer credit they have arrears or the use of administrative procedures such as consumer insolvency proceedings. European Commission (2013) composed a specific definition was for the study where households are considered over-indebted if they are having recurrent difficulties meeting (or falling behind) with their commitments, whether these relate to servicing secured or unsecured borrowing or to payment of rent, utility or other household bills.

Due to the lack of common definition of the phenomenon, it is difficult to assess the exact number of over-indebted people but no doubt it is significant and increasing. Over-indebtedness is a heterogeneous problem.

Among the working poor and long-term unemployed, it usually caused by accumulated missed payments on utility and phone bills, and on rent. The economic crisis, with many lay-offs and reduced social benefits, has enlarged this group with debt problems. However, much of the increase in over-indebtedness is caused by another group: people who were in well-paid employment, lost their jobs and are now left with large mortgages on their houses without the prospect of increasing their income anytime soon. Between these groups and within them, there is great heterogeneity in the causes and consequences of over-indebtedness. Among causes, one can mention predatory lending, insufficient and weak consumer protection, irresponsible personal finance practices caused by widespread consumerism, a lack of financial literacy. Over-indebtedness has serious consequences on the health of people affected because it endangers their psychological stability and causes the feeling of anxiousness, fear, frustration and stress. Over-indebted persons often have worse health conditions; they suffer from continuous feelings of exhaustion, and endure more physical pain in comparison to the total population. Because of the aggravated health condition of individuals affected, significant social costs arise which can be classified in direct terms (the medical treatment, convalescing in hospital, medicines etc.) and indirect costs (reduction of productivity, absence because of the sick leave, the costs of long-lasting medical treatment, rehabilitation and the early retirement of affected individuals). There are also further social costs, such as increased probabilities children dropping-out of education, lowered productivity and increased or of criminal behaviour. Thus, because of over-indebtedness and low levels of education poverty can be transferred to new generations.

Data on indebtedness and financial difficulties among EU households from 2011 in general allows grouping households in CSEE in various sections according to the level of household arrears (very high, high, moderate and low). Croatia is not included since it was not an EU member then. The first section involves Romania, Hungary and Bulgaria followed by Slovenia and Poland in the second group and the Czech Republic and Slovakia in the third one. According to data from the European Central Bank (ECB), in the first group the share of households with level of household arrears and households' inability to make end meets is very high above, 21% and 36% respectively. The situation is little bit better in Slovenia and Poland where mentioned shares are high and over EU average, 11% and 26% respectively. The situation regarding level of household arrears is relatively positive (below EU average) in Czech Republic and Slovakia, but still in these two countries there is a high percentage of households that were unable to make end meet. In Bulgaria and Hungary the household debt declines compared to the disposable income in the recent years, in all other countries the trend is the opposite (European Commission, 2013).

## 2. SITUATION IN OBSERVED COUNTRIES REGARDING PRIVATE OVER-INDEBTEDNESS

**Bosnia and Herzegovina (B&H)** - Microfinance has been a lifeline for many in B&H playing a critical role in helping people - particularly women - recover from the conflict. Yet the rapid growth of microfinance industry combined with inadequate financial literacy among its customers resulted in multiple borrowing and over-indebtedness. Aggravated by the financial crisis, over-indebtedness led to a dramatic rise in non-performing loans and an average of 40 percent loss in equity. This figure would have been even higher except that MFIs had already begun to aggressively write off loans. By 2009, one-third of microfinance clients in the country had at least two loans and were unable to make on-time repayments. Nearly all the 12 largest microfinance institutions (MFIs) experienced a sharp rise in portfolio-at-risk, reaching 7% in June 2009. There are numerous activities aimed to restore microfinance sector by promoting Responsible Finance practices: consumer protection, financial institutions self-regulation, and financial education. In addition, various international organisation, like International Financial Corporation (IFC), focus on debt resolution and improving the legal and regular problems. Praiseworthy is the initiative of establishing *Plus*, a non-profit debt advice centre. Since 2009, over 7,000 people participated in its personal finance workshops, and over 2,000 individuals received debt counselling and mediation services. More than 40 percent of over-indebted microfinance clients who turned to *Plus* for counselling were able to work out a financial plan to re-pay their loans. In addition to face-to-face workshops, *Plus* organised a telephone hotline on debt issues and a mobile financial education programme.

**Bulgaria** - Belchev (2014) explains that until 2009 the banking services in Bulgaria experienced a rapid development, what was followed by a consolidation of the banking sector and its adjustment to the circumstances of the economic crisis. The processes of credit expansion in Bulgaria took place in the wider context of fast penetration of household credit and was accompanied by several important changes: banks reduced their operational costs, primarily by the optimisation of the branch network; granting loan conditions were revised and the risk was optimized; credit financing transferred from funds provided by the mother companies<sup>1</sup> to own resources. There are two main time periods in the dynamics of lending to households: the

moment of accelerated credit expansion in the period 2006-2008; and the period of slowing down and freezing of lending after 2009. Between the end of 2010 and March 2014 there was there is an increase of the share of bad and restructured loans in banks' portfolio (from 10.3% in 2009 to 18.1% in 2014) due to the deteriorating labour market conditions and rising unemployment. The Economic Policy Institute realised the survey of household over-indebtedness in Bulgaria with the goal is get the insight into a profile of the borrowers. Almost half of all indebted respondents (46%) have significant loans (over € 10,000), while 41% have debt servicing difficulties. Situation seriously deteriorated in the period 2009-2013, so a share of households that properly servicing banking loans has decreased from 33.8% of all households to 22.8%. The main reason for the households' irregular repayment of their debt is the budget deterioration, so 43% of all affected identified the decrease of income from a permanent employment as the main cause for their over-indebtedness. An important part of the respondents' profile is their future expectations about the family budget. For this purpose, they had to evaluate their possibility of future debt serving difficulties. The respondents were sorted into two groups in those who already have debt serving difficulties and those who have not. The first group has much more negative expectations. In the survey by Gurov (2014) 75.9% of respondents stated that the terms of borrowing in Bulgaria are too harsh; almost 4 out of 5 "fully agree" that the interest rates and especially the annual percentage rate of charge are too high to venture into contracting a loan, 3 out of 4 declared themselves in favour of state intervention in the household lending market and in the bank policies for crediting. Furthermore, around two thirds declared the procedures for obtaining and servicing credit are lacking needed transparency and the same proportion declared that creditors are not correct in communicating information about the loans they offer. Almost half of the interviewees contemplate that creditors and debtors are not equal in rights and that banks dictate unilaterally the terms of the interaction. In comparison to the previous period, Gurov believes that it is possible to confirm some degree of financial maturation and improvement in the financial literacy of Bulgarian population. While the unreasonable demands are significantly shrinking - for example the demands for high deposit interest rates and low loans interest rates - the criticism towards the imbalance in the creditor-debtor interaction and the low level and/or the lack of transparency and responsible crediting are intensifying. Finally, the overall attitude toward loan consumption is very negative: 58.5% of respondents state that they will resort to credit under no circumstances, except for extreme urgent necessity.

**Croatia** - In approximately the last 14 years, the credit indebtedness of the population in Croatia first increased from 25.0% of GDP at the end of 2003 to 30.6% at the end of 2005 and reached the peak of 40.7% at the end of 2010. Since than the debt of the household sector 2011 stagnated. Weaker household demand for loans was largely due to negative trends in the domestic labour market and increased tax burden that led to stagnation in real disposable income. The process of decreasing indebtedness intensified during 2012, so the household debt until the end of September dropped below the level of 40% GDP (Croatian National Bank, 2013). In 2013 households continued to increase their savings in banks and housing savings banks (by average 4.1%), which considerably contributed to the rise in their overall liquid financial assets. The halting of the contraction of economic activity at the beginning of 2014 was not a sufficiently strong incentive for the recovery of undermined household optimism. Together with the further decline in real income and the obvious change in consumers' habits, caused by the years-long recession that decreased their real assets. This was a major hurdle in strengthening household sector's demand for new, especially long-term, loans. The deleveraging process continues; even slight deceleration is quite possible. Despite that, the potential future bank losses which could arise from lending to this sector have increased, primarily due to a greater exposure of households to interest rate risk. The sharp appreciation of the Swiss franc increased the household sector debt at the beginning of 2015. However, the fixing of the CHF/HRK exchange rate at the level it had stood prior to the impact neutralised the short-term effects on the debt repayment burden of some households, transferring the entire burden to the banking sector. The expected further stagnation of employment and the continuously high exposure to exchange rate and interest rate risks remain a threat, which may, in the event of a more severe shock, make debt repayment difficult for some households. By the end of September 2015, total debt had declined by -0.5% at an annual level, while the correction was much higher (-6%) if the estimated effect of the conversion of loans in Swiss francs is included in the calculation of debt. The debt-service burdens continued to plague lower-income families disproportionately primarily because the income of the poor does not allow them to save. Only 13% of the poor have had access to borrowing (from either the banking system or intermediaries other than relatives) during the last 12 months. The poor do not save much and barely borrow in formal credit markets - which exposes them more to loan-sharking and higher income rates. The combination of low capacity to save with limited access to borrowing leads to the situation that the poor are also vulnerable to shocks and hence to income fluctuations. Although the percentage of indebted households in the lowest income groups is relatively small, relative indicators show that their debt and loan repayment burdens are significant. Croatian research on household debt is scant and one rare piece is by Bejaković, Mastela Bužan and Urban (2008). According to data by the Household Budget Survey, the authors deem that one third of households (about 470,000) have debt, and this

proportion did not change between the 2003 and 2006. However, the share of households with mortgage loans increased from 9 to 14% and the share of households with other loans decreased from 27 to 23%. Approximately 3% of households have housing and other loans. The average number of loans per household is 1.4 which has not changed in the observed period. Approximately 3% of households have three or more credits. Using the Household Budget Survey, Sugawara and Zalduendo (2011) find that very few households in Croatia are at risk as a result of the shocks experienced over the past few years. They state that new vulnerable households represent about 2 percent of all households, 6 percent of households are with debt and 2–3 percent of aggregate banking system assets. The low levels of vulnerable households, as well as the low levels of debt incidence, suggest that household debt is unlikely to become a drag on aggregate economic activity and that financial stability risks remain manageable. In particular, the approval of the 2007 Consumer Protection Act incorporated many of the EU Directives related to financial consumer protection. Furthermore, The National Council on Consumer Protection was established in 2008. Its goal is to advise the Government on its national strategy for consumer protection. One of the important factors that have a positive and direct influence on the level of indebtedness is the existence (or lack) of the credit registry. In an economy in which the value of the credit information index is null, because a country does not have an adequate and efficient credit bureau, the potential for over-indebtedness is large and can lead to an increase loan defaults. Simovic et al (2011) believe that Croatia is embedded in the mentioned situation because the bureau started effective operations in 2007 by which time the level of indebtedness of the population had reached a high level. Twenty Croatian banks signed a contract for the founding of the Croatian Registry of Credit Obligations (HROK). After obtaining approval of the Croatian National Bank, HROK was registered as an enterprise for business services and significantly prevented further problems with over-indebtedness. The Croatian Banking Association (HUB) and its member banks have long warned of the current account overdraft as one of the most expensive types of loans. It should only be used for bridging monthly household budget gaps until the salary or another income is paid into the client's account. The financial literacy of citizens seems to be rather poor, as citizens are inadequately informed about the rights and obligations in dealing with banks and other financial institutions (Vehovec, 2012). Within its Personal Finance Management project entitled "How to Harmonise Income and Costs?" (Free of charge workshops for citizens and available on its website [www.hub.hr](http://www.hub.hr)), the HUB and its member banks have informed the participants that it is generally more favourable to take on some other type of credit and to repay a "persistent" overdraft. Finally, in March 2015 the Government endorsed a consumer bankruptcy bill in an attempt to give over-indebted citizens a chance for a fresh start. However, this is not a magic wand but a difficult procedure both for debtors and creditors. All insolvent consumers could file for bankruptcy if they have not been able for three straight months to pay their debts which exceed HRK 30,000 (€ 4,000). This was an attempt to strike a balance between debtors who could not service their liabilities because of the crisis or other reasons and creditors who often incited citizens to incur debts. Before filing for bankruptcy, a debtor would first have to attempt to settle with the creditors out of court, before an advisory body the Financial Agency. If no agreement is reached, the proceedings would continue in court, with the consumer getting another chance to settle with the creditors. If no court settlement is reached, the court would appoint a trustee to divide the consumer's estate and represent a bridge between the court, the consumer and the creditors. Debts would be written off for debtors without assets or job prospects, while employed debtors would retain money only for the bare necessities, the rest going towards paying off their debts. However, some technical issues were not resolved (for example, who would cover the costs of trustees) and due to that the interest was significantly lower than expected.

**Czech Republic** - There is no common definition of over-indebtedness in the Czech Republic, nor of risk of over-indebtedness. However, some relevant definitions were used, like the one by the National bank that considers the ratio of a household's repayments to its income, reduced by essential expenditures on food, housing, energy, health and transport. If this ratio is over 50% the household is considered over-indebted. According to the Czech National Bank (2012) 38% of households have loans and these are frequently higher-income households. The ratio of household debt to gross disposable income reached 56.8% in 2012. Over-indebtedness in the Czech Republic concerns mostly lower-income households. Regarding demographic characteristics, more often over-indebted than other segments of population are young families and people who attended but did not finish secondary school. Recent trends are not positive and in the period 2010-2012 the percentage of over-indebted population increase for 4% annually (European Commission, 2013). The main macro-economic causes of over-indebtedness was unemployment level, followed by wage level and social welfare level because it is more difficult to find jobs, and wages have declined with the crisis. Furthermore, housing costs (especially in the Capital Prague) and utility costs are also important causes of over-indebtedness because most households that face this problem are paying rent for an apartment or have a mortgage. Finally, predatory or usurious types of credit/loans are an important driver of over-indebtedness. When banks refuse to give credit to people, the latter very often turns to predatory lenders that try to benefit from customers' defaults imposition of high contractual penalties and obtaining enforcement orders in order to satisfy a loan claim. The

poor financial skills and low level of financial literacy of large segments of society, led to a steep increase of over-indebtedness. The main effects of over-indebtedness is the deterioration of both living standards and well-being, followed by home repossession, reduced labour market activity, and family breakdown. The Czech Republic is one of the countries where a consumer association is the main provider of debt advisory services, complemented by private (for-profit and non-profit) organisations. The Czech Consumer Association co-founded with the Česka spořitelna Bank of the debt advisory centre, while other relevant providers include members of the association Citizens Advice Bureau and some other NGOs. Changes in responses to over-indebtedness observed during the last decade, mainly concern the Insolvency Act that came into force in 2008. The main aims of the new regulation were to ensure more transparency and better foreseeability of insolvency proceedings; confirm the status of creditors; motivate the debtor to commence dealing in a timely manner; discharge debtors if appropriate; speed up and improve the overall effectiveness of insolvency proceedings. The new challenges that need to be addressed by makers of policy decisions include: solving advertising that promotes credit and debt; improving financial education, unravelling the increased number of mortgages with variable interest rates; improving legislation and enhancing counselling and regulating debtors' fees (such as non-covered cost of unpaid reimbursements, etc.).

**Hungary** - There is no common definition of over-indebtedness but quite often is used approach that a household can participate in an over-indebtedness programme and get funding to repay its debts if the debt is the result of rent or utility arrears, is at least six months old and to the value of more than 50,000 HUF, or if at least one utility service has been cut off, and as long as the household's income is not above the minimum level required for housing need. There had been a significant increase in the number of over-indebted households, so data from Eurostat shows that the percentage of the population with arrears was 19.1% in 2007 and increased to 24.7% in 2011, what was more than twice the EU average of 11.4% (in 2011). Households more exposed to over-indebtedness are mostly poor and/or those with one or two unemployed persons. However, due to the crisis and changes in exchange rates, households with higher education and income levels were increasingly affected by financial problems, in particular those with mortgages in foreign currencies. The main cause of over-indebtedness is the unemployment level, followed by changes in exchange rates. Many households had taken out the maximum credit amount that the household budget could support and as macro-economic factors deteriorated they are over-indebted because they do not have any savings or fall-back options. Some of the most vulnerable group in Hungary are the Roma minority because they have no access to banking and other most important financial services, so they are target group of informal lenders (Bernát and Kőszeghy, 2011). Despite of some positive attempts by the Government, usury is expanding as the social welfare system is being destroyed while the availability of legal credit for a significant part of population is rather problematic. Households had become much more cautious when it comes to using credit. Consequences for affected households are seen in deteriorated standard of living, utility disconnection, worsening mental health and well-being. These were followed by home repossession and family breakdown or divorce, the removal of children from the household by authorities and relatively often cases of social exclusion. The lack of personal insolvency in Hungary was underlined as a relevant factor that aggravates the consequences of being over-indebted. Measures in force to alleviate the impact of over-indebtedness are mostly rare and ineffective. The identification of households at risk of becoming over-indebted at an early stage is not common at all, while legislation on systematic debt advisory services was passed but operated on a voluntary basis and only a few local governments provided such services. Furthermore, fairly effective in alleviating the impact of over-indebtedness, face-to face debt advice services are available only for households with utility or rent arrears and primarily for those living in cities, as the banks and utility service providers usually do not have branch offices in small settlements. According to European Commission (2013), changes regarding the regulation of credit, utilities and housing should be made at the national level. Also, there is a need to improve the financial literacy and to develop the budgeting skills of citizens, for example through various popular TV and radio channels.

**Poland** - Although there is no a specific definition of over-indebtedness, the Polish Financial Supervision Authority imposes a ceiling on monthly repayment instalments of 50% of the income of those earning below the average national salary, and 65% for those earning more. In summer 2012 there were 2,215,356 persons temporarily failing to meet their obligations in August 2012, what is an increase of more than 100% in comparison with the data figures for August 2007 (less than 950,000) (European Commission, 2013). Over-indebted and/or have constant difficulties meeting their financial commitment are households consisting of people between the ages of 25 and 64, households with one or more children, households living in owner-occupied housing with mortgages, households with two unemployed persons and households where the education level is elementary (primary) school or less. Regarding the age of over-indebted households, younger households - those between the ages of 25 and 39 - were more likely to face problems because they had higher living expenses, had been more negatively impacted by the economic crisis or had a more undisturbed attitude to

taking on debt. According to Ślązak (2014), the share of moderately indebted households (as high as their semi-annual income) dropped from 53% in 2003 to 41% in 2013. As a matter of fact, this author believes that the excessive debt reliance of Polish households is not widespread and there are no crucial social problems in this field. The country was affected relatively lightly by the economic crisis, in terms of economic growth, and maintained positive growth rates throughout the period from 2007 to 2011. Nonetheless, macro-economic factors have been important causes of over-indebtedness, in particular unemployment level that increased from 7% to 9.6%. In addition, the important factor was changing in exchange rates because many households in Poland had taken out loans in foreign currency, in particular in Swiss Francs. Between the end of 2007 and the end of 2011 the value of the Swiss Franc rose from 2.19 Polish Zloty to 3.67 Polish Zloty (Polish National Bank, various years) leading to a noteworthy increase in repayments for households who had taken out loans in Swiss Francs. Further important causes of household over-indebtedness in Poland are poor money management or a decrease in income due to business failure. Regarding cultural attitude towards debt and actual level of personal over-indebtedness, in Poland taking out credit had traditionally been perceived negatively and still it is by many older people (above the age of 40 or 50). On the other side, young people have a more relaxed attitude to credit and placed less emphasis on being debt-free, probably because they are more likely to be influenced by consumerism and/or to be willing to buy without thinking about the consequences. The most important consequences of personal over-indebtedness are financial exclusion, deteriorated standard of living, lowering well-being and disconnection of utility (water/electricity/gas/etc.). The debt advice sector in Poland is not particularly well developed so most over-indebted people have to rely on non-governmental organisations or public authorities working in the general field of consumer protection. The personal insolvency was introduced in 2009, but it is barely made use of by over-indebted households due to the strict nature of the procedure. Obviously there is the need for more control of unregulated lenders that often provided predatory loans with high-interest rates without doing sufficient credit checks. Additionally, it is crucial to improve consumer insolvency law and the provision of financial education.

### 3. CONCLUSION

Household over-indebtedness is a relatively new phenomenon for citizens of in Central and South East Europe countries, caused by the combination of changed economic circumstances and emergence of mass-consumption society and the fast liberalization of market related activities. The main actors the new circumstances are credit institutions (primarily commercial banks), on the one hand, and CSEE citizens trying to finance more and more actively different aspects of their life strategies and consumer needs on the other. It is important to underline that majority of the citizens in observed countries have no or very weak experience and financial literacy in dealing with and using financial products in a liberalised market and that access to credit modified their economic behaviour. Household indebtedness is a serious private and social problem, and if over-indebted households are not able to meet their liabilities due to altered macroeconomic conditions (e.g. an interest rate hike, unemployment growth or diminishing income), this might lead to a financial crisis.

To prevent multiple borrowing turning into over-indebtedness, financial institutions should ensure the implementation of adequate and comprehensive risk management tools. They need to assess not only the individual's credit risk but also include also all other forms of risk, primarily the market risks. Indeed, credit risk management must analyse clients' repayment capacity in the context of the market in which the loan is being disbursed, as much at the family and/or business level as the community level, and sometimes the regional level. From the Governments' side, there is a need to develop and/or improve consumer protection measures. Of particular importance are disclosure guidelines for product terms and pricing. It is important to promote further financial literacy training so that individuals can make better informed decisions about the products and services they use. The financial education and literacy programmes need to cover three areas: consumer awareness of the risks and rewards of various financial products; consumer education in preparing personal and household budgets and making long-term financial decisions oriented towards long-term sustainability; and surveys of financial literacy to understand which parts of the population may be particularly vulnerable to weaknesses in budgeting and planning, predatory lending and financial scams. The Governments can help in organising education professionals to provide free of charge, independent and reliable services on financial planning and providing advices to help citizens who have financial problems and do not possess adequate knowledge to cope with the complex range of financial products. The Governments should work systematically and help with consumer education and enforcement actions to enhance public awareness and to organise independent, free and confidential counselling services to target groups that have difficulty repaying a debt. In the observed countries there is a need to consider the possibility of introducing the subject of personal finances management in the curriculum of primary and secondary schools. Finally, it is a crucial to encourage and/or enhance the involvement of target groups in the planning and implementation of activities of advisory bodies to ensure

effective fulfilment of their needs, and to ensure that the target groups have equal access to and availability of advisory bodies. Briefly, over-indebtedness is a complex, multi-faceted, social phenomenon, caused and compounded by a combination of factors. There is a need for more robust data to facilitate informed policymaking because there are real social and economic benefits associated with preventing and addressing over-indebtedness. Thus, there is a need for a multi-dimensional and integrated government policy response. The aim of policy development should be to prevent and resolve over-indebtedness, and not just to manage and/or alleviate it.

## ACKNOWLEDGEMENT

Predrag Bejakovic will express his gratitude to the support by the Croatian Science Foundation under the project 6558 Business and Personal Insolvency – the Ways to Overcome Excessive Indebtedness.

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# INTANGIBLE CAPITAL AND PUBLIC SECTOR PERFORMANCE: EVIDENCE FROM THE POLICE SECTOR IN SLOVENIA

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## ABSTRACT

Intangible capital, defined as (Corrado, 2005): (1) computerized information (IT software and databases), (2) innovative property (primarily R&D, but also design and other) and (3) economic competencies (brand equity, firm specific human capital and organizational structure), has been shown to raise productivity in the private sector by up to a third. While the interest in the intangible capital in the private sector has been growing fast, the nature, structure and impact of intangible capital for the performance of the public sector has been receiving much less attention (Corrado et al., 2014, Redek, 2015). The recent economic downturn, austerity measures and the increasing (public) pressures for the efficiency in the public sector, call for a new approach in public sector management and for the need to identify the potential sources of inefficiency, including the nature of the intangible capital.

This study focuses on the police sector in Slovenia. The police has been, similarly as other public services, facing budget cuts, employment cuts, low technical investment, more stringent working conditions, low wages, and deteriorating relations. On the other hand, the call for public security has intensified, especially in view of recent migration problems. Despite the continuous cuts in funding and personnel, the sector so far managed to perform its duties. But the increasing strain is evident also in an on-going strike (since November 2015), requiring higher wages and better working conditions. The purpose is to analyze the nature of intangible capital in the police sector to determine, which aspects of intangible capital are more and which less problematic and how the weaknesses in the intangible capital impact the performance of the sector.

The analysis is based on survey methodology, adapted from the methodology for the study of intangible capital in the private sector (details in Prašnikar, ed., 2010). The data on intangible capital in the public sector was collected in 2014 and 2015. For the police sector, we received 160 responses. The results reveal that the police sector is comparatively in the worst position among different segments of the public sector in terms of intangible capital. The main problems for (1) information capital are low investments into equipment and centralized decision-making about all investments, revealed in poor satisfaction with the performance of IT. In terms of (2) innovative property poor focus on service quality is revealed, the services are not user and goal focused. In terms of (3) competencies, the sector invests comparatively a lot into training (obligatory by law), but the human resources management is evaluated as poor, motivation for work is low due to very limited mechanisms to reward the employees, if working well, promotion is not performance based. The inefficiencies from the perspective of intangibles' management are revealed in performance, primarily low motivation. In order to improve the performance of the sector and public sector at large, the state will have to improve the management of the public sector and go beyond cost and budget cutting.

The study contributes to the field of the study of the intangible capital, primarily intangible capital in the public sector. It is the first such broad and detailed study and one of the few (Corrado et al., 2014) that study the intangible capital (in comparative sense) in the public sector.

## KEYWORDS

Intangible capital, public sector, police, efficiency, performance

## JEL CLASSIFICATION CODES

H11, H12, H56

# VIRTUAL ORGANIZATION OF WORK SPACE – A SYSTEM GRASP

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## ABSTRACT

Directions of Information and Communication Technology (ICT) development substantially determine functioning of every organization in numerous aspects of its activity. One of the meaningful changes is organizing work in virtual space, which has an influence on optimum management of remote employees or an organization of virtual dispersed teams. Surely, remote forms of organization determine the attitude of the organization in the scope of remote team management and at the same time are of key importance to the development of information society and knowledge based economy.

Virtual Organization of Work Space (VOWS) is an area of remote work organization, which should be analyzed in many aspects. Firstly, this space is identified with the virtual environment and is defined as multidimensional, full of multidisciplinary information, forming new forms and social relationships. Secondly, VOWS may be analyzed in the cross-organizational and intra-organizational grasp. The cross-organizational grasp refers to widely understood cooperation, the aim of which is to take advantage of market opportunities (work within virtual organizations). In this dimension one can distinguish cooperation between the organization and, among others, business partners, clients, suppliers as well as the influence of ICT development on creating virtual relationships between these entities (cooperation). Virtual Organization of Work Space on the intra-organizational side concerns in turn the analysis of few key issues relating to new, virtual forms of work organization, connected with geographical dispersion of organization's members, the consequence of which is functioning of virtual teams, common virtual implementation of projects and teleworking.

In the present paper the author proposes a system grasp of VOWS, which allows to analyze virtual work space in a multifaceted way. The system approach to the VOWS makes it obligatory to treat it as a compact structure which possesses various elements on the input and output. Such a grasp allows us to understand better the nature of the elements constituting the whole of it, notice the interdependencies between them, indicate the relationships and capture the feedback that occurs. These elements cooperate one with another and influence one another, by this becoming more efficient than if they operated separately (the synergy effect). The methodology of virtual work organization requires consolidation of technology and humanities and it is important for the existence and further development of the digital world. Technological factors are connected with building IT infrastructure and common virtual information space. Humanities factors in turn concentrate on the role and meaning of a human being in the cooperating activities of virtual organizational structures. The basis for the analysis are the results of own research conducted among remote employees.

## KEYWORDS

Information and Communication Technology (ICT), Virtual Organization of Work Space, virtual work, telework,

## JEL CLASSIFICATION CODES

L10, O3

## 1. INTRODUCTION

Issues of the virtualization of the organization is from many years a subject in the literature of management studies. It results from the growing popularity and the universality and the influence of solutions from the scope of information and communications technologies (ICT) (Frączkiewicz- Wronka A. and Wronka-Pośpiech M., 2014). The development of ICT considerably affected the functioning and changes of directions of bot economic, as well as social life. Socioeconomic progress and fundamental changes in the structure and employment statuses are being observed (Czekaj, 2009). A cooperation with stakeholders and particularly

relations with customers are subjects of change. Thanks to deepening processes of the virtualization organizations establish the cooperation through different communication channels increasing their scope of operations into this way. Even though for many years ICT are the permanent element written into the functioning of every organization, their potential as well as the influence on organizational activity is changeable and is succumbing to different test procedures. How P. Jackson and J. Klobas underline, virtualization processes are dynamic, the condition of the virtualization of the organization is changing, as well as different internal and external aspects, which causes the change of the virtualization vision (Klobas & Jackson, 2008).

The following structural transformations of the organization tied with the virtualization have multifaceted character. Z. Kierzkowski underlines that "progress in the methodology of the virtual organization of actions connected with the analysis of the consolidation of the technology and arts" (Kierzkowski, 2013) is important for the being and the subsequent development of digital world. Technological factors are associated with the structure of IT infrastructure and the common space of information. Next humanistic factors take into consideration the meaning and the role of the man in cooperative action of virtual organizational structures (Kierzkowski, 2013).

Deliberations conducted in this article are concentrated on issues of the Virtual Organization of Work Space, which is being made by different forms of virtual work (e.g. telecommuting, virtual teams). Virtual organization of work space (VOWS) is connected both with organizing of the virtual work, as well as employing virtual employees and building the adequate structure of virtual teams. Virtual teams should be perceived in the same categories, like traditional, that is through: leadership, communication, cohesion, structure, culture, sharing the knowledge, exploiting the technology, conflict, process of the decision making etc. (Travica, 2008). ICT solutions are a condition of VOWS but for the development and the activity of VOWS factors, which were defined as soft elements of the management in the article, decide.

The goal of this article is the characteristics of VOWS and the presentation of own researches connected the characteristics of VOWS both through the exploitation of ICT as well as an analysis of soft elements of the management.

## **2. CHARACTERISTICS OF THE VIRTUAL ORGANIZATION OF WORK SPACE**

Idea of the space is defined as the set of elements, usually called points with the certain additional structure. A scope or also frames of phenomena considered in it are being defined by the space. The virtual space is being included in the context of networks of mutually connected computers, especially the Internet, the intranet and the extranet which create it and constitute the base for the virtual environment and information existing in it (Zacher, 2013). These are components of the virtual environment (Mazurek, 2012):

- in the context of the content – multimedia, object, relational databases, aggregated and decomposed information, new information;
- in the context of tools available for users – widely understood software e.g. contents management systems, CRM, database applications, social media platforms;
- in the context of the infrastructure equipment – computers, tablets, phones, smartphones, servers, computer networks.
- ICT technologies activate virtual space, but it is being created by people. M. Warner and M. Witzel see virtual space as (Warner & Witzel, 2005):
- the notional space determined by the level of knowledge, which the organization have and by its creativity;
- technological space determined by technological possibilities of the organization (systems parameters) and abilities of operators;
- cultural space, which Boisot name information space – („the sort of common mental space, in which people will be able to successfully cooperate in teams”).

Virtual Organization of Work Space (VOWS) is an area of the organization of the telecommuting, which one should consider multi-faceted. Firstly, this space is being identified with the virtual environment and is determined as "multidimensional, full multi-domain information, forming new forms and social relations" (Zacher, 2013). Secondly it is possible to consider VOWS in the inter-organizational and intra-organizational

aspect. Inter-organizational aspect refers above all to the widely comprehended cooperation, which is oriented on using market chances (work in the framework of virtual organizations). A cooperation of the organization is included in this area, among others with business partners, customers, suppliers and influence of the ICT development on creating virtual relations between these entities (cooperation). Next VOWS from the intra-organizational side comes down to the analysis of a few crucial issues referring to new, virtual forms of labour organizations, connected with geographical dispersion of participants in organizations, of which consequence is functioning of virtual teams, joint, virtual carrying out projects and the telecommuting. A remote communication responsible for performing tasks and communicating is a base of VOWS functioning. It has a significant meaning both for members of the teams, as well as other remote employees deprived of direct contacts. Creating the effective communication is important, particularly in case of cooperation and projects intensively connected with the knowledge management and finding the appropriate relation between the dispersed knowledge of specialists, coordinating and integrating of all action and the completion of processes of the socialization of both members of virtual teams and the employed in the form of telecommuting (Panteli & Chiasson, 2008). Moreover the frequency of the communication and communications technologies used in this respect influence, among others the productivity of remotely working persons, the confidence, integration or a sense of responsibility (Webster, Wong, 2008), and these factors determine the functioning of employees in VOWS. The communication is recognized as "precursor of the confidence" (Grudzewski, et al., 2007), creator of processes of the socialization, which in case of virtual forms of the labour organization take on special significance, since it is being thought that the work in VOWS is more difficult, since employees must communicate crossing borders of place and time (Chudoba & Watson-Manheim, 2008) using limited possibilities of forms of the communication.

Thirdly it is possible to characterize VOWS from a point of view of the criterion:

- subjective – it is a set of subjects, in which relations and actions between them are determined. In this aspect a level of employer, manager, employee, customer, organizations cooperating and dependent on the subject using VOWS and all occurring relations between them is being taken into account;
- objective – it is a set of financial and immaterial key resources and relations, which take place between them in VOWS. Financial objects refer up to the equipment and tool infrastructure of appropriate solutions of the information and communications technologies. Next immaterial objects are above all people, and more precisely their knowledge, perception, experience, abilities and relations, in other words significant elements of the intellectual capital forming VOWS.

Fourthly it is possible to describe VOWS with different sorters and appropriate associations, in different perspectives of its visualization, among others so as the prospect:

- functional - refers to tasks, functions which VOWS is supposed to carry out and for taking into account possibilities of its using by the determined set of resources which an entity has at its disposal at a particular moment;
- social - regards the modelling of processes of the socialization, including limitation of the virtual cooperation, as well as the need of creation of factors determining its effectiveness, i.e. e.g. trust;
- technical - refers to the proper selection and determining of the influence of the equipment, tool and appliqué infrastructure of the information and communication technology, taking into account the possibilities of managing remote information, what determines functioning of subjects in VOWS;
- legal – possibilities, which result from legal regulations;
- organizational - refers to logical grouping of action and stores, which purpose is a proper dividing of work, structuring of actions and determining of stores essential for functioning of the given entity in VOWS.

It is possible to consider VOWS on the base of a system take. The system attempt at VOWS analysis forces treating is as consistent structure having diverse elements on the in and out. System approach to VOWS (figure 1) lets better understand the nature of elements making it whole up, to notice their relations, to point at relations and to detect appearing feedbacks. Shown elements cooperate with oneself and have an influence on themselves, through which are becoming more efficient, than if each of them acted individually (synergy effect).

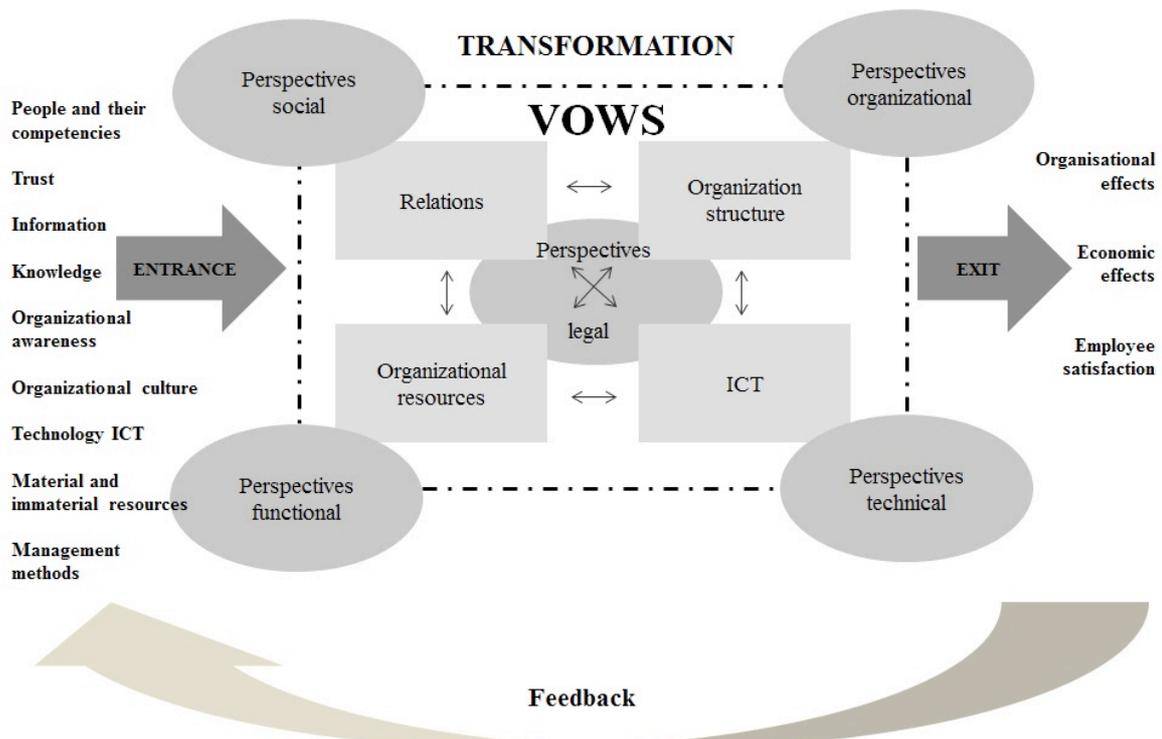


Figure 1. Virtual organization of work space – system aspect  
 Source: own study

Above analysis let the Author for suggesting her own definition of VOWS concept. It is an area of organizing activity and processes of the work, in which these undertakings are being implemented in virtual space based on ICT solutions. VOWS is being created by remote employees and virtual teams and makes organization to due fitting soft elements of the management improving the potential.

### 3. CHARAKTERISTICS OR VIRTUAL ORGANIZATION OF WORK SPACE IN POLISH COMPANIES

#### 3.1. Researches methodology

Researches of VOWS were conducted in years 2012-2013. Since VOWS is still not a general domain of many enterprises, conducted examinations were limited to organizations chosen on purpose, in which virtual forms of the labour organization are applied. Enterprises, which were marked out for examinations, met the following criteria:

- companies employing virtual workers and these ones, in which virtual teams act;
- realization of the strategy of the virtualization in chosen areas of the functioning;
- using ICT solution in their own activity in at least two key aspects, in which were included: tools supporting communication and tools supporting overcoming organizational distance between employees.

5% of employees from 68 Polish enterprises took part in the examination. Group of the consisted of 426 persons, from which 357 filled in the questionnaire correctly. In the examination participated both managers, and employees performing their tasks in the form of the virtual work. The questionnaire form was used as the research instrument.

In the examination participated both manufacturing, service, commercial, as well as mixed companies (i.e. service-sales and production-commercial enterprises) (table 1).

Table 1. Schedule of the type of examined companies

Type of the company	Number of companies	Percentage of the total in the researched VOWS
Manufacturing	21	31
Services	26	38
Trade	10	15
Mixed	11	16

Source: Own study

In table 2 a schedule of the size of examined enterprises was presented. Microenterprises, employing no more than 10 persons, were also included in the group of small-sized enterprises, what constituted 3% of the total examined.

Table 2. Schedule of the size of examined companies

Size of the company	Number of companies	Percentage of the total in the researched VOWS
Small	23	33,82
Medium	29	42,65
Large	16	23,53

Source: Own study

A fact that in examined enterprises there are employees working in telecommuting or virtual teams are functioning was an important component of examinations. Generally there were 125 persons averagely employed in examined enterprises, from which on average 27 persons represented the group of remotely employed people. In 30 from 68 examined enterprises remote employees are not being employed through formal agreements of telecommuters and the employer (e.g. in the form of telecommuting agreement), but employees perform their work remotely or virtual teams are functioning, which are appointed to the completion of specific projects and tasks.

### 3.2. Implementation of ICT in examined companies

The identification of solutions and ICT tools in examined enterprises was divided on:

- tools backing the communication and overcoming the organizational distance between employees up (*role*: completion of the process of the communication; *tools*: computer networks of the Internet, intranet, extranet type, videoconferences Internet messengers, e-mail, portals etc. and functionalities of mobile phones);
- basic tools supporting work performance (*role*: work performance, in scope of drawing information in the different form up, design, comparing data, information; *tools*: databases, ERP, CRM, SCM systems, tools of designing i.a. graphical, websites, MS Office);
- tools supporting processes of the knowledge management (*role*: supporting processes of the knowledge management; *tools*: workflow systems, systems i.e. documents management, decision support, expert, wiki tools, data warehouses, Business Intelligence, building maps of the thought whether e-learning).

Indications of the examined concerning solutions from the scope of communications technologies are fluctuating around tools acknowledged as basic, straightest and universally used (mobile phone and e-mail). Their importance results above all from enough intuitive functionality, universality and formed position, as the essential tool in the process of communication.

It is not possible to regard tools supporting the performance of work as the ones, which stimulate the development the virtual work, since their rate of utilization as a whole is quite low and depends on tasks performed in the enterprise. Achieved results highlighted two main types of tools most often used in examined enterprises. Databases, which are one of them, are used by the examined several times during the week (38%) or every day (32%). MS Office tools are the second type, which are being exploited several times during the week (25%), in addition as far as 51% of respondents use them in their routine work. Such a

situation results perhaps from two crucial issues. Firstly, databases constitute the source of obtaining information, particularly for these employees, which are in the certain geographical distance from their partners. Access to data and information lets them performing work and fulfilling their duties. However MS Office enables execution of tasks with using universal, functional and easy applications, which are facilitating preparation of the text (Word), collecting and classifying data (Excel or Access) whether presentation of collected information (Word and Power Point).

Analyzing achieved results in using computer tools supporting processes of the knowledge management it is possible to single out tools, which are most often exploited in this group. It is possible to rank among them:

- documents management systems, which are exploited once a week (22% of indications) or every day (6% of indications);
- knowledge databases, which are exploited once a week (21% of indications) or every day (7% of indications);
- data warehouses, which are exploited once a week (10% of indications) or every day (6% of indications).

Received results are compatible with the universality of using databases by respondents. It tells about the fact that in examined enterprises processes of collecting both acquisition of the data and information have material meaning. Over the half of the examined showed that they did not use IT solutions supporting processes of the knowledge management at work, apart from such IT solution, which knowledge bases are.

As part of the examination a correlation analysis was conducted, which pointed on essential statistically connections between VOWS process and the frequency of using tools supporting processes of knowledge management. It means that the highest VOWS level in examined enterprises is (VOWS level was connected with the number of remote employees), the more often tools supporting processes of the knowledge management are used. The larger rate of using tools supporting processes of the knowledge management can contribute to promote the cooperation and the learning from others as the basic form of in-service training of participants in the virtual cooperation (Kot et al., 2015). VOWS escalates actions becoming part of a concept of organization based on the knowledge and the trainee organization.

Table 3. Spearman's rates of correlation between the level of the Virtual Organization of Work Space and the frequency of using tools and ICT solutions in the company

<b>Tools and ICT solutions in the company</b>	<b>VOWS</b>
Tools supporting communication and overcoming organizational distance between employees	0,18
Basic tools supporting work performance	0,19
Tools supporting processes of knowledge management	<b>0,37</b>

Source: Own study

Achieved results of the measure of correlation (low Spearman's rates) between tools supporting the communication and overcoming the organizational distance between employees and VOWS (table 3) confirm that these tools in the comparable level are being used both through enterprises employing remote employees, as well as these ones, which they employ less of such persons. Applying tools supporting communication and overcoming the organizational distance between employees are recognized as support and supplementation of the process of communication with purpose of realizing it at the best (Webster, Wong, 2008) irrespective of the employment status and the labour organization.

### **3.3. Soft elements of management in Virtual Organization of Work Space**

In conducted examinations soft elements of the management were being analyzed, among which were ranked: communication, competences, leadership, organizational culture and trust (table 4).

Table 4. Characteristics of soft management elements

Element	Characteristics
<b>Organizational culture</b>	Certain set of elements essential for VOWS functioning, which include values, models of behaviours and norms and the politics of the organization in the process of the reorganization of the work space
<b>Competences</b>	Set of specific features being a potential of knowledge, ability, personality features, attitudes, behaviours, cultural values, experience and readiness for action contributing to the optimal functioning of virtual organization of work space
<b>Communication</b>	Providing the possibility of the intercommunication of individuals and groups from a distance, the transmission of information in the different form with applying solutions of communications technologies
<b>Trust</b>	It is connected with creating the climate of the predictability, reliability and the openness in the virtual organization of workspace
<b>Leadership</b>	Taking action in order to create the climate of the confidence, keeping relations, competent using ICT potential, making and implementing concomitance principles, individual approach towards partners and monitoring works performed remotely

Source: Own study

The key aspect led in conducted examinations was appointing the value of Spearman's correlation rates for the link between soft management elements defined in the examination and VOWS. The correlation analysis showed essential statistically connections between VOWS and almost all soft elements of the management - with organizational culture, communication and leadership (table 5). It means that the highest VOWS level in examined enterprises is, they are characterized by the highest level of soft elements of the management mentioned above.

Table 5. Spearman's correlation rates between the level of Virtual Organization of Work Space and soft management elements in examined companies

Soft management elements in the company	VOWS
Leadership	<b>0,75</b>
Communication	<b>0,74</b>
Organizational culture	<b>0,65</b>
Trust	0,49
Competences	0,30

Source: Own study

The evolution of the virtual work explicitly shows that a change in perceiving determinants and stimuli of creating these forms of work took place. It results from the fact that new work forms - particularly virtual - constitute the chance of the development and better improving the labour organization for contemporary organizations, but simultaneously are a considerable challenge for them. The lack of the comprehensive approach for VOWS creating can result in the appearance of negative consequences of the virtual work. It is possible to rank among them: dissatisfaction and the dislike of employees or managers, increasing conflicts among employees, fall in the confidence, fall of commitment of employees into action directed at the achievement of the goals, the return to traditional forms of work, but also giving by crucial employees their jobs up, for which virtual forms of the work and the possibility of fulfilling their duties in this form is a base for optimum functioning in contemporary working conditions. Providing of comfort for employees at simultaneous achieving added value from virtual forms of the work new by the organization, should be closely connected with proper directing action at soft elements of the management.

## 4. CONCLUSION

The subject matter presented in this article regards the current and multifaceted issue of managing virtual forms of work. Virtual Organization of Work Spaces is being stimulated through ICT development but its effective functioning is dependent on soft elements of management. Results achieved at work can be

useful for entities influencing building virtual places of employment, by pointing at both technical and humanistic aspects, which have basic meaning for the execution of tasks in VOWS.

Presented findings point also at more distant direction of VOWS development which correlates with the concept of organization based on knowledge and trainee. Common factors of both concepts are also noticeable in achieved results, both of literature studies, as well as of these ones resulting from empirical examinations.

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# OPERATIONALIZATION OF CONSUMER ETHNOCENTRISM THROUGH RESEARCH ON PRODUCT NATIONALITY IMPACT ON PURCHASING DECISION RELATED TO CONSUMER PRODUCTS IN BOSNIA AND HERZEGOVINA

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## ABSTRACT

Product nationality is one of the intangible characteristics that consumers use in forming their propensity to purchase certain products. The term 'product nationality' indicates that the effect is caused by the national identity of consumers which is defined as a set of meanings that belong to a culture and which separates them from other cultures. Individuals show a strong degree of national identity by being identified with religious, historical, cultural and social aspects of their nation, developing a strong sense of national unity. In this context, an important phenomenon that can be investigated is consumer ethnocentrism, which is perceived as the tendency to purchase domestic products. One of the socio-psychological factors that influence consumer ethnocentrism refer to the cultural openness, which is defined as the willingness to interact with people from other cultures and countries. Some studies show that members of a group who have spent enough time among other cultures develop high ethnocentric or even nationalistic tendencies towards their culture. Such operationalization of the phenomenon of consumer ethnocentrism, which is viewed through the identification of members of a culture or ethnic group with the nationality of the product was investigated on the example of Bosnia and Herzegovina (B&H), through purchase of consumer products in several product categories. Unlike the previous few studies on the impact of product nationality and consumer ethnocentrism on the behavior of Bosniaks, Croats and Serbs in B&H, which had been examined in the context of consumer ethnocentrism tendency of these national segments to purchase products produced in B&H, the new research conducted at the intentional sample of 120 equally represented respondents has taken into consideration national identification of consumers with products produced in B&H, Croatia and Serbia. The survey was conducted in the area of Brcko District in the period from July 2015 to January 2016. In order to prove or reject hypotheses by identifying the key determinants, product nationality, price and perceived quality, the results showed that each of the national segment shows a high level of awareness about the national origin of the product and a high level of consumer ethnocentrism towards products with shared national identity, where the highest level of consumer ethnocentrism was noticeable among Serbs in B&H. This approach to the operationalization of the phenomenon of consumer ethnocentrism in multinational economies confirms the lack of national identity at the national level and the need to build that identity in order to strengthen the local economy, and also the clear signal to domestic producers to use segmented positioning strategy in the local market. The study also found that consumer ethnocentrism is more expressed in the purchase of products in categories with less distinctive difference in the quality of products (cooking oil, ground coffee, milk) than in categories with more noticeable difference in quality (chocolate, canned soup), which indicates the need for B&H manufacturers to look for the ways to increase market share in the domestic market based first and foremost on improving the quality of their products.

## KEYWORDS

product nationality, national identity, consumer ethnocentrism

## JEL CLASSIFICATION CODES

JEL: M31

## 1. INTRODUCTION

Product nationality or national origin of product is one of the intangible characteristics consumers use when forming their preferences towards purchasing certain products and which they express in their purchasing behavior (Laroche, Papadopoulos, Heslop, Bergeron, 2003). Researches on product 'nationality' impact have existed since the existence of the first book about consumer behavior, that is, since 1960, when marketing experts started to examine the role of national stereotypes in product evaluations. Until the end of twentieth century, there have been over 750 researches that deal with product 'nationality' impacts (Papadopoulos & Heslop, 2002).

In this paper, term 'product nationality' has been used (Scarlett, Koslow: 2009; Dmitrović, Vida: 2010), as a determinant of a purchasing decision that is researched in consumers through their expression of consumer ethnocentrism when making decisions about purchasing a wide range of products.

Within the first scientists who defined consumer ethnocentrism from the economic aspect are Shimp & Sharma. They explained consumer ethnocentrism as a concept which includes tendency of individuals to view domestic products as superior and it includes individual consumer beliefs about righteousness and morality of purchasing domestic products (Durvasula & Lynsonski, 2009).

Consumer ethnocentrism, as a concept, occurred in developed countries, which are characterized by the existence of the strong, homogeneous national identity of its population. Before making decisions about studying consumer ethnocentrism in multinational countries, structure of national identity of society should be taken into consideration. A multinational country is a term for historic and modern countries that are located in areas where population is made up of two or more nations, that is, ethnic groups with different cultures, language and religions. The mentioned national identity is defined as a set of meanings that belong to a certain culture that separates them from other cultures. Individuals show a strong level of national identity when identifying themselves with religious, historic, cultural and social aspects of their nation, developing a strong sense of national unity (Keillor et al., 1996).

In economies with multiple national segments of population, where each segment expresses a strong level of national identity, product nationality adapts a greater significance, and the consumer ethnocentrism issue becomes more complex for research, and positioning of domestic products becomes a greater challenge for domestic manufacturers. An example of such, multinational country, is Bosnia and Herzegovina. Only a small number of researches have been conducted in it, dealing with questions of product nationality impact on purchasing decisions (Dmitrović, Vida, 2010), and consumer ethnocentrism (Dmitrović, Vida, 2009; Čutura, 2009; Veljković, 2009; Dmitrović, Vida, 2010; Marinković, Stanišić, Kostić, 2010; Čutura, 2011; Renko, Karanović, Matić, 2012; Matić, 2013). A large number of such researches have been conducted observing consumer ethnocentrism as a uniquely applicable concept when researching consumers classified into different national segments.

## 2. LITERATURE REVIEW

Literature about impact of product nationality on decision-making process regarding purchasing, product evaluation and consumer purchase behavior, dates back to early 60s, when Dichter, in his article in Harvard Business Review, emphasized how the world anthropology will become a necessary tool for international marketing experts (Dmitrović & Vida, 2010). Impact of product nationality or country of origin of products occur in literature for the first time as 'country-of-origin effect' in 1965 in Schooler research (Dinnie, 2003), and today, it is researched under numerous terms. By researching the literature about the introduction of this term into studies, as well as the impact of product nationality on purchasing decisions, it is possible to identify the three main periods of chronological research of this phenomenon (see Table 1).

The first period includes 1965 to 1985, and begins with Schooler's study on effect of product nationality in Central America. In the first twenty years of research, numerous researchers have determined the existence of country-of-origin effect or country-of-origin image on consumer purchasing decisions. However, this stage has not presented a research on the strength of such effect.

The second period, from 1985 to 1992, has marked further progress in volume of research of product nationality impact. Johansson et al (1985) present doubts regarding results of previous researches and stated that previously conducted researches overly present the significance of product nationality impact, especially because the researches included only one product attribute. Later, Ettenson et al (1988) joined these

conclusions advocating joint approach to research, mentioning that price and quality of products may have a greater effect on consumer behavior than information about product nationality alone.

The third period of research, from 1993 to 1999, is characterized by the proliferation of various research directions where many of them re-conceptualize the country-of-origin effect using the richer terminology, such as: brand origin (Thakor & Kohli, 1996), country-of-origin image (Papadopoulos & Heslop, 1993), and product-country image (Askegaard & Ger, 1998).

The fourth period, from 2000 to 2015, is characterized by further progress in research of product nationality, through research of subculture impacts within a country, unlike previous researches that implicitly assumed that national markets are made up of culturally homogeneous groups of consumers (Lenartowicz & Roth, 2001; Laroche et al, 2003).

Table 1. Development of Product Nationality Concept in Research Literature

<b>AUTHORS</b>	<b>DEVELOPMENT OF PRODUCT NATIONALITY CONCEPT AND TERMINOLOGY APPLICATION IN LITERATURE</b>
Schooler, 1965	The first research of "country-of-origin effects" which determined the existence of the effect, but the nature and the strength of this effect on purchasing decisions has not been researched.
Nagashima, 1970, 1977	Research on impact of "product-country image" on decisions on purchasing of foreign products in Japanese and American consumers. Author stated that "product-country image" should play a key role when choosing an international marketing strategy.
Johansson et al, 1985	The new methodological approach to research on "country-of-origin" effect on product evaluation using models of observing multiple product attributes simultaneously.
Ettenson et al, 1988	They advocate all-inclusive approach to research, stating that product price and quality may have a greater impact on consumer behavior than solely an information about country of origin of products.
Papadopoulos & Heslop, 1993	They criticized that the construct of "country-of-origin" is too narrow and leads to incorrect opinion, and they introduced the term "product-country image" in order to get closer to the multidimensional character of products/brands.
Thakor & Kohli, 1996	They introduced the term "brand origin" that is defined as a place, region or country in which a product belongs as perceived by consumers.
Lenartowicz & Roth, 2001; Laroche et al, 2003	They questioned the effect of subcultures within a country on business results and took into consideration the existence of heterogeneous cultural groups of consumers within one country.
Parameswaran & Pisharodi, 2002	They consider that the understanding of acculturation and other processes of assimilation of immigrants would be of great significance for marketing experts on domestic and international markets that operate in culturally heterogeneous societies.
Quelch, 2003	Introduced the geopolitical dimension in the domain of "country-of-origin effect".
Dmitrović & Vida, 2009, 2010	They boldly introduce the term "product nationality" in literature.

Source: Authors

Dmitrović & Vida (2009) have researched the effects of signs of product nationality on consumer behavior and they have presented the results of two researches on the basis of survey of adult consumers in four South-Eastern European countries: Croatia, B&H, Serbia and Montenegro. The results have shown that consumer ethnocentrism impacts the purchase of domestic products directly and indirectly through evaluation of quality of domestic products. Authors have established that consumer ethnicity has a direct impact on expression of consumer ethnocentrism, and on purchasing domestic products. However, knowledge about role of national identification and openness towards other cultures as predecessors of consumer ethnocentrism and/or evaluations of quality of domestic products were not consistent in all countries and studies, pointing out the need for further research on impact of product nationality on purchasing decisions. Also, the impact of identification of consumers with the nation related to expression of consumer ethnocentrism and evaluation of domestic product quality was inconsistent on samples of countries involved in this research.

In the expanded research a year later, Dmitrović & Vida (2010) researched, classified and synthesized various research direction that study the role of national origin of products, brands, services and consumer institutions. By analyzing papers of other authors they had cited, authors of this study have concluded how other researchers also questioned the prominence of information about product origin by raising doubts if the consumers were aware of the national origin of brands, and if they are, if they find important where the brand was designed, projected or produced (Dmitrović & Vida, 2010).

Renko, Crnjak, Karanović i Matic (2012) researched the impact of consumer ethnocentrism on intent to buy Croatian products and products of former Yugoslavia and EU origin, in order to provide useful information for the needs of marketing implications, gathered through research results. Through research, it has been determined that the tendency of consumer ethnocentrism is a significant predictor in the intention to buy domestic and foreign products in Croatia.

Čutura (2011) has also recognized the significance of a multinational structure of B&H in the context of purchasing domestic products, and in her research, she analyzed basic characteristic of consumer ethnocentrism in B&H research context, with the aim to determine the possibilities of encouraging purchases of domestic products based on functioning mechanisms of consumer ethnocentrism. As expected, it was shown that ethnocentric consumers value domestic products more, they show a higher level of readiness to purchase, and purchase more domestic products in the frame of researched categories of consumer goods. However, as in most of the similar researches, consumer ethnocentrism was observed through tendency or repulsion when purchasing domestic products, but without consideration of national identity of consumers and how they identify themselves with the product nationality.

Within researches conducted in developed countries, which suggest that preferred products are the ones from countries which are perceived culturally similar to the domestic country in comparison to products from countries that are observed culturally different, are the ones from Crawford & Lamb (1981), Heslop et al (1998) and Wang & Lamb (1983).

There are significant possibilities for further research. However, future research on impact of product nationality should overcome simple research on impact of product origin with a greater emphasis on development of theory and theoretical research.

### **3. THEORETICAL FRAMEWORK AND PROPOSITIONS**

In researches in the field of international marketing, country-of-origin of products has been emphasized as important factor of procurement and consumption. In literature, we find inconsistent terminology that describes this phenomenon, the "country-of-origin" of products, "source country" of products, product/brand "national origin", "product-country image", and "country-of-origin" effect (Dmitrović & Vida, 2009). Dmitrović & Vida (2009) were the first to research the term „nationality“ of product, which relates to the role that national origin of product, brand, service and institutions (ex. Retailers) play in decision making process, and finally, in the consumers' purchasing behavior.

Normative aspects of product nationality are presented in research on consumers in 1980s through conceptualization of consumer ethnocentrism (Shimp & Sharma, 1987). The concept of consumer ethnocentrism and CETSCALE<sup>14</sup> are a newer contribution to the growing number of studies on product nationality impact (Netermeyer et al., 1991; Shimp & Sharma, 1987; Sharma et al., 1995).

Researches on expression of consumer ethnocentrism may present an important step toward better understanding of ways in which consumers compare domestic and foreign products, and also the reasons that lead them to development of patriotic prejudices against foreign products. Highly ethnocentric consumers may have a tendency towards biased product evaluations, and therefore they unreasonably value domestic products in comparison to foreign products.

#### **3.1. Ethnocentrism Phenomenon & Factors**

The concept of ethnocentrism represents a universal tendency of individuals to observe own group as a center of the Universe, and to interpret other sociological units from the perspective of the group, and to discard

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<sup>14</sup> Consumer Ethnocentrism Tendency Scale

those people who are culturally different, blindly accepting those who are culturally similar (Booth, 1979; Worchel & Cooper, 1979). The members of one ethnic or national group perceive symbols and values of their group as objects of pride and unity, while they undermine the values of another group.

This phenomenon is deeply rooted in most relations within a group and it is connected to the feeling of family pride, religious prejudices, racial discrimination and patriotism. Other authors even consider ethnocentrism to be a part of human nature.

The concept of ethnocentrism is mentioned for the first time in sociological literature through the definition of the phenomenon given by William Graham Sumner (1906), who defines ethnocentrism as: "...View on things where own group is the center of everything, and where all other groups are ranked and compared against own group...".

In more than twenty years of publishing papers after Shimp & Sharma, researchers have tested and refined the concept of consumer ethnocentrism on various markets and under various conditions. Shankarmahesh (2006) provides an all-inclusive overview of findings until today. By structuring various contributions, he has developed a frame with the emphasis on factors of consumer ethnocentrism in the sense of consumer characteristics (2006). There were four types of factors identified: socio-psychological, economic, political and demographic. Even though this categorisation is focus on prediction of the level of consumer ethnocentrism it is also useful for discussion on consumer characteristics in the general context of purchasing foreign products against the domestic ones.

In the category of economic factors, an important aspect has been emphasized by Schuh (1994). Focusing on the example from Eastern Europe, he described how a higher level of country development leads to increase of the level of consumer ethnocentrism. The author states that in countries with the lower level of development, there is still a great gap between quality of domestic and foreign brands, and this stays the main trigger in the purchasing decision. However, as the country develops, more and more domestic brands overcome quality issues, enabling buyers to take others factor in consideration, such as the origin (Schuh, 1994).

Verlegh (2007) takes another attempt to explain the biasness of buyers towards own identity. He admits an important role of consumer ethnocentrism, but he adds an additional concept named "national identity". Referring to the theory of social identity, the author states that consumers are moved by a motiv to have a positive image about their national country (Verlegh, 2007). Considering that consumer ethnocentrism may be described as a cognitive concept, the national identity, as a determinant in purchase decision process, emphasised affective aspects of consumer biasness towards their national country. On a sample consisting of American and Holland consumers, Verlegh shows even stronger impact of national identity on quality evaluation of domestic products than the consumer ethnocentrism does (2007).

Rosenblatt (1964), among other factors that impact ethnocentrism, also identifies political propaganda. He explains how political leaders may increase the level of ethnocentricity of a nation through raising awareness about the threat that presents the outside group. How much impact will the political leaders have depends on the political order in that country. Political history also determines the level of ethnocentrism in a society. The country that has a long history of oppression (ex. Poland) is more ethnocentric than a country that has a long history of concurs (ex. Russia), and the reason for that is the collective animosity towards everything brought on by the aggressors, and towards their products as well.

### 3.2. Measuring Ethnocentrism

Credits for the introduction of the consumer ethnocentrism phenomenon in research belong to Shimp and Sharma (1987). They have not only introduced the term 'consumer ethnocentrism', but they have also offered CETSCALE to marketing literature – a unique scale for measuring consumer ethnocentrism – a scale that is created and confirmed by numerous researches.

Shimp and Sharma (1987) were the first to develop an all-inclusive scale for measuring consumer ethnocentrism, even though numerous other instruments for measuring "attitudes towards other foreign products" existed already. One of those instruments is the Reirson's (1966) scale that was widely used by early researchers, such as Dornoff et al (1974). The international application of the CETSCALE, originally developed in America, has been confirmed through numerous studies, including Herche (1992), Durvasula et al. (1997), Hult et al. (1999), Luque-Martinez et al. (2000), Bawa (2004).

CETSCALE has originally been designed in order to measure tendencies of ethnocentric consumers towards purchasing foreign products against purchasing of American products in America. CATSCALE has

been formed by conduction of series of preliminary studies, preliminary tests and techniques for refinement of the scale (Shimp & Sharma, 1987). As a result, 17 statements used to measure consumer ethnocentrism were developed, where each one satisfies at least 0,5 (factor loading) of reliability criteria. The scale has been confirmed as reliable.

Among the empirical researches, there is application of the original 17-item CETSCALE, but also the shortened versions of the scale with 10 items, developed also by Shimp & Sharma (1987) in their pioneer research. Among the researches, there are also other adapted versions that are different in the number of items (ex. 3, 4, 5, 11, 14 or 16 items), and in the choice of items used in research of tendencies of consumer ethnocentrism (Jiménez-Guerrero et al., 2014).

Table 2. 10-item CETSCALE

Only those products that are unavailable in the USA should be imported
American products, first, last, and foremost
Purchasing foreign-made products is un-American
It is not right to purchase foreign made products because it puts Americans out of jobs
A real American should always buy American-made products
We should purchase products manufactured in America instead of letting other countries get rich off us
Americans should not buy foreign products, because this hurts American business and causes unemployment
It may cost me in the long run but I prefer to support American products
We should buy from foreign countries only those products that we cannot obtain within our own country
American consumers who purchase products made in other countries are responsible for putting their fellow Americans out of work

Source: Shimp & Sharma (1987)

Taking into consideration the operationalization of product nationality through expression of consumer ethnocentrism on consumer purchasing decisions in multinational countries, and the importance of understanding the actual consumer behavior during purchasing of fast moving consumer products, this research has tried to answer the main question "Does product nationality represent a significant determinant in the decision in purchasing fast moving consumer products in multinational countries and what is its relation to price and perceived product quality?". In order to answer this, the following research hypotheses have been set:

**H1:** Consumers from different national segments differ nationality of fast moving consumer products.

**H2:** Product nationality is more emphasized in relation to product price when making decisions about purchasing fast moving consumer products.

**H3:** Product nationality is more emphasized in relation to perceived product quality when making decisions about purchasing fast moving consumer product.

## 4. EMPIRICAL RESEARCH

To research impact of product nationality as a determinant in making decisions in purchasing consumer products in the context of B&H, which falls into multinational countries, geographic region of the Brcko District has been chosen for the research due to several specifics that contribute to this research. As an independent functional unit within the country of B&H, it does not belong to neither one of the entities and it represents Bosnia and Herzegovina on a small scale. The representation of national segments of Bosniaks and Serbs is equal, while there are somewhat less Croats in Brcko in comparison to those two segments, which makes a realistic allocation on the national level as well. Initially, 50 surveyed people were chosen for each national segment into the intentional sample. The final intended sample contained 40 surveyed people from each, Bosniaks, Serbs and Croats, since other questionnaires were incorrectly or inadequately filled. The surveyed filled a questionnaire which contained open and close ended questions.

### 4.1. Analysis of Collected Research Results

At the beginning of data analysis, a complete demographic image of the sample, made up of variables such as nationality, gender, age, level of education, and monthly income, was considered.

Table 3. Demographic Image of Surveyed People

Nationality	Bosniak		Croat		Serb
%	33.3		33.3		33.3
Gender	Male			Female	
%	31.7			68.3	
Age	0-18 yrs.	18-30 yrs.	31-45 yrs.	46-60 yrs.	61+ yrs.
%	5.8	25.0	42.5	25.0	1.7
Level of Education	High school		College	University Degree or higher	
%	50.8		2.5	46.7	
Monthly Income	Up to 500 KM	500-1,000	1,000-1,500	1,500 or higher	
%	35.0	28.3	28.3	8.3	

Source: Research results of the authors

The first question in the questionnaire had an aim to gather how much are the surveyed from all three national segments aware of the product nationality at the time of making a purchase. There were five product categories offered, and within each category, there were 4 most common brands, where the first brand in each category was manufactured in B&H, the second one in Croatia, the third one in Serbia, and the fourth one was manufactured in any of these three countries or some other foreign country.

Each national segment has shown a high level of awareness of the product national origin, and the greatest number of correct answers to the origin of each individual product came from the surveyed for exactly the one product that had the national origin as their nationality.

In the second question, the surveyed had the possibility to name only one product within each product category that represents their first choice when purchasing. The intended sample gave the possibility of knowing the product nationality which is the first choice of each national segment. With this question, and with the following question of the similar type, the same five product categories, and same brands within those categories, were kept.

The results have shown how in categories with naturally less obvious difference in product quality (milk, and coffee) the first choice of each national segment was the product with the same national origin as the nationality of the surveyed, where in categories with the more obvious difference in quality (chocolate, soup from a bag), the advantage was given to brands that have the highest quality and are most recognized in the category. The only exception was the category of oil where all three national segments gave advantage to the Brcko brand BIMAL. However, this outcome is probably due to the emotion of local patriotism of Brcko locals.

In the third question, the surveyed ranked factors that influence their decision in purchasing, and additional instructions to the surveyed related to the mention of the product that was named first choice in the previous question. Ranked factors were quality, price, country-of-origin, brand recognisability, and design/packaging of the product.

The questionnaire results have shown that the surveyed stated, for each category, that the winning factor in making decisions when purchasing was product quality, and the following factors by importance was the country-of-origin for each category. The price was ranked third by importance in each category and then the brand recognisability. The least important factor when purchasing in each category was design or the packaging of the product.

If we consider that the first choice of each national segment in categories of edible oil, milk and coffee was a product with the same national origin as the nationality of the surveyed, then we would expect that the country-of-origin is the most important factor in these three categories, which is not the case. However, it is still in the second place before the remaining three factors, even price. This may be interpreted as readiness of the surveyed to pay more for the product with national identity that matches their national identity, while the choice of quality as the most important factor may be interpreted as less indicative in these three categories, since these are types of product within which it is hard to notice difference in quality (oil, milk, coffee).

In the fourth question, the surveyed were asked to mark products within named product categories that they would readily buy, if in the time of purchase, these are discounted or cheaper than all other offered product brands. The question was construed in such way so that the price as a factor was discarded when making decisions.

Based on results, we may notice that in categories with less obvious difference in product quality, all three national segments have the greatest tendency to purchase products with the same national identity as them, however, there is readiness to also purchase products of other nationalities in a lesser percentage. In categories with a more emphasized difference in quality (chocolate, soup from a bag), the greatest readiness was expressed to purchase MILKA chocolate in Bosniaks (65%) and Serbs (67.5%), while Croats showed almost equal readiness to purchase DORINA (75%) and MILKA (72.5%). The least tendency to purchase chocolate was same in all three national segments as far as CHOCO-CLUB VISPAK goes, which may be connected with a much lesser quality in comparison to other chocolates. Tendency to buy PODRAVKA soups was greatest in all three segments, and again, here is the case of noticeable difference in quality in comparison to other products from the group.

Inner reliability of the scale for measuring consumer ethnocentrism is calculated by the Cronbach's Alpha coefficient, and high reliability for CETSCALE measuring scale has been determined.

Table 4.: Reliability CETSCALE

Cronbach's Alpha	Number of items
.868	10

Source: Research results of the authors

The significance of the correlation matrix has been determined with the Barlett's test, and adequacy of the correlation matrix for factorization has been determined by the Kaiser-Meyer-Olkin test for adequacy of sampling.

Table 5.: KMO and Bartlett's Test of CETSCALE sphericity

Kaiser-Meyer-Olkin measure of sample adequacy	.810
Approximate HI squared	611.833
Bartlett's sphericity test	Degrees of freedom df
	45
	Significance
	.000

Source: Research results of the authors

From the table, it is obvious that the KMO measure of sample adequacy is adequate and it amounts to 0.809. The Bartlett's sphericity test is statistically significant ( $p=0,000$ ), and factor analysis is justified. Considering the collected values of the size of factor saturation on the first non-rotating main component and high reliability for the measuring scale in the further multi-variation analysis of tendencies of consumer ethnocentrism, will be treated as a uni-dimensional homogeneous construct. Further analysis uses variance analysis with the aim to examine the impact of demographic factors on tendencies of consumer ethnocentrism. In the following table, data collected through variance analysis between tendencies of consumer ethnocentrism and demographic factors, is presented.

Table 6.: Analysis of Variance between Tendencies of Consumer Ethnocentrism and Nationality of Surveyed People

	N	Median	Std. deviation	Std. error	95% interval of reliability for the median		Min.	Max.
					Lower Bound	Upper Bound		
Bosniak	40	23.5750	6.31192	.99800	21.5563	25.5937	10.00	40.00
Croat	40	32.5250	6.87615	1.08721	30.3259	34.7241	16.00	48.00
Serb	40	32.8000	5.71637	.90384	30.9718	34.6282	18.00	46.00
Total	120	29.6333	7.60134	.69390	28.2593	31.0073	10.00	48.00

Source: Research results of the authors

The total results for consumer ethnocentrism show that the highest degree of consumer ethnocentrism is present in Serbs, a little less in Croats, and the least in Bosniaks.

## 5. IMPLICATIONS

Gathered research results have a theoretical-methodological and empirical implication. In theoretical-methodological sense, progress, to introduce product nationality as a term within relevant determinants in purchasing decisions in multinational countries, has been made.

In empirical sense, contribution of this research is seen in the understanding of behavior of consumers of different national segments in purchasing in multinational and multicultural countries, and their attitudes towards products of certain nationality.

Considering the issue of positioning of domestic products in multinational countries, due to emphasis of consumer ethnocentrism, the need to conduct research on consumers and their purchasing behaviors is greatly significant for domestic manufacturers.

Since product nationality impacts consumer behaviors, purchasing habits and product selection, product nationality presents an important variable during selection of marketing strategies of domestic, as well as foreign suppliers. Further, researches of product nationality impact may influence creation of effective government politics, which in many countries conduct campaigns that encourage purchasing domestic products with an aim to strengthen domestic economy and decrease import.

Considering that this research was limited by set goals, this research should serve as a good starting foundation for new research with the following recommendations:

- *Continue conducting researches that will explore in more depth the relationship between product nationality and perceived quality as key determinants in purchasing wide consumption products.*
- *Continue conducting researches that will explore in more depth the relationship between product nationality and product price, as another important determinant in purchasing wide consumption products.*

## 6. CONCLUSION

Consumer answers to product nationality as a product attribute, and effects of product nationality on motivation of consumers and purchasing behavior, and their final implications for marketing research and practices, have been researched in literature from several theoretical perspectives. The development chronology in this field shows that, from the visionary idea about the role of product nationality in globalised markets until current times, the scientists have shown the lasting interests for the effects of product nationality.

In the context of the impact of product nationality, one important phenomenon that may be researched is the consumer ethnocentrism, which is observed through tendency to buy domestic products.

Such operationalization of the consumer ethnocentrism phenomenon, which is observed through identification of one culture, that is, one national group, with the product nationality when choosing products for purchasing, is expressed in the B&H example, as a multinational economy, as well as in examples of purchasing fast moving consumer products from several product categories.

In comparison to only a few researches on impact of product nationality and consumer ethnocentrism on behavior of Bosniaks, Croats, and Serbs in B&H, conducted in order to examine the consumer ethnocentrism in the context of tendencies of these national segments in purchasing BiH products, this new research considered an intentional sample of 120 equally represented surveyed people, where national identification of consumers with products manufactured in B&H, Croatia and Serbia was taken into account.

As proven, there are numerous factors that influence consumer behavior, along with product nationality, expressed through consumer ethnocentrism, and this research also included price and product quality, as well as unavoidable key determinants that impact consumer purchasing behavior.

Through a detailed analysis of the researched results, the following conclusions about impact of product nationality, emphasized through the expression of consumer ethnocentrism, on consumer purchasing behavior, were drawn:

- *The concept of consumer ethnocentrism in multinational economies should be observed in the context of national identification of different national segments of consumers with products.*
- *Countries, where more national segments and cultures are present, should work on creation and strengthening of a unique national identity at the national level in order to strengthen the domestic economy as a consequence of a strong consumer ethnocentrism of its population.*
- *Product nationality is one of the key determinants in purchasing decision, however, it should be observed parallel with other product attributes, since more factors simultaneously impact consumers.*

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# IMPACT OF PROCESS OF ADOPTION OF INNOVATION ON INNOVATION DIFFUSION

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## ABSTRACT

Innovations take an inevitable part in the development of society, hence frequently discussed but they are the adoption and diffusion of innovations that are the most significant and discussed concepts. The processes of adopting and diffusing innovation are two different concepts, though closely related, and having an impact on one another. The adoption of innovation is defined by the process of adopting innovation and relates to an individual i.e. it is the subjective thinking process in which one shall come through various phases (perceiving, drawing one's attention, assessing, testing and adopting), and results in innovation adoption provided that the process of adoption would have succeeded. Given the speed of response of adopters to innovation (adoption rate) we shall recognize several categories defining the adopters (Innovators, Early Adopters, Early Majority, Late Majority, Laggards) having specific characteristics. The diffusion of innovation taking place depends on the process of adoption of innovation, and it is further defined by the process of spreading innovation from its place of origin towards final users i.e. it is the group process in terms of spreading the innovation within specific social system of individuals. The diffusion process involves many adoption processes; thus, the slower the adoption rate i.e. the longer the individual processes of adoption process last the longer the diffusion process. The process of spreading out innovation over adopters is to be drawn on a map of spreading innovations representing the process of distributing innovation starting from its place of origin up to the very last adopter. Understanding the processes of adoption and diffusion provides much useful information such as an expected duration of diffusion process, a profile of innovation's recipients, medium for spreading information about innovation etc. The paper deals with the processes of adoption and diffusion of innovation covering these two important terms, considering the distinctiveness and determining interdependencies between them; furthermore, it shows the valuable information should we gain, and also the potential use for such information to apply to practice, providing that we understand these two mutually interconnected processes.

## KEYWORDS

Adoption of innovations, diffusion process, innovation, timing of innovation.

## JEL CLASSIFICATION CODES

030

## 1. INTRODUCTION

There is no doubt innovations take an inevitable part in the continual economic development (Misankova, 2013), improving living standard (Hraskova, 2012) and development of society, hence frequently discussed; however, they are the adoption and diffusion of innovations that are frequently discussed concepts in terms of identifying differences and interdependencies.

The major publications referring to the subject matter are as follows: the Paul Trott's Innovation Management and New Product Development (Trott, 2012) discussing theories of adoption and diffusion of innovation, the Tidd, Bessant and Pavitt's Managing Innovations (Tidd, 2007) dealing with processes of diffusion of innovation, and defining supply and demand models of innovation diffusion or the most frequently cited Rogers' Diffusion of Innovations (Rogers, 1983). Information about adoption and diffusion of innovation are of the utmost importance regarding marketing activities of company, and it is the

perspective the Trommsdorff & Steinhoff's Marketing of Innovations (Trommsdorff & Steinhoff, 2009) deals with the issue of diffusion of innovation.

The paper draws on published theoretical backgrounds of adoption and diffusion of innovation, focusing on differences and interdependencies between them; furthermore, a comprehensive model of diffusion of innovation in social networks is to be made, identifying the ways the adoption process affect the process of diffusion of innovation.

## 2. ADOPTION OF INNOVATIONS

The adoption of innovation is defined as the process of adopting (accepting) innovation relating to an individual i.e. it is the thinking process in which one shall go through various phases of adopting innovation i.e. from initial perceiving innovation (the very first mention of the innovation) to adopting innovation. The process of innovation adoption consists of several phases (Figure 1); however, not all of them are necessarily to pass, thus 'truncated process' (i.e. skipping some phase(s) that cannot be run in some cases and/or adopters omit them intentionally) often takes place instead.



Figure 1. The Process of Innovation Adoption

To **perceive** innovation is considered to be the first phase of the process of innovation adoption in which potential adopters start to recognize innovation but yet lacking information about innovation i.e. the phase refers to the adopters' initial contacts with innovation.

Keeping the initial concept of innovation in the minds would generally draw the **interest** of potential adopters and trigger seeking more information about innovation to reflect the interest.

The phase of **assessing** innovation shall take place based on the information gathered i.e. adopters think of innovation in terms of making use of innovation in respect of their current and/or future situation, and hence find the innovation useful and interesting or not.

As a general rule, assessing is followed by **testing**; however, it is not always possible for testing to take place as there may not be the opportunity to try out the innovation prior purchasing. Since testing shall make it possible to evaluate the thinking process of assessing innovation, hence, it is the phase of testing in which potential adopters decide on accepting the innovation or not.

The adopters accept (**adopt**) the innovation providing the testing phase have been successfully completed; however, the adoption may proceed even in case adopters had either no chance to test innovation in advance or simply did not do so but such a case increasing the risk of innovation may ultimately fail to satisfy the expectations.

The process of innovation adoption might fail in any of the phases, though, and leading to innovation's refusal i.e. potential adopter's decision not to accept the innovation. The process is likely to be interrupted because of the following:

- *dissatisfaction* - refusing innovation, as any of the phases of adoption process yield satisfying results e.g. innovation draws no interest; adopter is lacking information on innovation; adopter finds innovation not useful based on information available; there is no chance to test innovation etc.
- *substitution* - refusing innovation, as preferring another innovation that fulfills the same needs (substitutive innovation)

### 2.1 Classification of Adopters based on Adoption Rate

Given the adoption process would have succeeded, the potential adopter becomes the adopter i.e. one who adopt innovation; and it is the speed of response of adopter to innovation (adoption rate) that is the main criterion for classifying the adopters. Hence, we shall recognize several categories of adopters (Figure 2).

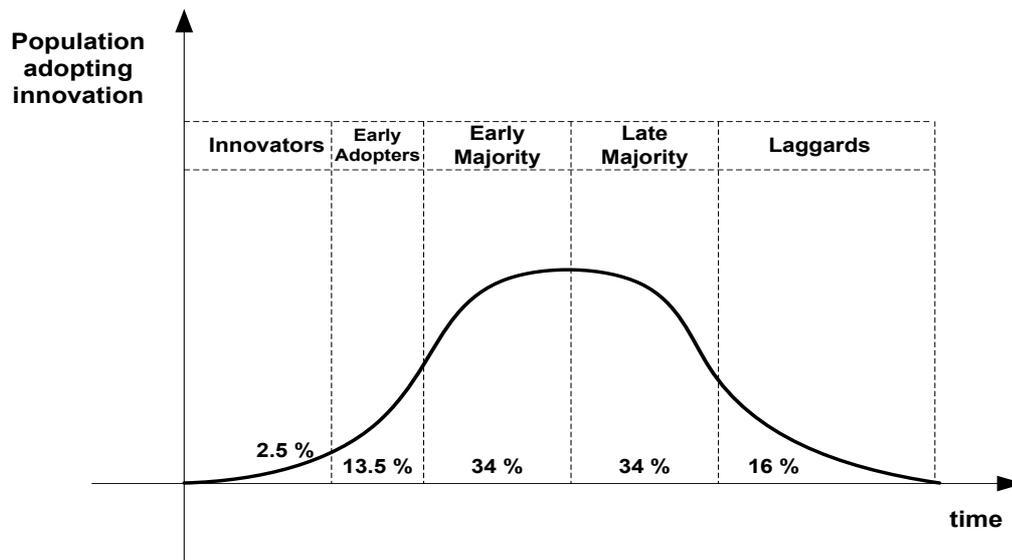


Figure 2. Adopter Categories

There are the basic categories established based on the long-term monitoring adopters' behaviour and attitudes towards innovations i.e. how do they tend to react to innovation. The Rogers (1983) draws on that adopters differ in level of motivation for adopting new innovation and identifies five adopter categories, each of them having specific characteristics. They are as follows.

**Innovators** initiate the process of diffusion of innovation and represent first 2.5% of adopters; they are well-educated and eager for novelties, thus promoting social links among the adopters worldwide. In general, innovators are rich enough to invest into novelties and willing to take risks, as there are no reviews available, and thus they are the innovators who are the pioneers and the earliest adopters. The innovators take the key role in the process of diffusion of innovation as they are typical of willing to take risks and coping with failure and/or the fact the innovation would not meet their needs easily.

**Early adopters** represent 13.5% of all adopters. They are often young, educated, having the respect of their peers, showing outstanding leadership qualities, and unlike the innovators, they are well integrated into the social systems. The early adopters tend to seek reviews to try out the innovation. Moreover, as they are considered the leaders, they take the key role in triggering innovation and eliminating other adoptants' concerns about implementing the innovation.

The category of **early majority** represents about 34% of all adopters. The adopters belonging to the category are rather conservative but open to new ideas, and tend to adopt innovation immediately prior adopting the innovation by average individuals i.e. they do not respond quickly to innovation but still do not lag behind. The early majorities stick to the "neither the first, nor the last" and shall be characterized by prudence and longer adoption rate.

The **late majority** adopters represent another about 34% of all adopters. They are mostly older, more conservative and less educated. The late majorities tend to adopt innovation soon after being adopted by average individuals that shall be regarded as the economic necessity and/or the response to growing social pressure. They would rather wait until innovation is adopted by the majority, even though they are convinced of the usefulness of innovation i.e. they need to trigger motivation to adopt the innovation. Moreover, the late majority adopters often lack financial resources, so they would not take risks to spend their resources on innovations until fully convinced that innovation meets their needs. They are identified in terms of skepticism, cautious and circumspect behavior.

The last category of **laggards** makes up about 16% of all adopters. The laggards hold traditional values and hardly would they adopt the novelties. They adopt the innovation at the time there is already another new object of innovation available i.e. innovators are about to adopt something completely new when laggards are about to adopt the innovation. Moreover, the laggards have limited resources, so they are not willing to take risks and spend them on innovation unless absolutely convinced of innovation. Unstable economic situation

also makes them careful about adopting innovations, and they do draw on reviews of other adopters in order to decide to adopt the innovation. Nevertheless, most adopters tend to go ahead and seek novelties, but laggards; they tend to stick to the routine, making the innovation process to slow down.

### 3. DIFFUSION OF INNOVATIONS

The diffusion of innovation is defined as the process of spreading innovation (idea, product etc.) out towards a final user (e.g. consumer). It is the group process in terms of spreading innovation in social networks consisting of individuals (Trommsdorff, 2009). It is also defined as the process of distributing information about innovation among individuals in given time and using communication and information channels (Ivanicka, 2009).

The spread of innovation from its source to final adopter is plotted on the map (Figure 3).

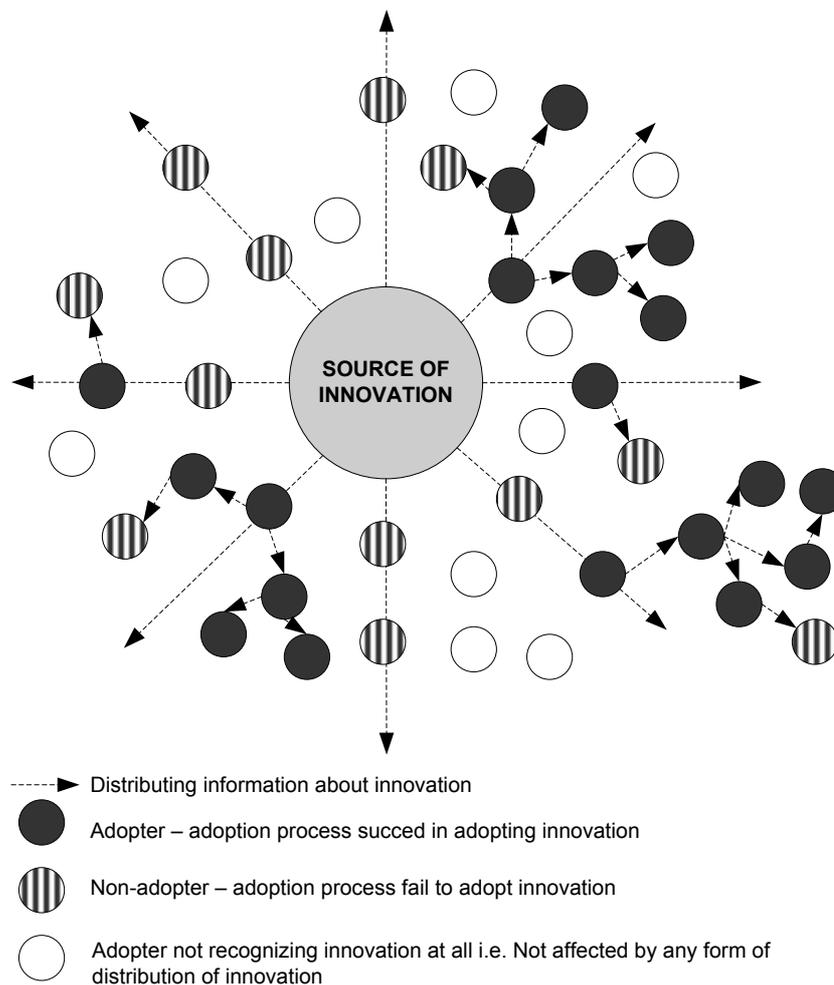


Figure 3. Diffusion of Innovation

The map shows possible ways of communicating innovation from its source to final adopter where arrows indicate intended way of spreading innovation over potential adopters by means of targeted promoting (i.e. early adopters would emerge provided that promotion take place) and nodes stand for potential adopters; hence, having the following meaning:

- nodes laying on arrows represent potential adopters who recognize innovation i.e. the adopters keep initial information about innovation in the minds
- black nodes represent adopters who have adopted the innovation i.e. the adoption process succeeded in adopting innovation
- striped nodes represent potential adopters who did not adopt the innovation i.e. the adoption process failed to adopt innovation
- white nodes represent adopters not affected by the spread of innovation i.e. the adopters have no knowledge of innovation

In general, the process of spreading of innovation takes nonlinear form (i.e. tends to branch) i.e. adopters adopting innovation share positive experience of innovation, more adopters emerge along the line and it branches out whereas adopters not adopting innovation share negative experience and influence other potential adopters to not to adopt the innovation i.e. innovation is not likely to be shared along the line; in that regard, however, we observe the following paradoxes:

- Paradox I - the adopter shares positive experience of innovation, however, another adopter would find the innovation rather unacceptable and thus becomes the non-adopter i.e. adoption process fails and innovation is not likely to be shared along the non-adopter's line despite reviews
- Paradox II - the non-adopter shares negative experience of innovation, however, another adopter would initiate the adoption process, though; it turns successful and the non-adopter becomes the adopter despite bad reviews

Based on the graph of the spread of innovation we observe the following scenarios:

- Innovation tend to spread at source - typical of innovations where targeted distribution is of the most success (i.e. targeted promotion at source) i.e. consumable goods where adopters do not think much of reviews but tend to buy on impulse
- Innovation tend to spread farther from source - typical of successful innovations i.e. satisfied adopters share the experience along the line i.e. the farther the source, the wider the spread of innovation, and branches out until exploiting the potential (i.e. encompassing as many adopters as possible) i.e. hard goods where adopters seek reviews in order to decide on purchasing i.e. adopting the innovation
- Innovation is spread evenly - typical of the majority of average innovations where the diffusion process does not tend to swing (no "boom" expected) i.e. common products

The authors of innovation are able to predict the process of diffusion of innovation provided that they fully understand the diffusion process, which is deemed the critical element of innovation management; and, hence, an accurate prediction provides useful information such as:

- Time
- Adopter profile
- Medium
- Effect of adoption on diffusion

**Time** represents duration of diffusion process, which is the time from initiating innovation diffusion to innovation spread out up to the very last adopter. Information on the duration of diffusion process is of the utmost importance in terms of planning the succeeding innovation, and only if we are able to accurately predict the diffusion process, is it possible to plan new innovation in advance, and thus prevent forming a time gap between initial object of innovation and the new one (Figure 4).

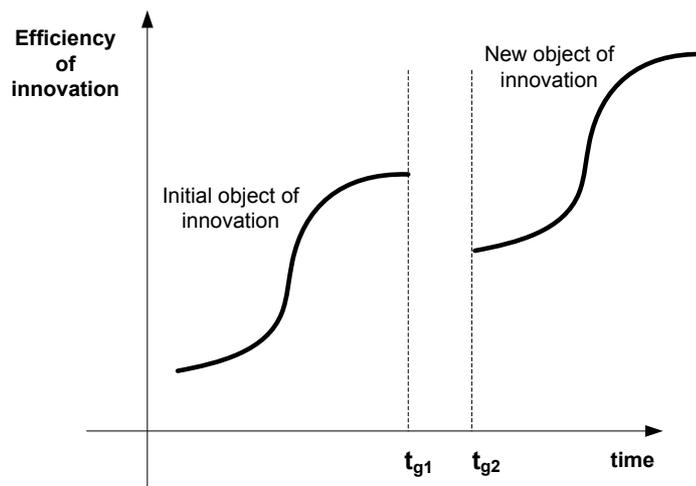


Fig. 4. Time Gap Discontinuity in Innovations

Based on the object of innovation, it is possible to assume the **profile of potential adopter** i.e. to identify potential adopters of innovation i.e. to whom it is intended for, and so to recognise important features and characteristics of potential adopters that influence deciding on proper forms of promotion of innovation, and thus communicating information about innovation in the desired direction.

**Medium** involves the means (or forms) of targeted distribution of information about innovation i.e. the methods for conducting and stimulating the diffusion of innovation; however, inadvertent spreading of information about innovation should be monitored together with the media engaged (e.g. internet, TV, radio, press, personal contact, reviews etc.) so that the authors of innovation will make use of findings of monitoring when deploying another innovation.

Regarding the **effect of adoption on diffusion**, it is crucial to understand the process of adoption of innovation as relating to an individual i.e. it is the thinking process in which individuals go through individual phases of adoption process (i.e. from initial perceiving innovation up to adopting innovation). The diffusion process then depends on the pace of the adoption process and provided that the adoption process have been completed successfully, and involves numerous adoption processes, the total number of which cannot be determined precisely i.e. the process of diffusion of innovation would consist of processes that have succeeded in adopting innovation i.e. it is possible to track them back (e.g. the number of objects of innovation sold) and/or processes that have failed to adopt innovation.

#### 4. CONCLUSION

Based on the above mentioned, shall we identify the processes of adoption and diffusion of innovation as interdependent processes that cannot take place in isolation. It applies that individual adoption processes determine courses of action for subsequent diffusion process. The most important factor affecting the adoption and diffusion of innovation is time since the overall length of diffusion process depends on adoption rate to innovation i.e. the faster the adoption rate, the shorter the diffusion process as a result of which another innovation would emerge quickly. Given the tendencies in innovation life span; in particular, the tendencies towards shrinking diffusion processes, companies have to boost creativity and innovation activities, and invest into new technologies, as they need to be more flexible and react very swiftly in terms of placing of novelties on the market in shorter time intervals.

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# EXAMINING INTERDEPENDENCE OF MDA BANKRUPTCY MODELS' ABILITY TO PREDICT AND VARIABLES INVOLVED

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## ABSTRACT

The financial soundness and stability assessment of business entities is deemed to be the information of the greatest importance in terms of dynamic business environment. Many strategic choices made by management and/or other stakeholder groups are based on the financial stability assessments, and they are the bankruptcy prediction models that enable indicating the adverse financial developments. There are many prediction models widely known nowadays differing in reliability i.e. ability to predict, variables involved, sector preferences, conditions on national markets (to what extent the conditions are taken into account) etc. Having considered the above mentioned, it is obvious that no such universal and uniform prediction model is likely to be made being able neither to indicate the adverse financial developments eventually resulting in bankruptcy reliably and timely nor to be applied to all sectors or regions.

The paper deals with the bankruptcy prediction models pointing out at the predictive ability of them, which is considered to be one of the essential quality and model reliability criteria. The terms of bankruptcy is further determined together with identifying the individual forms of bankruptcy prediction models assigned to one of the three defined groups (statistical prediction models, Artificially Intelligent Expert System models (AIES) and theoretical models). Furthermore, the scale of variables being involved but varying in intensity once applied is addressed. The overall predictive ability of bankruptcy models is also rather diverse what shows the results of a survey carried out to identify the dependence between a number of variables involved and the predictive ability of model using the Pearson correlation coefficient (the survey covered 42 random bankruptcy models, which have been applied in various countries worldwide, belonging to a category of multivariate discriminate analysis (MDA)). The reason for justifying just the MDA models is that they are being largely engaged and applied comparing to all the other known and recognized models. Given that the calculations proved there is a non linear correlation between a number of variables involved and predictive ability of a model, the quality of model is therefore impossible to be tracked in terms of the number of variables involved, and the level of predictive ability depends to a large extent on a number of variables and factors involved, which are supposed to get considered in advance.

## KEYWORDS

Bankruptcy prediction models, Multivariate Discriminate Analysis, Prediction, Accuracy of Prediction Model.

## JEL CLASSIFICATION CODES

C53, G33

## 1. INTRODUCTION

The efforts to achieve early recognition of the business entity financial instability led to establishment of new methods for financial analysis, so-called prediction models. They act as indicators of early warning of business entity's negative financial development - forecasting - based on the history of entity's results. Such

models are based on the prerequisite that business entity heading towards bankruptcy shows specific financial differences, symptoms in comparison with financially healthy entity (problems with current ratio, net working capital, profitability, etc.) for certain period of time beforehand. Similarly, it is necessary to emphasize that none of the financial analysis prediction methods may be deemed as 100% reliable and it is not possible to include conditions specific for entity's environment.

The decisive qualitative attribute of prediction models is the ability to classify entity with sufficient reliability into the category of prosperous (solvent) or non-prosperous (insolvent) entities. The level of predictive ability level varies upon the existing models, logically, the value declines with the period of time for which the prediction is executed. Input data for models are data taken from entity's Statement of Finances.

Bankruptcy is defined as financial insolvency or legal proceedings for solving financial commitments of an insolvent debtor (being person or entity). The purpose of bankruptcy proceedings is to distribute assets to creditors in a fair way and (in majority of cases) release the debtor from further financial commitments. Bankruptcy may be declared by debtor alone (voluntary bankruptcy) or by creditors (involuntary bankruptcy), (Sibl et al, 2002).

Bankruptcy is a legal proceeding involving a person or business that is unable to repay outstanding debts. The bankruptcy process begins with a petition filed by the debtor (most common) or on behalf of creditors (less common). All of the debtor's assets are measured and evaluated, whereupon the assets are used to repay a portion of outstanding debt. Upon the successful completion of bankruptcy proceedings, the debtor is relieved of the debt obligations incurred prior to filing for bankruptcy.<sup>15</sup>

Bankruptcy is a legal procedure for liquidating a business (or property owned by an individual) which cannot fully pay its debts out of its current assets. Bankruptcy can be brought upon itself by an insolvent debtor (called 'voluntary bankruptcy') or it can be forced on court orders issued on creditors' petition (called 'involuntary bankruptcy'). Two major objectives of a bankruptcy are (1) fair settlement of the legal claims of the creditors through an equitable distribution of debtor's assets, and (2) to provide the debtor an opportunity for fresh start.<sup>16</sup>

## 2. BANKRUPTCY PREDICTION MODELS

There are various prediction models, differing in approaches and methods applied for their compilation, demand for input data, number of variables, form of interpretation of results, etc. The existence of large number of models is caused by the fact that there is not universal application in various sectors and economic conditions. It is understandable that creators of prediction models strive to create a model that is able to provide a required value of prediction capability within the longest possible period of time, however, it is very difficult in the environment of ever-changing market conditions.

The modern age of entity financial health prediction goes back to 1960s of the previous century. Then, Tamari, M., Beaver (1966), V. H., Altmann, E. J. (1968), considered as founders of scientific forecasting of entity financial health, published their studies regarding early warning systems. Since then, there have been hundreds of prediction models created

Bankruptcy prediction models based on the method of linear discriminant analysis ("indexes") represent a widely used tool for analyzing corporate failures or evaluating a company's financial health. Many authors focus on searching for a better new set of variables that would have greater power of discrimination than alternative ones or focus on finding a better classification algorithm (Karas & Reznakova, 2014).

The prediction accuracy of such models, that is how a model can be used to identify the threat of a bankruptcy well in advance, is a much debated issue. The research takes two individual lines:

1. Identifying suitable variables of a model. In devising a model, it is rather difficult to collect sufficient data on bankrupt companies, as bankruptcy is relatively rare in business.

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<sup>15</sup> <http://www.investopedia.com/terms/b/bankruptcy.asp>

<sup>16</sup> <http://www.businessdictionary.com/definition/bankruptcy.html>

2. Testing various methods that can improve the prediction accuracy of models. The most commonly used method for designing a model is linear discriminant analysis (LDA), (Karas & Reznakova, 2014).

Due to the number of prediction models and their diversity we have tried to perform a classification based on researches executed so far. By studying and analyzing of information sources including bankruptcy prediction models, we established three groups integrating models based on approaches used for their construction:

### 1. Statistical Prediction Models

UDA	- univariate discriminant analysis (linear)
TDDA	- two-dimensional linear discriminant analysis (linear)
MDA	- multivariate discriminate analysis (linear)
QDA	- quadratic discriminant analysis
PCA	- principal component analysis
LOGIT	- logistic regression
PROBIT	- probit regression
LP	- linear programming
DEA	- data envelopment analysis
SA	- survival analysis
FT	- fuzzy techniques
CUSUM	- cumulative sums
PAP	- partial adjustment processes

### 2. AIES Models (Artificially Intelligent Expert System Models)

RPDT	- recursively partitioned decision trees
CBR	- case-based reasoning
GA	- genetic algorithms
NN	- neural network
RS	- rough sets

### 3. Theoretical Models

BSDM	- balance sheet decomposition measures
GRT	- gambler's ruin theory
CMT	- cash management theory
CRT	- credit risk theories

The survey also focused to monitoring the level of application of particular models. Altogether, there were over 800 prediction models gathered and analyzed. The first group of models - Statistical Prediction Models - are the most applied models. The benefits of this category are elimination of subjective impact and views of entities in comparison with so-called credit models based on allocation of points where values of selected financial indicators are transformed to points using charts stipulated by expert methods. It is a scheme of several ratio-type indicators with assignment of corresponding significance. The summary of compiled function represents score which serves as a base for decision-making whether the particular entity is susceptible to bankruptcy. From the point of view of processing the Statistical Prediction Models, models created by use of discriminate analysis prevail greatly.

Discriminant analysis is the method which allows company to decide whether an element belongs or does not belong to the advance set group which is not always simple and clear. The term discriminant analysis first appeared in 1936 in works of R. A. Fischer in the article The Use of Multiple Measurement in Taxonomic Problems. The nature of discriminant analysis defined by Fisher simply consists of the methods to explore the relationship between a group of independent characters (which we call discriminators) and one qualitative dependent variable – output. The output is in the simplest case a binary variable  $y$  that acquires only two values (Cisco & Kliestik, 2013):

- 0 in case that the object is in the first class,
- 1 in case that the object is in the second class.

The main task of discriminant analysis is to find the optimal attributing rules that will minimize the likelihood of erroneous classification of elements, i. e. it will minimize the median of erroneous decision (it may happen that the element actually comes from a particular group, we classified into different group by obtained discriminant analysis). Each element is characterized by several features which reflect its properties. This means that the examined elements (units) are realizations of the random vector  $X = (X_1, X_2, \dots, X_n)$ . Random variables  $X_i$ , where  $i = 1, 2, \dots, m$ , corresponding to measured characteristics. The procedure starts with an analysis of group of elements in which is known relation to a particular group and also values of the random variables. (measured characteristics) - training set. The result of the analysis of the training set is to find discriminant function that determine the likelihood of classification of new still unclassified element to particular group on the basis of measured values  $(x_1, x_2, \dots, x_m)$  of its characteristics (Kocisova & Misankova, 2014).

The discriminate analysis integrates the group of ratio-type indicators evaluated for two categories of entities - entities just before bankruptcy and entities, which are not endangered by bankruptcy:

1. *UDA - Univariate Discriminant Analysis (linear)* - classification of entities to prosperous and non-prosperous is carried out by using a single financial indicator with favourable ability to execute such distinction (cash flow/liabilities, ROI)
2. *TDDA - Two-dimensional Linear Discriminant Analysis (linear)* - classification of entities to prosperous and non-prosperous is carried out by using two financial indicators that may not overlap each other
3. *MDA - Multivariate Discriminate Analysis (linear)* - classification of entities to prosperous and non-prosperous is carried out by using three or more financial indicators that create n-dimensional space.

MDA may be considered as a generally recognized, standard method of prediction of entity financial health with attribute of continuous evaluation model. Such models comprise of linear combination of variables (financial indicators) with greater testimonial value for the purpose of differentiation between prosperous and non-prosperous entities. General form of linear discriminate function is as follows:

$$D_i = D_0 + D_1X_{i1} + D_2X_{i2} + \dots + D_nX_{in} \quad (1)$$

where:

- $D_i$  - entity discriminate score  $i$   
 $X_{ij}$  - value of variable  $X_j$ , where  $j = 1, 2, \dots, n$  for entity  $i$   
 $D_j$  - linear discriminate coefficient, where  $j = 0, 1, \dots, n$

The value of discriminate score  $D_i$  gives us an idea of entity financial health and classifies entity into the category of declining or prosperous entities. Classification of entity is carried out by mutual similarity, i.e. entity is classified to the category of declining entities and its discriminate score  $D_i$  is lower than limit value and vice versa, while there is a proposition that if entity is classified to the group of declining entities in time  $t$  than there is a high probability it shall be classified in the same way in time  $t+1$ , too. In majority of cases, MDA methods show quite reliable prediction ability. Inability to detect non-linear relations in input data is considered as disadvantage.

Our primary goal is to save prediction ability of MDA category models in relation to number of variables that represent structure of such models. Bellovary, J. et al 2007 analyzed 165 bankruptcy models executed since 1965. Table 1 shows individual indicators included into the analyzed prediction models, arranged by their occurrence, starting with the most occurring ones.

Table 1. Factors Included in Five or More Studies

Factor/Consideration that Include	Number of Studies
Net income/Total assets	54
Current ratio	51
Working capital/Total assets	45
Retained earnings /Total assets	42
Earnings before interest and taxes /Total assets	35
Sales/Total assets	32
Quick ratio	30
Total debt/Total assets	27
Current assets/Total assets	26

Net income /Net worth	23
Total liabilities/Total assets	19
Cash/Total assets	18
Market value of equity/Book value of total debt	16
Cash flow from operations/Total assets	15
Cash flow from operations/Total liabilities	14
Current liabilities/Total assets	13
Cash flow from operations/Total debt	12
Quick assets/Total assets	11
Current assets/Sales	10
Earnings before interest and taxes/Interest	10
Inventory/Sales	10
Operating income/Total assets	10
Cash flow from operations/Sales	9
Net income/Sales	9
Long-term debt/Total assets	8
Net worth/Total assets	8
Total debt/Net worth	8
Total liabilities/Net worth	8
Cash/Current liabilities	7
Cash flow from operations/Current liabilities	7
Working capital/Sales	7
Capital/Assets	6
Net sales/Total assets	6
Net worth/Total liabilities	6
No-credit interval	6
Total assets (log)	6
Cash flow (using net income)/Debt	5
Cash flow from operations	5
Operating expenses/Operating income	5
Quick assets/Sales	5
Sales/Inventory	5
Working capital/Net worth	5

Source: Bellovary, J., L. et al, 2007

Out of the group of over 800 prediction models surveyed, we used random selection to create a group of 40 MDA category models (see Table 2). Random selection was not determined by any criterion related to origin of such model, its author, year of creation, sector of its preferential application, etc. Obviously, these models vary according to their composition regarding the number of variables used and tested prediction ability.

Table 2: Overview of evaluated MDA prediction models

#	Author	Country	Year	Sector	Number of variables	Predictive ability [%]
1.	Alici	United Kingdom	1996	manufacturing	4	60,12
2.	Altman and Lavallee	Canada	1981	manufacturing/retailing	5	83,00
3.	Altman, Baidya and Riberio-Dias	Brazil	1979	general/manufacturing	5	88,00
4.	Anandarajan, Lee and Anandarajan	unknown	2004	general	5	82,80
5.	Bhatia	India	1988	publicity traded	7	87,00
6.	Bidin	Malaysia	1988	manufacturing	7	45,00
7.	Bilderbeek	Netherland	1979	manufacturing	6	80,00
8.	Coats and Fant	unknown	1992	general	5	72,00
9.	Daniel	unknown	1968	general	10	91,80

10.	Espahbodi	unknown	1991	banks	4	83,00
11.	Fernández	Spain	1988	manufacturing	6	84,00
12.	Gloubos and Grammatikos	Greece	1988	manufacturing	5	92,00
13.	Gru	unknown	1973	small businesses	5	85,00
14.	Guan	unknown	1993	general	5	87,00
15.	Gurčík G-index	Slovakia	2003	agriculture	5	69,00
16.	Chrastinová CH-index	Slovakia	1998	agriculture	5	10,00
17.	Izan	Australia	1984	manufacturing	5	90,00
18.	Keasey and Watson	United Kingdom	1986	small firms	5	70,00
19.	Koh and Killough	unknown	1990	general	4	78,60
20.	Leksrisakul and Evans	Thailand	2005	publicity traded	5	60,00
21.	Lindsay and Campbell	unknown	1996	general	2	71,00
22.	Luoma and Laitinen	Finland	1991	manufacturing/retailing	3	64,70
23.	Marais	United Kingdom	1979	manufacturing	4	93,00
24.	Moses and Liao	unknown	1987	smal private gov. contractors	3	85,00
25.	Moyer	unknown	1977	general	9	89,00
26.	Neumaier, Neumaierová	Czcech	2000	general	5	85,00
27.	Neumaierová, Neumaier	Czcech	1995	engineering	6	70,00
28.	Odom and Sharda	unknown	1993	general	5	59,26
29.	Pascale	Uruguay	1988	food	3	98,00
30.	Pindado and Rodriques	Portugal	2000	small businesses	2	84,00
31.	Sajter	Croatia	2008	general	1	88,00
32.	Springate	Canada	1978	general	4	92,50
33.	Sprintage	Canada	1983	canadian firms	4	90,00
34.	Ta and Seah	Singapore	1981	manufacturing	4	77,00
35.	Taffler	United Kingdom	1974	manufacturing	5	60,00
36.	Taffler	United Kingdom	1982	manufacturing	4	95,00
37.	Takahashi, Kurokawa and Watase	Japan	1979	manufacturing	8	83,00
38.	Takahashi, Kurokawa and Watase	Japan	1984	manufacturing	3	100,00
39.	Vuran	Turkey	2009	general	5	84,00
40.	Yang, Platt and Platt	USA	1999	oil and gas companies	5	88,00

Source: own processing

The analysis of random selection model samples included calculation of the following statistical indicators:

- Number of variables median: 5 variables
- Number of variables modus: 5 variables
- Average number of variables: 4.83 variables
- Average prediction ability in %:

Consequently, we evaluated relation of models between their prediction ability and number of variables used included into their structure by using Pearson correlation coefficient:

$$r_{XY} = \frac{n \cdot \sum_{i=1}^n x_i \cdot y_i - \sum_{i=1}^n x_i \cdot \sum_{i=1}^n y_i}{\sqrt{n \cdot \sum_{i=1}^n x_i^2 - (\sum_{i=1}^n x_i)^2} \cdot \sqrt{n \cdot \sum_{i=1}^n y_i^2 - (\sum_{i=1}^n y_i)^2}} \quad (2)$$

$$r_{XY} = -0,06017$$

### 3. CONCLUSION

The value of Pearson correlation coefficient calculated is close to zero which means that it is not possible to linearly correlate number of factors of the model and its prediction reliability in relation to bankruptcy prediction. Therefore we can definitely confirm that the model prediction accuracy is not determined by the number of variables included. In many cases, models with lower number of factors are more reliable than models including higher number of factors. Therefore, the model prediction accuracy predominantly depends on the correct selection of variables used. As it can be seen in Table 1, out of 165 evaluated bankruptcy models, the following ratio-type indicator was used for as many as 54 of them: Net income/Total assets. The high occurrence of this indicator proves its fundamental impact on prediction ability of bankruptcy models.

We evaluated the level of causal dependence of model prediction ability from number of variables used by applying determination coefficient, which is defined as second power of correlation coefficient  $r$ . Interpretation of determination coefficient  $r^2$  is based on dispersion analysis of model prediction ability, which should be interpreted by the value of variability of number of variables to the extent providing linear dependency of prediction ability of models. In our case, the determination coefficient value  $r^2 = 0.00362$ , i.e. only 0.362% of bankruptcy model prediction ability variability may be interpreted by linear relation with number of included variables (regression line). As much as 99.638% of bankruptcy model prediction ability variability may be interpreted by other causes such as linear dependence between number of used variables and prediction ability.

The bankruptcy prediction model or rather the index without a grey zone could classify a company only as financially healthy (active) or as a company threatened with bankruptcy. However, one can argue that there is still a long distance between these two states. The role of the application of a grey zone to the index is to fill this gap. A company in the grey zone could then be viewed on one hand as threatened by bankruptcy, but on the other hand there will probably be efforts made to reverse such a fate in the given company. From this point of view, the incorporation of a grey zone in such models is a necessity (Karas & Reznakova, 2014).

### ACKNOWLEDGEMENT

This research was financially supported by the Slovak Research and Development Agency - Grant NO. APVV-14-0841: Comprehensive Prediction Model of the Financial Health of Slovak Companies.

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# ERPS IMPORTANCE IN THE INFORMATISATION OF WORKFLOWS IN COMPANIES

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## ABSTRACT

In the era of globalization, of net-economy, business management has a crucial role for companies. Information and communications technology is used in all companies in the process of taking over of real time information underlying the substantiation and decision-making. The sheer volume of data with are facing companies and the need to improve working methods led to the implementation of some computing technology (hardware and software) that increase the speed of data processing, storage space and listing methods. In this paper we aimed to research the importance and role of enterprise resource planning systems (ERP) in the informatisation process of workflows, because the integrated systems of ERP type are designed to be the core of a company, being able to integrate all departments into a single management system. For this we first presented the workflow necessary resources, basic concepts related to workflow advantages and disadvantages. Then we did a study on ERP integrated systems, pointing out the features of two performant ERPs (Microsoft Dynamics NAV and SAP Business Suite) with highlighting their effects and role in the company, the reasons for why companies choose to implement them, and the issues that must to be considered for as this choice to be a profitable one for the company. The paper concludes with a set of conclusions on the decision to implement an ERP with a view the computerization workflows in a company, depending on the size of companies and the benefits they can bring, and coming ahead the companies under growing.

## KEYWORDS

workflow, net-economy, informatisation, performance, real time

## JEL CLASSIFICATION CODES

D80, M15, M32

## 1. INTRODUCTION

How important is the choice of efficient and cost-effective software for a company in today's economy, given that a struggle both for resources and survival on the market? In contemporary society, for the computerization of workflows, choosing an ERP system is a necessity rather than an option.

Due to business environment that is in a rapidly changing, for as a company to be competitive and provide quality products and services, it needs a performing computer system. In the age of globalization business and the emergence of the Internet, the informational systems had to keep pace with the digital era needs. A great help comes from Internet that provides support new businesses and quick access to large volumes of information.

Information technology is used worldwide to all companies that rely on it in decision making, and to keep in touch in real time with all production units, offices, sales and distribution centers. Currently is desired transition to a technology model capable of obtaining information and on this basis to substantiate their decisions.

International competition has intensified especially due to economy globalization and development of information technology. Thus, companies have to survive a fight with an open competition, because no longer benefit of the protected markets and the information plays a strategic role in business success.

Due to the emergence of many information technologies, changes occurred both in society and in management, because it was noticeably increased working speed and quality of service. Everything starts from human and spreads through rapidly technology by him, so over-bidding individual behavior.

Given these premises, we plan to investigate the computerization of workflows through a computerized system for enterprise resource planning ERP (Enterprise Resource Planning), since ERPs are designed to be the core of a company, being able to integrate all departments into a single management system.

In this regard, in this paper we intend to present the importance and usefulness of an informatics system of ERP in workflow management within a company. For this we first identify the necessary resources of workflow, we present concepts related to workflow, and will highlight some advantages and disadvantages of it. Then, we plan to do an analysis on the decision to implement an ERP, depending on the size of the company, a number of benefits which it can bring and presentation mode how an ERP system can meet the needs of companies in full development. We will conduct a study on Embedded Computing Systems ERP type with highlighting the role and their effects in the company, the reasons why companies choose to implement them, and aspects to be taken into account for this as choice to be a profitable one for company.

## 2. WORKFLOW AT A COMPANY IN THE DIGITAL AGE

At a company level, the computer system can be divided into several subsystems adapted its needs: information systems at the operational level, knowledge management systems within the company, systems information for current management, systems for strategic management, transaction processing systems, systems for research and development, decision support systems, support systems of the executive etc.

The purpose of informatics systems is to provide information requested by the user in an appropriate form and at opportune time to facilitate decision making. All of this represents support for substantiation of decisions related to a domain, by using modern computers (Militaru, G., 2004, p.32-35).

Information systems are created based on workflow in an enterprise, taking over most of the documents and translating them in an optimized manner in a database.

The concept of workflow, familiar in an organization involves its achieving the objectives by coordinating several activities involving several contributors. Activities are exposed of the constraints and interdependencies, dictating the order of participants' activities. In exceptional situations, failures or disruptions arisen, their resolution must not lose sight of the ultimate goal.

Thus workflow refers to the lucrative processes of a company, serving of a final goal. For workflow is also used and business process term.

When we talk about workflows, should we consider notions such as (Apsap.ro, 2013):

- Workflow - involves partial or complete automation of a business process where documents, information and tasks are passed from one participant to another to perform a certain task, according to a set of procedural rules;
- Workflow Management System - running on workflow engines; able to define, create and manage workflows using software, having as objective interpretation of the model (definition) process, interaction with participants and the use of tools and software;
- Business Process, implies the existence of a set of interdependent procedures that serving together an objective, both in business and in policy goal, within an organizational structure defining the roles and functional relationships;
- Activity, describes an operation that represents a logical step in a process;
- Instance is a particular case of process or activity, along with associated data;
- Workflow Participant (agent, actor, participant) - this resource make work instantiated of an activity by business workflow and is presented as the form of one or more elementary operations distributed to a participant, who knows his attributions through a list of tasks.

To manage workflows, a support for managers is represented by the ERP integrated systems that offer numerous solutions and benefits.

### 3. INTEGRATED SYSTEM ENTERPRISE RESOURCE PLANNING

Integrated informatics systems are defined like complete systems through which it conducts managerial activities, interactions between organizations, business processes, knowledge acquired and other structural changes (Soava, G., 2013). In the market economy, in which the business environment is characterized by a special dynamic, due to the need to adapt to changes permanent market, it needs as decisions to be taken in real time, be flexible.

Increasing global competition, of the access potential clients to information and changing their behavior in the buying decision, has generated the need the personalized offers towards customers in real time. Thus imposed itself as the informatics systems intended of businesses to permanent evolve to include components covering the whole problem of analysis, decision support, forecasting and business planning at all levels, beginning from execution up to senior management that can provide real-time information and with meaningful content, working in an integrated way with the release of their actions required and tracking them within the organization.

ERP is the abbreviation for Enterprise Resource Planning that represent a management software of the business processes that enables an organization to use a system of integrated applications to manage and automate workflows related with technology, services and human resources. ERPs integrate all aspects of operations, including production, research and development, sales and marketing.

Davenport (1998) defines ERP as a package of applications that covers all functional areas of a company such as sales, marketing, accounting, human resources. ERP has become a topic of increasingly known in recent years by the emergence of countless releases that convince business community of the need to implement of the integrated applications.

According to Gartner, ERP is defined as the ability to deliver an integrated suite of business applications. ERP tools share a common process and data model, covering broad and deep operational end-to-end processes, such as those found in finance, HR, distribution, manufacturing, service and the supply chain. ERP is defined as the ability to deliver an integrated suite of business applications. ERP tools share a common process and data model, covering broad and deep operational end-to-end processes, such as those found in finance, HR, distribution, manufacturing, service and the supply chain (Gartner IT Glossary)

Characteristics of ERP systems are (Soava, G., 2013):

- integrates most of business processes;
- processes the most transactions of an organization;
- modular design;
- a central shared database;
- allow access to real-time data;
- transaction processing and planning of integrated activities,
- modules are integrated, the data transfer between modules is automatically;
- can be configured and adapted to business requirements of companies and at the changes within them;
- are complex systems, flexible, and provides best practices;
- must have open-system architecture, i.e. any module can be interfaced or detached at any time without affecting the others;
- most ERP systems can also be accessed via Internet.

An ERP system is created to be used for larger businesses and often require dedicated teams that to customize and analyze data, to handle updates and implementation. Instead, ERPs created for small business involves management software solutions for lighter, adaptable to customer business (Webopedia, 2013).

Considered initially as large-scale applications, for "the rich", ERP solutions have proven available to broad masses of customers and are implemented in large corporations but also in small and medium enterprise.

Businesses in the digital age can't be sustained without the existence of robust ERP solutions that can process large volumes of data in real time.

#### **4. ERP CONTRIBUTE TO IMPROVING THE PERFORMANCE OF A COMPANY'S**

An ERP is the backbone for companies, because comprising a series of integrated modules that optimize the activity and allows integration of new solutions with the development of business.

Implementing an ERP system is geared more of processes and people, rather than technology. Companies must develop and sustain long-term organizational changes to achieve improvements in the business environment.

Some key reasons why companies have every incentive to implement ERP solutions are (fitrix.com):

- Improve the relationship between the management of operational, tactical and strategic. Company management will be done in accordance with strategy and plans, and real-time access to the right information helps identify problems in a timely manner;
- Improving labor productivity, of own services, and operational efficiency within but also outside the enterprise;
- Reduce costs through increased flexibility. With ERP it will achieve expansion of transactions, information and collaboration functions within the business community;
- Provides support for changing needs of industry and process technology for seamless integration of end-to-end;
- Reduce risks. With ERP, companies do face at complex business challenges and it chooses the best business practices;
- Financial and organizational management are improved to give a better visibility in the company. Increase profitability, improving financial control and risk management;
- Optimize IT spending. Business processes are integrated and optimized, high costs of integration are removed, improving cash flow and reduce the need for loans;
- Provides immediate access to company information by giving of employees the new ways to access information necessary for their daily activities.

From experience, companies have found that to withstand intensely competitive market, the best way is to reduce costs without affecting the quality of products or services that could damage the company's image. The question is: how can you do this to keep simultaneously the profit level and allow the business development? Reducing costs without causing of profit or quality it can be achieved by introducing an integrated ERP system because (SeniorSoftware, 2013):

- Implements an integrated solution that brings together people and workflows within a company to ensure proper and safe management of the data, but and access to these in real time. In a single platform are centralized all the information, to provide access to any type of data, thereby facilitating communication and coordination. Cost reduction is due to the fact that the information are entered only once in the database, comprises several components (production, accounting, management, budgets, cost centers, logistics, etc.), the flexibility allows a customization on the specific business, the software is oriented towards business process optimization and flows, the system is scalable, allowing the addition of new modules as the company grows;
- Operational processes are automated and standardized. The large number of employees and the long working the time make ineffective the operations carried out by hand, these are and quite unorganized. For a smooth running of activities is necessary a standardization and automation of the business processes that will increase productivity and create a clearer picture of the business;
- There is an improvement of the procurement process. One of the most important parts of a business is communication with suppliers. ERP System correlates primarily, buying activity with sales activity. It analyzes existing data about ERP sales, to correctly determine future acquisitions;
- Tracking costs in detail. Through an ERP system it can determine the expenditure budget and subsequently monitors whether the actual costs were within the desired boundaries. Thus, increases control over business costs;
- Optimize inventory. Excess inventory automatically increase costs. An ERP system that integrates an inventory optimization option lowers the cost of inventory;

- Effectively manage deposits. In ERP system are integrated a WMS that facilitates the transfer of information from headquarters to the warehouse and vice versa and optimizes warehouse space and expenses such as rent, administration and staff remuneration is reduced;
- It can achieve a control of the auto fleet, which usually generates high costs for wages and documents for drivers, to taxes, insurance, fuel and revisions. Through an ERP ensures control over their because they have modules that help the company to easily identify any of its vehicles, keep track of each machine (route, consumption, accidents and fines), aims duration of unavailability of each car and its causes;
- Improves sales process. From sales activity are obtained typically income, but is also of generators of the cost. These can be decrease with help out solutions offered by ERP systems, CRM or SFA;
- Possibility of integrating in ERP of an online shop. The expenses of such a store are lower compared to a real shop, which involves rent, wages, taxes and maintenance;
- Optimizes the analysis and reporting process by implementing a Business Intelligence solution that provides the advanced analysis on the evolution of company indicators. The system provides an interactive and visual interface, the analyses and graphs available providing an overview of the costs generated by business.

There can be no doubt that ERP is an important tool nowadays. How more companies begin to compete on a global scale, simplifying operations and processes will become a key issue for them. Is importantly to find the best ERP system for own business.

## **5. PERFORMING ERP SOLUTIONS**

### **5.1 Characteristics of an efficient ERP**

A performance ERP solution must contain of a modern data base, available on any platform enabling communication with other applications and provide a full range of technologies eBusiness. Customer needs have become increasingly demanding, so the new ERP applications include support for interconnection with mobile devices (laptop, PDA), enterprise portal that allows use of the application from anywhere in the world via the Internet or running the application to be done on parallel servers (hotnews.ro, 2015).

A performance ERP system must meet "some important requirements in terms of centralization and integration information, availability, security, scalability etc. It is also necessary as the different modules implemented to be integrated, the system to be interfaced, easily configurable, could sustain processes online and to make available the tools to support decision making "(ORACLE Romania, 2014).

In this way, investment in an ERP will lead to efficiency and company development by satisfying the company needs and possibilities of market forecasting and the budgets. There will be an increase in the company's business performances by achieving an optimization of all processes (increasing cash flow, reducing production time and delivery, inventory optimization, shortening the financial cycles) but also by making available of reliable information managers real time. The benefits of implementing an ERP can be difficult to quantify in figures, but are evident in terms of productivity of employees, achieving administrative tasks very time consuming, taking decisions, reactions to market changes etc.

Advanced applications, is based on specific processing platforms, able to access data (structured and unstructured) from sources and applications external platform, in various forms (documents, text etc.) by direct search or contextual, process them in real time to obtain the information in various forms (graphics, tables, reports). The user interface is friendly, allowing a flexible and interactive selection of information to be analyzed. Real time processing of huge data volumes is achieved through the use of technology "in memory".

### **5.2 Microsoft Dynamics NAV (Navision)**

Microsoft Dynamics Nav (Navision) is an integrated management system for SMEs, an effective solution for workflow management of business, flexible and at relatively low cost. The product is rapidly integrating in company processes, having a high degree of customization, adaptable of client's business pattern.

Microsoft Dynamics NAV offers its customers the various related functions, regardless of the market where the company work, supporting even of the most specialized organizations. Due to its high degree of adaptability and ease of use, Dynamics Nav benefit from numerous functionalities, add-ons and even their own development.

Microsoft Dynamics NAV streamlines the employees work and does the business competitive. It benefits from a variety of functionalities, from the standard versions can benefit from elements such as customer relations, production optimization and management, financial - accounting management and reports (Synergizer Business Solutions, 2015).

Microsoft Dynamics Nav app includes several key modules:

- Financial Management;
- Production;
- Business Intelligence;
- Sales and Marketing;
- Distribution;
- Procurement and billing;
- Integration with client systems.

The app can be customized to meet exact requirements specified by customer management.

Microsoft Dynamics Nav has over 1 million users worldwide, in more than 50,000 companies, being successfully used in over 130 countries. What makes this program so popular is its simplicity and ability to mold perfectly to the needs of managers which choose for their companies. This adapts and generates immediate results, the investment proved profitable. It is a complete, easy to adapt and with international dimensions, able to adapt extremely easy both to a company with a complex structure and the needs of growing businesses (Microsoft, 2012).

Microsoft Dynamics NAV is one of ERPs that bring benefit companies such ARBOMedia company has chosen Microsoft Dynamics Nav ERP in order to computerize workflows, which reduced by half the workload of the Finance Department.

ARBOMedia Romania is a subsidiary of ARBOMedia AG, a listed German company and the largest Europe's independent advertising director. The company works nationwide, where manages mandates media, by selling advertising space to advertisers, but also to direct customers. In other words, ARBOMedia is an intermediary for advertising spaces (either printed on a particular media, multimedia or online) between providers (television, magazines, newspapers) and customers (advertisers or various major manufacturers). ARBOMedia was occupied until 2002 mainly of Romanian National Television, but currently, manages around 200 national and regional media vehicles such as: Hotnews.ro, Gazeta de Cluj, Seven Nights, Gazette of Iasi, Galati Free Life etc. ARBOMedia is present in Romania since 1995, with over 40 employees ([https://www.microsoft.com/romania/business/studiu\\_de\\_caz/Arbomedia.aspx](https://www.microsoft.com/romania/business/studiu_de_caz/Arbomedia.aspx)).

During the period when only manage mandate of the only media supplier, TVR, ARBOMedia was pretty straightforward activity in the financial department, using a simple accounting application, not integrated with application for management of advertising space (AdLounge which was distributed by sub-branch from Munich). The information required for billing, payment or other accounting operations were reintroduced manually. Once with the entry of a larger number of publications (online and print support), the ARBOMedia portfolio transaction volume exceeded 1,000 invoices per month, the data input operation becomes greater wasteful of time. Also, for management reports was using Excel, but with increasing amount of data it has not coped for a fast and efficient processing.

To improve this situation, reducing the time required for billing and recording in accounting of the transactions, and to accurately track management level by various reports, the existing accounting application has been replaced by Microsoft Dynamics NAV ERP.

How did they manage however to purchase this solution? Initially it was drawn up a list of 10 solutions, but concluded that only 3 of the selected products could satisfy and adapt to new requirements. After analyzing the situation, general manager of company is decided that the Microsoft Dynamics NAV is final solution.

In November 2005 it started with the analysis stage, switching in live mode being made on 1 February 2006, with data for the new year. The license was acquired at the beginning only for financial accounting department, for a number of three users. A fourth license was purchased for a person from credit control. Modules implemented were: financial, sales and acquisitions, also realizing NAV interface, for managing of

the advertising space and sales MIS. This interface retrieves automatically and regular the detailed sales order to invoice them. Based on data recorded automatically it creates purchase orders in the supply system, all documents of sale-purchase being managed in multi-currency regime. At application was added later and functionalities such as contract management, new relations of management etc., benefiting from maintenance after implementation until now.

As a first benefit, was observed work rapidity with application because employees at the Financial Department quickly learned how this works.

For the Financial Department, are essential automatic correlation operations purchases and sales, together with the reports of receipts and payments, payments to suppliers being made, in general, at moment of cashing from customer.

The program allows tracking of the receipts from customers and generates the automatic payment to suppliers, on contracts and orders. It was the strength of the Dynamics Nav, which is why he was also elected for implementation.

Has been considerably reduced the workload of the financial department and was facilitated the work from the accounting department by introducing automatic data, which led at orientation towards motivational activities for employees.

Financial analyzes obtained using Microsoft Dynamics NAV are clear and updated at all levels (contract, customer, and supplier) and financial reports are of high quality. Moreover, the working time to generate a report is reduced at within seconds, before being deposited much more work.

With application help are obtained the performance indicators faster regarding contract with a client, analyzing revenues, aggregate values, outstanding invoices or days of delay. Overall, the company ARBOMedia appeared pleased of Dynamics NAV program implementation and will expand its mandates portfolio without fear that the number of transactions will decrease the quality of activities.

### **5.3 SAP, the worldwide leader in software solution**

SAP (System Applications and Products) is a complex informatics system used in database management, it being dedicated to big companies because of the cost of acquisition and implementation still quite substantial.

SAP is at this moment the world leader in software solutions for any type of companies, including the best solutions for enterprise resource planning (ERP), leading to greater efficiency throughout the company. Through SAP, managers are able to identify the problems, shortcomings and find resources leading to their elimination or reduction. SAP solutions, being open source are capable of integrate with almost any IT solution, thus protecting investment in technology also allows the company to take decisions in real time. In this way, SAP Business Suite intelligent solutions, radically changing the way companies do business, leading to an acceleration of processes deployment, thus redefining the speed with which companies operate, to a simplification of internal interactions, offering a wide range of growth opportunities for these.

SAP is installed in more than 183,000 customers in over 130 countries. Development and implementation of the IT solution is supported by 55,000 professionals operating in a global network of offices. Due to the implementation of the main applications of SAP Business Suite solutions package on in-memory computing platform can achieve processing of huge amounts of data, which allows for immediate results even in the most complex analyzes. Because in-memory technology allows access at the data direct from memory, query results are obtained more quickly than in traditional data warehouses (sap.com).

In addition, SAP platform has the ability to simultaneously process both transactional data, resulting from the execution of operational processes and analytical data provided by existing IT systems within organizations, which provide the managers a range of business tools - including marketing analysis, financial analysis, claims management, resource management or analysis on the consumer sentiment - as well as reporting and analytical tools, specifically designed to increase corporate value depending on the specific industry they belong.

SAP Business Suite package provides companies with a work environment that is open, which allows operational analysis and reporting with real-time updates and provides a new class of analytical applications, being able to develop on the basis of some scenarios generated in real-time. For example, can provide high quality services, creating simulations of alternative scenarios of production or execution, on which then implement depending on the relations strategy with customers and not as a result of the limitations of analytical capabilities. SAP can provide a support services package, and a solution for rapid deployment, to

enable all the customers to pass with its own database on SAP platform, without interruption and in a very short time.

Companies have through this platform on a number of business tools that allow marketing analysis, financial statements or consumer sentiment, receivables management and resources, and reporting and analytical tools made specifically to increase the value of companies. In this way, companies can manage all critical business processes in real time, such as budget planning and execution, reporting and analysis of financial data in order to use the most relevant information in the company's development strategy.

Basically, customers, on basis of the needs from certain times, can rethink the model and business processes carried out in the company, taking advantage of the information generated by the organization. Thus, through SAP, companies also have the option to conduct predictive analysis by that can change e.g. the model focused only on product, into one focused on services. Business models offered, are based on the each customer's unique preferences and requires detailed analysis of the various market segments, new sources and data formats (from the social environment or various applications).

Real-time technologies, combined with the potential of mobile applications to access data and information in real time, reduces the number of business processes and generate new means in order to change radically the market, enabling leaders to conduct business based on current requirements. Also can allow employees to access at any time and from any location the business information or new data, which enables decision makers from companies to analyze in real time information and take the necessary steps within them.

For a pertinent analysis of SAP, SAP AG conducted a survey to see how many companies are planning to implement technology of "in-memory" in the next 12 months (NYSE: SAP, 2013), and found that 20% of private companies of globally intend to implement in-memory technology in the next period to benefit from real-time access to data and information, and a percentage of over 10% of them are already in the process of implementation and about a third of respondents plan to implement such technologies in the coming two to three years.

SAP solutions provide specific functionality depending on regulations of the countries where they are implemented and put available to companies a comprehensive set of solutions for business management.

Summarizing all the issues raised we can emphasize the key benefits of these technologies:

- quickly adopt new technologies and applications using a flexible platform;
- uses huge volumes of data through the use of technology "in computing";
- has the ability to transfer people and businesses the confidence and strength needed to work together efficiently and to effectively using the company's internal resources so as to be one step ahead of the competition;
- offers users a comprehensive range of solutions for any type of company specific operations;
- provide a package of support services, and a solution for rapid deployment, allowing that in a very short time and without interruption, passing customers with own database on SAP platform.

Integrated ERP, SAP provide the managers a set of tools to enable flexible modeling company, so as to realize a real-time control of costs and their profits, and identify areas of the organization where these are recorded. This informatics solution can support the processes of reorganization / restructuring / merger / sale, by providing accurate and consistent data.

Following this brief overviews of the features provided to companies of this integrated package, SAP, we conclude that is the ideal platform for the future company and for consumer applications, in which it is realizing the instant analysis of each transaction, and the collaboration is based on data received in real time, regardless of their volume, with no constraints of imagination.

SAP does not experiment, does not test the applications with customers, but guarantees them through the transparent "road map", that the ERP will include all the functionality through "road map" of transparent that ERP will include all the imposed functionality both of the immediate changes as well as of the future!

ERP SAP is a solution in which continuously invests and is geared towards facilitating the use of such solutions of as many companies regardless of dimensions and domains of activity. SAP provides preconfigured packages of the business process of type Rapid Deployment Solutions that can be customized according to the specific customer, in a short implementation time, with lower cost, and with the development of the activity of companies, will implement new functionality.

## 6. CONCLUSION

After analyzing of the many benefits brought by the implementing an ERP system, we can conclude that indeed these systems are the core of an enterprise, by integrating all departments into a single system, with a complete database. Although it is not easy to choose a program that meets the requirements of all departments (financial, accounting, human resources, manufacturing), the final decision is taken primarily in view of the costs involved (subscription or license, maintenance, personnel training) and secondly the way the system modules to suit the situation of the company. It usually choose a system that also benefit from a user-friendly interface.

We noticed that ERP systems are the intersection of three major components: management practices, information technology and specific business objectives. To get the benefits and avoid system failure is in desperate need of a successful management. If the strategy and technique are correct, the success rate will be higher. Most important is human resources management, because employees must be "educated" on the objectives of ERP system implementation. The fact that ERP systems use a common database, integrating all relevant information circulating in the company, helps eliminate data inconsistency. With ERP, the old systems from each department are replaced by a single software program communicating with each other and whose specific programs can be accessed as needed, serving equally the needs of all departments.

On the contribution of ERP to improve the performance of a company, I noticed that the implementation of such a system helps to:

- Improve the relationship between strategies and operations;
- Improving the productivity and understanding;
- Reduce costs through increased flexibility;
- Reduce risks;
- Better visibility in the company;
- Optimize IT spending;
- Provides immediate access to company information.

When choosing an ERP system must be verified compatibility with the company. The application must adapt to business needs, to match the nature of the business, to be flexible, but it is also important to select a vendor with a certain proven track record in their own business.

Although often not given due attention, the ERP software selection is very important. The needs will be determined by the customer, whether it has the necessary resources and specialists, or variant recommended by an external consultant with experience and necessary resources. The requirements must be defined in a clear and detailed way so the customer and the supplier will be able to more accurately assess the costs, the trust will be greater, more complete offer, chances for the successful implementation is greatly increased and will reduce risk and implementation time.

Analyzing the resource requirements for a workflow, its statuses, a number of advantages and disadvantages, and knowing some notions of workflow we achieved some proposed objectives. When brings into discussion the enterprise resource planning and control, should be considered necessary resources (financial, material and human). Presentation of the advantages of implementing an ERP system and concrete analysis of such software, Microsoft Dynamics NAV and SAP, leads to the conclusion that all objectives were achieved in this paper.

The successful implementation and the good references made by companies working with Microsoft Dynamics NAV ERP and SAP, lead us to conclude that Microsoft Dynamics NAV is a good solution for any SME development trends and SAP is still intended for large companies financial potent. The main reason for we choose this software, in addition to ease of use, is that manufacturing companies give an extra confidence in their quality and efficiency.

The success of an ERP solutions has at base the proper degree of customization the business processes of the Company, which may increase the value of the software and allows the company to maximize the benefits.

The costs of an ERP solution is a sum of costs, respectively costs for software licenses, implementation services, maintenance costs, the costs of integration with external applications and their maintenance, the cost of hardware and telecommunications infrastructure. Also, the cost depends on the specificity and complexity of implementing the solution in a particular company (modules, number of users).

The selection process involves drawing up a list with functional requirements, understanding the ERP and then evaluating the best products to see which best suits their business from functional viewpoints, budget and industry. The differences are made at the level of implementation rate and additional features, this is the

benefit of customers, seeking to obtain a good price and additional features and services, but in addition, must be taken into account and credibility of the supplier.

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# DETERMINANTS OF BUSINESS INNOVATION ACTIVITIES IN MANUFACTURING INDUSTRIES – CZECH REPUBLIC AND ESTONIA CASE STUDY

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## ABSTRACT

Economic entities facing an ever accelerating pace of changes, which brings with it advantages and disadvantages. In recent years, the OECD described the Czech Republic and Estonia as a strengthening economies focusing on the promotion of research, development and innovation. However, finding of proper determinants of innovative activities represent a complex process lacking universal formula of which variables positively affect innovation creation. Prior studies showed the number of factors influencing innovation activities. Purpose of this article is to show that the proper combinations of these factors allow creation of more significant effects influencing the growth of companies' turnover. We created own multiple linear regression models by using data from Community Innovation Survey conducted in the Czech Republic and Estonia between the years 2010-2012 to test the relationship between dependent variable represented by % of turnover in new or improved firms' products and selected determinants of innovation activities. The aim of this article is to measure direct effects of individual determinants of business innovation activities on growth of turnover in innovated products in the manufacturing industry in the Czech Republic and Estonia and compare them with results of combinations of these factors. We show that both countries are more effective by using proper combinations of selected determinants of innovation activities. Specifically, we show that, by combining cooperation on innovation with different partners, companies in Estonian manufacturing industry are more effective and more significantly affect their growth of turnover than companies in the Czech Republic. We also show that in both countries there is a growing inefficiency in provision of public subsidies (from national or European funds). In the conclusion, we show the appropriate combination of factors that positively affect the formation of innovation and we are proposing a number of new practical implications for the policy makers of both countries.

## KEYWORDS

Innovation, industry, entrepreneur, manufacturing, Czech Rep., Estonia

## JEL CLASSIFICATION CODES

O30, O31, O38

## 1. INTRODUCTION

Innovations are the most important determinant of the entrepreneurs' performance and nowadays in globalized world they are more and more important also in non-business organizations. The innovations in both types of organizations are subjects to constant changes, both internal and external (Hajek and Stejskal, 2015; Prajogo, 2016). Management, work with people and their management, as well as technology and corporate culture belong to the internal factors. Shefer and Frenkel (1998) assigned to this group others as entrepreneur size, age, ownership type, location, type of industry. These all can significantly affect the firms' ability to produce innovation (it is confirmed by a number of studies, for example Balachandra and Friar, 1997; Kuratko et al., 2014). External factors are, paradoxically, less well understood and we know less about their impact on innovation. The effect of demand, market size, the activity of customers, competitors,

suppliers' strategy, but also the legislative and institutional interventions of public administration, all these significantly affect all activities of entrepreneurs (Tripsas, 2008, Prokop and Stejskal, 2015). In addition, it should be noted that external interventions have very strong dynamics with no possibility of any interference on the part of company management (Kennerley and Neely, 2003). However, firm management can react by corporate competitive strategy that can take advantage of individual strengths and opportunities what are posed by various (external) factors. This clearly shows that managers must seek the "fit" between firms' innovation strategies and the conditions of its environment as external environment can moderate the relationship between firms' innovation strategies and their performance (Prajogo, 2016).

Therefore, every innovative firm moves in an environment which is known for its innovative milieu (Shefer and Frenkel, 1998; Oksanen and Stahl, 2013), which is created by external factors. Compared to the above-mentioned factors, there are other factors that can effectively help the innovation emergence: the rate of local innovation, the degree of cooperation and collaboration among firms and the degree of economies of localization and agglomeration (Shefer and Frenkel, 1998). Campagne (1991) and others argue that innovative environment conducive to innovation is considered a cost-reducing factor that diminishes uncertainty and increases production efficiencies. Just the study of the various production factors - factors what shape the innovation environment - will help in the correct targeting of public policies (Stejskal and Hajek, 2015a; Meričkova et al., 2015). These policies often support the creation of such an environment, innovation systems (mostly in the regions), respectively. They can be regionalized integration policies or regionalized innovation policies. And it is up to the representatives of public power which policy will be shaped by their decisions and thus they will increase either local innovativeness (rate of innovation in a specific locality) or local synergies (degree of socioeconomic interactions among the firms located in close proximity; Millat et al., 1991). It follows that the innovative capability of enterprises and organizations in the region depend nowadays on the use and acquisition of specific production factors.

The aim of this paper is to measure direct effects of individual determinants of business innovation activities on growth of turnover in innovated products in the manufacturing industry in the Czech Republic and Estonia and compare them with results of combinations of these factors. The remainder of the paper is structured as following. Theoretical background and hypotheses are discussed in the following part. Subsequently, the data methodology, results and their analysis are shown. In the last part, there are conclusions and recommendations.

## **2. SPECIFIC FACTOR INFLUENCING THE FIRMS' INNOVATION ABSORPTION**

Modern localization theory proves the significant role of agglomeration and localization economies. These variables help to create a space (city, region), whose growth and performance they support. They contribute also to the emergence of innovative environment in which they generate new ideas and promote the development of technology-intensive manufactures. The technology diffusion is realized in the region or other area, which requires from individual economic actors a strong rapid reaction capability, the ability to adapt the "new" streamed from technology-diffusion process. This process and the "new" both are just depending on environmental external factors, on particular customer requirements and market development. The expected societal return on new technology without the diffusion process will be insignificant (Shefer and Frenkel, 1998).

Technological diffusion is a complex process that is based on the interactions among various subjects (regional actors), Camagni (1991) includes as main: companies and environment and technology. The diffusion is the process by which a technology spreads across a population of organizations (Fichman, 2000). Often it is perceived on international level because it affects international trade and foreign direct investment (Keller, 2001). The globalization made in last 50 years from technological diffusion the essential part of all innovation environments.

The complexity of innovative environment and its dependence on technologies is significantly increased the requirements for rapid reaction capability, adoption and application of new knowledge (every time some firm adopts the innovation, other firms can improve their estimates of the true cost of adoption; Kapur, 1995). This is form of assimilation, which is defined as the process within organizations stretching from initial awareness of the innovation, to potentially, formal adoption and full-scale deployment. For the creation and

establishment of technology influencing the effective diffusion we need to know the factors that influence diffusion and assimilation. Fischman (2000) describes such factors as (1) those pertaining to the technologies and their diffusion contexts; (2) those pertaining to organizations and their adoption contexts; and (3) those pertaining to the combination of technology and organization. The „propagating“ knowledge institutions are needed part of every innovation and technological environment. They help to generate new knowledge and to transform them into innovation. Among these organizations are included in R&D organizations, laboratories, government agencies, consultancy firms and also universities (Van Beers and Berghäll, 2008; Stejskal and Hajek, 2015b).

However, the individual factors do not occur alone (per se) in the environment but generally they operate in innovation-organization combinations. In fact, innovations don't arise in isolation, but are relevant to the organization or company, region or country. There the innovations can use the specific production factors and specific conditions in environment (we can talk about the so-called lab). These specific factors, which help strengthen the enterprises' competitiveness and performance, are knowledge and ability to learn, ability to cooperate, creativity and innovativeness. The absorptive capacity of the recipient's knowledge is also important. High absorptive capacity in a domain increases the organizational capacity to assimilate innovations in that domain (Cohen and Levinthal, 1990). This, in turn, suggests that the primary antecedents of absorptive capacity related knowledge and diversity of knowledge will also predict innovativeness with respect to particular innovations (Fichman and Kemerer, 1997). Indispensable determinants (factors) are as well as private R&D expenditures (investments) and public support for this area.

There are many studies that explore the relationship between selected production factors and innovative capabilities or firm's performance. Becker and Dietz (2004) examined the manufacturing industry in Germany. Their analysis focused on the impact of R&D cooperation on firms' innovation input and output. They found that German firms use R&D to supplement their internal resources in the innovation processes, to improve the innovative performance and the implementation of product innovations. On the input side, the intensity of in-house R&D also stimulates the probability and the number of joint R&D activities with other firms and institutions significantly. Robin and Schubert (2013) examined how cooperation with public research institutions affects the success of innovation in the markets (with the German and French companies). They found that cooperating with public research increases product innovation, but has no effect on process innovation, which depends more on firms' openness. It was found a gap in the effect of cooperation between France and Germany which was caused by being different innovation environment. They derived two important policy implications from our results. First, public-private collaborations in research should not be encouraged at all costs, since they may not sustain all forms of innovation. Triguero and Córcoles (2013) analyzed the manufacturing industry in Spain. They concluded that there are similar determinants of persistence in R&D and innovative activities: external/environmental factors, market dynamism, R&D affects and innovation. Regarding firm specific characteristics, size and outsourcing also have a positive impact on all processes. Clausen (2013) dealt with the analysis of external knowledge sourcing from innovation cooperation and the role of absorptive capacity. His results show that internal R&D, training and an educated workforce, as core aspects of firms' absorptive capacity, are positively associated with (the intensity of) innovation cooperation. An implication is that external knowledge does not enter the firm freely. The costs firms must invoke in order to be able to source external knowledge in the OI context is considerable. Without investing in internal R&D, training and recruiting workers with good educational qualifications, firms may not be able to follow the open approach to innovation. Similar studies from specific area - Central and Eastern Europe – are only a few. Srholec (2014) dealt with the Czech Republic; concretely he focused on cooperation and innovative performance of firms in comparative study comparing the Czech Republic, Norway and the UK. Therefore we know very little about the factors that influence the innovative capability of Czech enterprises in the manufacturing industry.

We aim to make an initial comparison of firms' situation in manufacturing industry in the Czech Republic and Estonia with an emphasis on the determinants of innovative activities. Both, Czech Republic and Estonia represent post communist countries with similar economies supporting science, research and innovation. However, Estonia has in recent years been regarded as a highly networked and highly innovative country with dynamic economy, favorable business climate and cost advantages that are open to growth (European Commission, 2016). Following previous arguments that innovations do not arise in isolation and individual factors do not occur alone we hypothesize that *(H) Combination of determinants of innovative activities more significantly influence growth of turnover in new or improved companies' products in manufacturing industry in the Czech Republic and Estonia than the situation when these factors occur individually.*

Prior studies underlined the importance of innovation and their influence on firms' productivity and growth (for example, Klomp and Van Leeuwen, 1999; Rao et al., 2001). Later studies showed the importance of other different factors influencing innovative activities and performance of companies, such as: cooperation, especially with different partners (López et al., 2014); public financing (Rodríguez-Pose and Di Cataldo, 2014); market orientation (Atuahene-Gima, 1996); participation in groups of companies or merging of companies (Dachs and Peters, 2014); investment in R&D (Hall et al., 2013).

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However, we claim, that this factors do not operate separately. Actually, they are more significant in combination with each other because it causes in creation of synergies and spillover effects. In fact, Liu and Buck (2007) also claimed that the existing literature examines separately the impact of various channels and factors for innovative activities and technology spillovers, and does not comprehensively investigate the integrated effects which together affect the innovation performance of firms. Huber (1998) suggested that the relationship between different factors (internal/external), organizational creativity and learning and innovation are bidirectional and synergistic. There are a lack of studies examining this common effects, especially in the Czech Republic and Estonia. Therefore, to answer our hypothesis, we create groups of variables and test their impacts on the growth of turnover from innovations – firstly, each variable separately; subsequently, the effects of combinations between variables.

### 3. DATA METHODOLOGY

For the data collection, Community Innovation Survey 2010-2012 were used. Community Innovation Survey (CIS) are harmonized questionnaire and part of the EU science and technology statistics carried out with two years' frequency by EU member states and number of ESS member countries (Eurostat, 2016). We use CIS to analyze the impacts of different innovation activities' determinants in The Czech Republic and Estonia between the years 2010-2012 and to make an initial comparison. In total, data on 5,449 Czech and 1,723 Estonian companies with at least 10 employees was obtained (response rate greater than 60 %). For the purpose of this study, we filtered 3,110 Czech and 921 Estonia companies, i.e., only companies from the manufacturing industries into our data group – specifically, countries covering NACE categories 10-33.

For this kind of analyses, regression models are commonly used (e.g. Schneider and Spieth, 2013). This model was fitted to investigate the relationship between one dependent variable represented by the % of turnover in new or improved products introduced during 2010-2012 that were new to the market and the number of selected independent variables (see Table 1). Multiple linear regression models have the following general form (Chatterjee and Hadi, 2013):

$$y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \dots + \beta_nx_n + \varepsilon \quad (1)$$

where            y is dependent variable;  
                    x<sub>1</sub>, x<sub>2</sub> ... x<sub>n</sub> are independent variables;  
                    ε is an error term accounts for the variability in y which cannot be explained by the linear effect of the n independent variables;  
                    β<sub>1</sub>, β<sub>2</sub> ... β<sub>n</sub> called the regression parameters or coefficients, are unknown constants to be determined (estimated) from the data.

Firstly, before composing the models, verification was conducted as to whether the data were correlated by using Spearman's test. After fulfilling the first prerequisite and dismissing the possibility of multicollinearity in the model, the analysis itself was conducted. General formula of the Spearman Rank Correlation Coefficient has following general form (Borradaile, 2013):

$$r_s = 1 - [(6 \cdot \sum d_i^2) / (N^3 - N)] \quad (2)$$

Spearman's Coefficient measures the strength of the linear relationship between two variables when the values of each variable are rank-ordered from 1 to N, where N represents the number of pairs of values (the N cases of each variable are assigned the integer values from 1 to N inclusive and no two cases share the same value). Difference between ranks for each case is represented by  $d_i$ .

Table 1 Variables used in the models

Dependent	Independent (categorical/continuous)					
	Cooperation	Innovation	Financing	Expenditures	Enterprise/Subsidiaries	Other
TURNMAR	CO	INN_G	FUNLOC	RRDIN	ENMRG	LARMAR
	CO_GP	INN_S	FUNGMT	RRDEX	ENOUT	GP
	CO_SUP	INN_P	FUNEU	RMAC	ENWEUR	
	CO_CUST			ROEK	ENNWOTH	
	CO_COMP					
	CO_UNI					
	CO_GOV					
	CO_CONS					

Legend - TURNMAR - % of turnover in new or improved products introduced during 2010-2012 that were new to the market, CO – cooperation arrangements on innovation activities, CO\_GP – co-operation partner: other enterprises within enterprise group, CO\_SUP – co-operation partner: Suppliers of equipment, materials, components, or software, CO\_CUST – co-operation partner: clients or customers, CO\_COMP – co-operation partner: competitors or other enterprises in sector, CO\_UNI – co-operation partner: universities or other higher education institutions, CO\_GOV – co-operation partner: government or public research institutes, CO\_CONS – co-operation partner: Consultants and commercial labs, INN\_G – introduced onto the market a new or significantly improved good, INN\_S - introduced onto the market a new or significantly improved service, INN\_P – introduced onto the market a new or significantly improved process (method of production; logistic, delivery or distribution system; supporting activities), FUNLOC - Public funding from local or regional authorities; FUNGMT – public funding from central government, FUNEU - public financial support from the EU, RRDIN - expenditures in intramural R&D in 2012 (% of total turnover), RRDEX - expenditures in extramural R&D in 2012 (% of total turnover), RMAC – expenditures in acquisition of machinery in 2012 (% of total turnover), ROEK - expenditures in acquisition of external knowledge in 2012 (% of total turnover), ENMRG - merge with or take over another enterprise, ENOUT - sell, close or outsource some of the tasks or functions of the enterprise, ENNWEUR - establish new subsidiaries in [home country] or in other European countries, ENNWOOTH - establish new subsidiaries outside Europe, LARMAR – largest market in terms of turnover between 2010-2012 (1 – local or national, 0 – other), GP - part of the group of enterprises. Source: own research

#### 4. DATA ANALYSIS AND RESULTS

To answer our hypothesis, we firstly analyzed the influence of each variable independently and measured their direct influence on % of turnover in new or improved products (new to the market). Table 2 shows the results of two mutually independent regression models – for the Czech Republic and Estonia. The first was assembled to analyze the situation of companies in manufacturing industry in the Czech Republic and the correlation coefficient of this model reached the value of 0.502. The coefficient of determination reached 0.252. P-value of the model was measured at 3.1 E-05. There was thus a rejection of the null hypothesis. The model could be regarded as significant. The second model analyzed situation of companies in manufacturing industry in Estonia. The correlation coefficient of this model reached the value of 0.706. The coefficient of determination reached 0.498. P-value of the model was measured at 1.2 E-04. There was thus a rejection of the null hypothesis.

Table 2 shows that only few determinants (from different groups) directly influence dependent variable – in the Czech Republic: (1) Expenditures in intramural R&D (most significant); (2) service innovation; (3) selection of the market (domestic; foreign); in Estonia: (1) cooperation with other enterprises within enterprise group; (2) establishment of new subsidiaries outside Europe; (3) public funding from central government; (4) cooperation with clients or customers; (5) participation in the groups of enterprises. Results

show that e. g. direct national and European public financing in the Czech manufacturing industries was completely insignificant (FUNGMT: 0.901; FUNEU: 0.532).

In Estonia, there, for example, were not found direct impacts of implementation of innovation on dependent variable (INN\_P: 0.133; INN\_S: 0.402). Therefore, it was necessary to use combinations of factors because innovation does not rise in isolation. These combinations allow emerge of synergies that significantly influence innovative activities (see Tables 3). These results confirm our claims above.

Table 2 Variables used in models for the Czech Republic and Estonia and their values

Variables	Czech Republic		Estonia	
	p-value	sd	p-value	sd
RRDIN	0.000***	0.157	0.000***	0.350
RRDEX	0.644	0.211	0.630	1.855
RMAC	0.530	0.058	0.488	0.136
ROEK	0.992	0.592	0.328	12.36
FUNGMT	0.901	0.086	0.014**	0.110
FUNEU	0.532	0.105	-	-
INN_P	0.437	0.085	0.133	0.090
INN_S	0.017**	0.077	0.402	0.109
CO	0.667	0.104	-	-
CO_GP	-	-	0.000***	0.154
CO_UNI	0.105	0.114	-	-
CO_CUST	-	-	0.047**	0.137
CO_COMP	-	-	0.249	0.115
CO_SUP	-	-	0.643	0.083
ENMRG	0.752	0.082	-	-
ENNWOTH	-	-	0.007***	0.164
LARMAR	0.017**	0.088	-	-
GP	0.187	0.051	0.037**	0.114

Legend: \*\* significant at  $P < 0.05$ ; \*\*\* significant at  $P < 0.01$ ; sd = standard deviation. Source: own research

By combining determinants of innovation activities, regression models showed us creation of advanced factors' combinations and significant links influencing turnover in new or improved products of companies. In the Czech manufacturing industry, largest market in terms of turnover (LARMAR) was proved as important determinant with influence on dependent variable - in combination with other variables (factors). For example, public financial support from the EU was shown as insignificant (Table 2 – FUNEU: 0.532). On the other hand, in combination with LARMAR, we found significant impact on % of turnover from innovated products (FUNEU\*LARMAR: 0.043\*\*). This is important finding, because as we can see, there is emerging inefficiency in provision of public financial support (both from national and European funds). For example, common combinations of national and European funds do not lead to significant effects (Table 3: FUNEU\*FUNGMT\*INN\_P: 0.987; FUNEU\*FUNGMT\*CO: 0.282). Conversely, proper targeting of the market in combination with innovations lead to creation of significant links (e. g. INN\_P\*LARMAR: 0.047\*\*). To reach more significant results, involvement of cooperation is necessary (Table 3: ENMRG\*INN\_S\*CO: 0.004\*\*\*; LARMAR\*ENMRG\*CO: 0.003\*\*\*).

In Estonian manufacturing industry, after implementation of advanced regression models, significant combinations of factors were also found. As it was shown above (Table 2), implementation of innovation and cooperation on innovation did not directly influence innovative activities in manufacturing industry in Estonia. On the other hand, proper factors' combinations lead to creation of links with significant impact. For example, implementation of service innovation in combination with cooperation with different partners leads to creation of strong significant links (in most cases, see Table 3): CO\_GP\*INN\_S (0.004\*\*\*); CO\_CUST\*INN\_S (0.006\*\*\*); INN\_S\*CO\_COMP (0.009\*\*\*). Results of regression models showed, that finding appropriate determinants of innovative activities is a complex process that is influenced by number of

factors – different for each country, also for each industry. Joint involvement of combinations of these factors was shown as important process positively influencing innovative activities of businesses in both countries – the Czech Republic and Estonia. Therefore, following our findings above, we can confirm our Hypothesis that Combination of determinants of innovative activities more significantly influence growth of turnover in new or improved companies' products in manufacturing industry in the Czech Republic and Estonia than the situation when these factors occur individually.

Table 3 Advanced combinations of variables in the Czech Republic and Estonia

	Czech Republic				Estonia	
	INN_P	INN_S	CO		INN_S	INN_P
FUNEU*LARMAR	0.029 (0.068)**	0.024 (0.090)**	0.009 (0.066)***	GP	0.004 (0.100)***	0.662 (0.081)
FUNEU*FUNGMT	0.987 (0.082)	0.411 (0.060)	0.282 (0.080)	CO_GP	0.004 (0.113)***	0.430 (0.077)
LARMAR*FUNGMT	0.027 (0.037)**	0.025 (0.051)**	0.543 (0.047)	CO_CUST	0.006 (0.071)***	0.210 (0.046)
LARMAR*INN_S	0.040 (0.080)**	-	0.653 (0.033)	CO_COMP	0.009 (0.051)***	0.099 (0.036)*
FUNGMT*ENMRG	0.837 (0.036)	0.033 (0.035)**	0.110 (0.044)	CO_SUP	0.461 (0.058)	0.034 (0.080)**
FUNEU*INN_S	0.587 (0.063)	-	0.028 (0.053)**	CO_COMP*FUNGMT	0.046 (0.047)**	-
LARMAR*ENMRG	0.152 (0.060)	0.0757 (0.062)*	0.003 (0.056)***	GP*CO_CUST	0.007 (0.097)***	0.018 (0.051)**
ENMRG*INN_S	0.264 (0.084)	-	0.004 (0.049)***	CO_GP*CO_CUST	0.006 (0.087)***	0.019 (0.036)**
ENMRG*CO_UNI	0.173 (0.047)	0.011 (0.024)**	-	FUNGMT*CO_CUST	0.087 (0.058)**	0.506 (0.031)

Legend: \* significant at  $P < 0,1$ ; \*\* significant at  $P < 0,05$ ; \*\*\* significant at  $P < 0,01$ ; table shows p-values; values of sd are shown in brackets. Source: own research

## 5. CONCLUSION

In this study, we show the importance of combinations of different determinants of business innovation activities. Both, the Czech Republic and Estonia were regarded by OECD (2012) as strengthening economies focusing on the promotion of research, development and innovation. Specifically, in 2012: The Czech Republic was becoming one of the world's 20 most competitive nations and developing a knowledge economy, with a focus on innovation, infrastructure and institutions; Estonia was strengthening the private sector's R&D investment and innovation capability and the business environment for innovation. But nowadays we can see that neither of the countries had made such a development and growth, as expected. It is clear; most of studies explained the different factors influencing business innovation activities (in the past, e. g. Balachandra and Friar, 1997; also nowadays, e. g. Antonelli et al., 2013). However, there is a lack of studies explaining combinations of these factors, therefore we defined the hypothesis. The results of multiple linear regression models allowed us to confirm our hypothesis and to claim that determinants of innovative activities more significantly influence firms' innovation activities in combinations with each other.

Our findings provide: (1) initial comparison of companies' situation in manufacturing industry in the Czech Republic and Estonia; (2) practical implications for policy makers. In both countries, it is necessary to combine individual factors. Appropriate choice of market location and cooperation arrangements on innovation activities in combination with other determinants was shown as very significant in the Czech Republic. In Estonia, results of regression models showed us advanced results and concrete partners of collaboration that significantly affected the growth of turnover from innovated products. We can see that in Estonia, collaboration arrangements on innovative activities with different partners resulted in very

significant impacts. This could be one of the reasons, why Estonia has been regarded by European Commission as a highly networked and highly innovative country with dynamic economy. Therefore, companies in the Czech manufacturing industry should focus on a suitable choice of cooperation partners (e. g. clients or customers, competitors or other enterprises in sector). Results also showed that in both countries there is a growing inefficiency in provision of public subsidies (from national or European funds) – therefore, proper targeting of public subsidiaries is necessary. Not each collaboration and each innovation activity requires public funding. In most cases, companies are more effective when they are financing their activities by themselves (Fitchett et al., 2014). Public authorities can use other (non-financial) methods to support companies (Sonne, 2012). For further research, we aim to make deeper analysis of factors combinations influencing businesses' innovation activities and also to make comparison with other European countries and with different industries.

## ACKNOWLEDGEMENT

This article was created as a part of the solution of the research task No. 14-02836S entitled "Modeling of knowledge spill-over effects in the context of regional and local development", financially supported by the Grant Agency of the Czech Republic.

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# THE PROFITABILITY ANALYSIS OF THE GREATEST HUNGARIAN ENERGY COMPANIES BETWEEN 2008-2013

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## ABSTRACT

I examined the profit generating ability of the greatest Hungarian energy companies with a self-made database. The analysis covers the period 2008-2013. Based on the net sales revenue of the greatest energy industry companies exploring the strengths and weaknesses of the operation with a thorough profitability analysis. I am investigating this accounting approach. I analyze the profitability with mono- and multi-causal indicator systems and financial methods with Microsoft Excel and EkoWIN financial analyst, forecasting and evaluating expert software. Database: covering the period 2008-2013 the balance sheet and income statement data (21 examined companies, which belong into the TOP 100) are downloaded from the e-statement. To say the question and include the following topics:

1. How has the net sales revenue?
2. How did the three levels of profitability and break-even sales revenues?
3. What are result is seen the calculation of complex profitability mix?

The objectives: is to draw attention to the sector profitability complex analysis and latent corporate crisis most frequent indication of weakness.

## KEYWORDS

Sales, profitability, production, financial realization

## JEL CLASSIFICATION CODES

G3

## 1. INTRODUCTION

The energetics industry greatest segment of the Hungarian economy. 23 percent of companies in the TOP 100 list are energy sector, intended mainly natural gas and electricity trading. The sales increase the most since the 2008 crisis, the energy company MOL. I examine in this work the profitability of the 21 energy companies, which belong into the TOP 100 between 2008-2013. Based on the net sales revenue of the greatest energy companies as growth opportunities for testing or exploring the strengths and weaknesses of the operation can not do without a thorough analysis of profit generating ability. We are investigating this accounting approach.

## 2. LITERATURE BACKGROUND AND METHODOLOGY

I examine the profitability only in accounting terms, so first we analyze the income statement (Brigham & Ehrhardt, 2014, Katits, 2007, Wahlen et al, 2010) and just expect some profitability ratio (Katits, 2007, Robinson et al, 2012). I calculate the break-even sales revenue (BESR) (Katits, 2007, Thukaram, 2012), because if you get the results compare with net sales revenues, we can deduce the break-even point change of the period under review. The growth prospects of the energy companies examine as follows: Internal growth rate (IGR) – the relevant branch of the national economy without use of external sources that is self-financing below. So the only sources of financing are from the retained profits (Chandra, 2011, Parrino & Moles & Kidwell, 2011).

**Database:** the Hungarian TOP 100's 21 energy companies (MOL, EON FÖLDGÁZ, MVM, EON\_H – Energia, PANRUS, EON – Energia, TIGÁZ, FÖGÁZ, Budapesti Elektronikai Művek, MOL energia, GDF SUEZ, Paksi Atomerőmű, MVM – Partner, FGSZ, MAVIR, DÉMÁSZ, Áramszolg., ELMŰ, Mátrai Erőmű, ÉMÁSZ). The balance sheet and income statement data are downloaded from the e-statement ([www.e-beszamolo.hu](http://www.e-beszamolo.hu)). The calculations were performed with Microsoft Excel (Mayes & Shank, 2014) and EkoWIN financial analyst, forecasting and evaluating expert software. It consists of the evaluation of complex economic performance in the period between 2008 and 2013. The study appears in the complexity on the one hand, that the performance of 21 greatest energy companies in the following I-III three groups of indicators are evaluated: the production (operations), sales and the financial realization (Table 2.). On the other hand, all indicator group includes revenues/expenses and profits/assets type of indicators.

With the EkoWIN financial analyst, forecasting and evaluating peer software we have received on the basis of the composition of the mix of profitability indicators. An index group A-B-C-D-E classification based on the following threshold values are:

- 0 – 19.9 points = (E) = critical
- 20 – 39.9 points = (D) = problematic
- 40 – 59.9 points = (C) = acceptable
- 60 – 79.9 points = (B) = good
- 80 – 100.0 points = (A) = excellent

### 3. ANALYSIS AND RESULTS

A firm or industry viability depends on how the revenue generating ability. The net sales revenue from the developments we can be assessed the possibility of the main sources of profitability (Katits&Koltai&Szalka, 2014). The volatility of the net sales revenue crisis weak signal, which is the expression of the sales risk. In the period 2008-2013, the net sales decreased only in 2009, but then rises (Figure 1.).

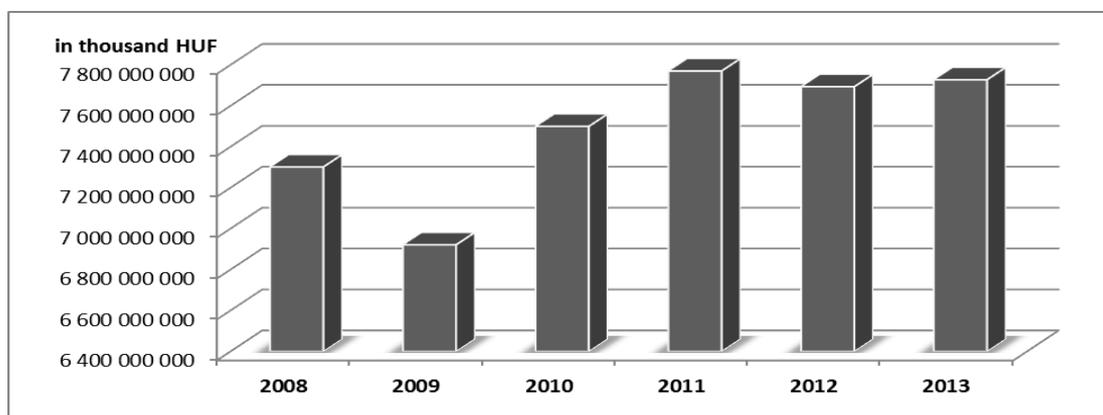


Figure 1 The Hungarian TOP 100's 21 greatest energy companies – Net sales revenues (NSR) (2008-2013).

Source: Own construction and calculation on the e-statement database

Falling and/or rapidly changing rates of return business risk expressions, which again the crisis weak signal. The operating and net profitability developments are shown in Table 1.

Table 1. The Hungarian TOP 100's 21 greatest energy companies – Profitability calculations (2008-2013)

Categories	2008	2009	2010	2011	2012	2013
NSR growth rate (%)	27,4	-5,2	8,4	3,6	-1,0	0,4
Operating profit/NSR (%)	3,9	5,1	5,2	4,2	5,1	2,9
Net profit/NSR (%)	5,6	-0,3	6,0	4,1	3,2	-0,9
BESR (in thousand HUF)	6 784 540 402	7 127 008 628	7 084 094 007	7 443 798 224	7 714 665 444	7 892 088 782
NSR (in thousand HUF)	7 301 353 561	6 920 986 381	7 499 679 780	7 770 095 652	7 693 392 248	7 727 507 000

IGR (%)	2,5	-2,6	4,1	2,1	0,1	-2,3
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Source: Own construction and calculation on the e-statement database

Thus, the operating and net profitability ratios are relatively low, as evidenced by the amount of revenue can cover.

The Table 1 shows the breakeven sales revenue (BESR, marked bold) and the amount of net sales revenue (NSR) published in the income statement (marked italics). In case the BESR is lower than the NSR, the companies have operating profit in the current financial year, in 2008, 2010 and 2011. The reverse case implies that the examined sector has operating loss, for example in 2009, 2012 and 2013.

Internal growth rate (IGR): the examined companies the only sources of financing are from the retained profits (Chandra, 2011). If the net sales revenue growth rates of the income statement (in Table 1. marked with bold) exceed the calculated IGR growth rates, the energy firms included sector can not meet its payment obligations, and financing capacity is upset and effective steps should be taken using the crisis management instruments.

With the EkoWIN financial analyst, forecasting and evaluating peer software we have received on the basis of the composition of the mix of profitability indicators presented in Table 2.

Table 2. The Hungarian TOP 100's 21 greatest energy companies – Profitability mix's indicators and values between 2008-2013 (in percent)<sup>17</sup>

Indicators	2008	2009	2010	2011	2012	2013
<b>I. PRODUCTION (OPERATION)</b>						
Net (operation) productivity	103,7	107,0	103,3	105,7	105,3	103,0
Net (before tax) productivity	99,6	108,3	104,8	105,4	103,7	99,9
Production (operating) income/Total assets	114,0	99,7	102,0	101,0	104,1	102,5
Production (before tax) income/Total assets	109,5	100,9	103,4	100,7	102,6	99,4
<b>II. SALES</b>						
Net (operating) profitability	103,8	107,0	103,3	105,7	105,3	103,1
Net (before tax) profitability	99,67	108,3	104,7	105,4	103,7	99,9
Operating income/Total assets	4,2	6,6	3,3	5,4	5,5	3,0
Earnings before tax/Total assets	-0,4	7,7	4,7	5,2	3,8	-0,1
Interest + Net profit/Total sources	0,4	7,5	4,7	5,5	3,7	0,0
Net profit/Equity (Return on Equity)	-1,4	11,2	6,6	8,1	4,9	-1,8
<b>III. FINANCIAL REALIZATION</b>						
Financial realized net (operation) profitability	104,8	109,2	104,0	108,0	108,7	107,6
Financial realized net (before tax) profitability	109,3	111,9	108,6	106,2	108,2	104,8
Financial realized (operating) profit/Total assets	113,9	99,7	101,4	99,3	105,1	102,2
Financial realized (before tax) profit/Total assets	119,3	102,2	105,9	97,8	104,7	99,8

Source: Own construction based on the software EkoWIN

Based on the calculation of the indicators for the rating of PRODUCTION (OPERATION), characterized 0-100 points, the results are as shown in Figure-2. The increase in own produced inventories means that the greatest companies of the energetics industry have been produced more than they sold. This is an economic performance, on the market has not yet been realized, but in any event the period under review was set up. Therefore, the yields are we took into account the change of own produced inventories at market value, and the expenses the change of own produced inventories at cost price. Thus, the rating of PRODUCTIVITY as follows:

- Good: between 2008 and 2013, but we see a decreasing trend from 2011 (Figure 2).

So clearly shows that the operation of 2009 after the global financial-economic crisis we be judged as acceptable, while after this appreciate good, that was in a better position, but deteriorated during the value in 2013.

<sup>17</sup> We are given the items of the calculation in Appendix.

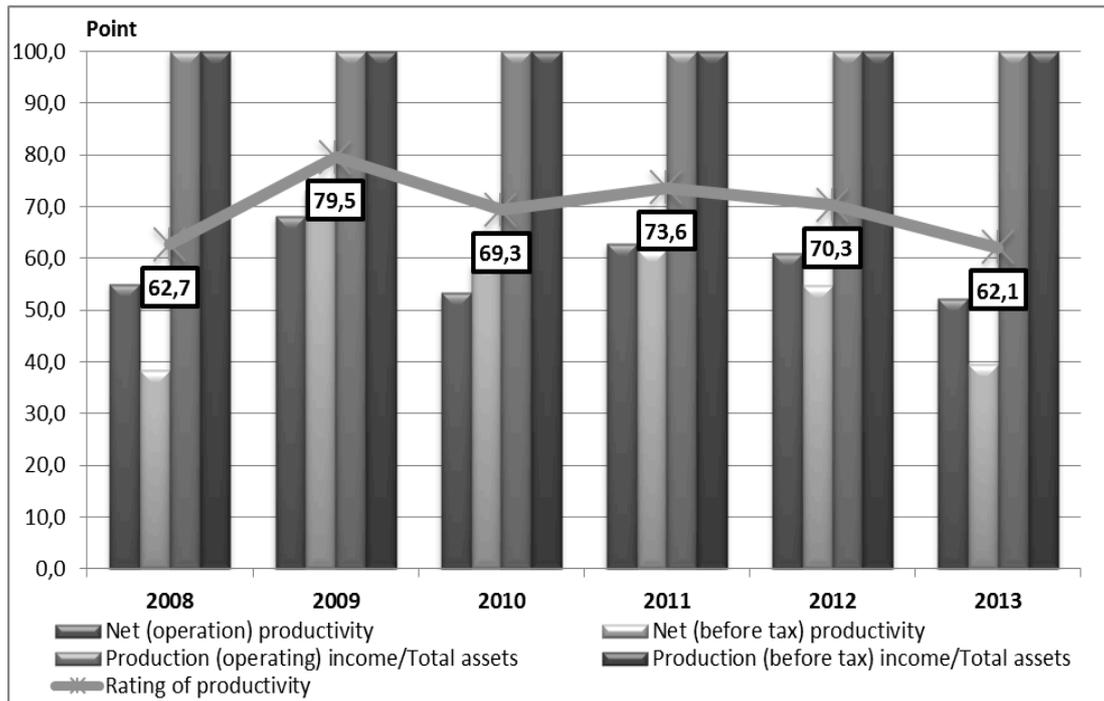


Figure 2 The Hungarian TOP 100's 21 greatest energy companies – rating of PRODUCTIVITY (2008-2013), Source: Own construction based on the software EkoWIN

The rating of SALES is as follows:

- Acceptable: 2008 and 2013.
- Good: every year between 2009 and 2012. The year 2009 stands out leaving only a very small difference in the excellent qualification. Unfortunately, we see a decreasing trend from 2012 (Figure 3).

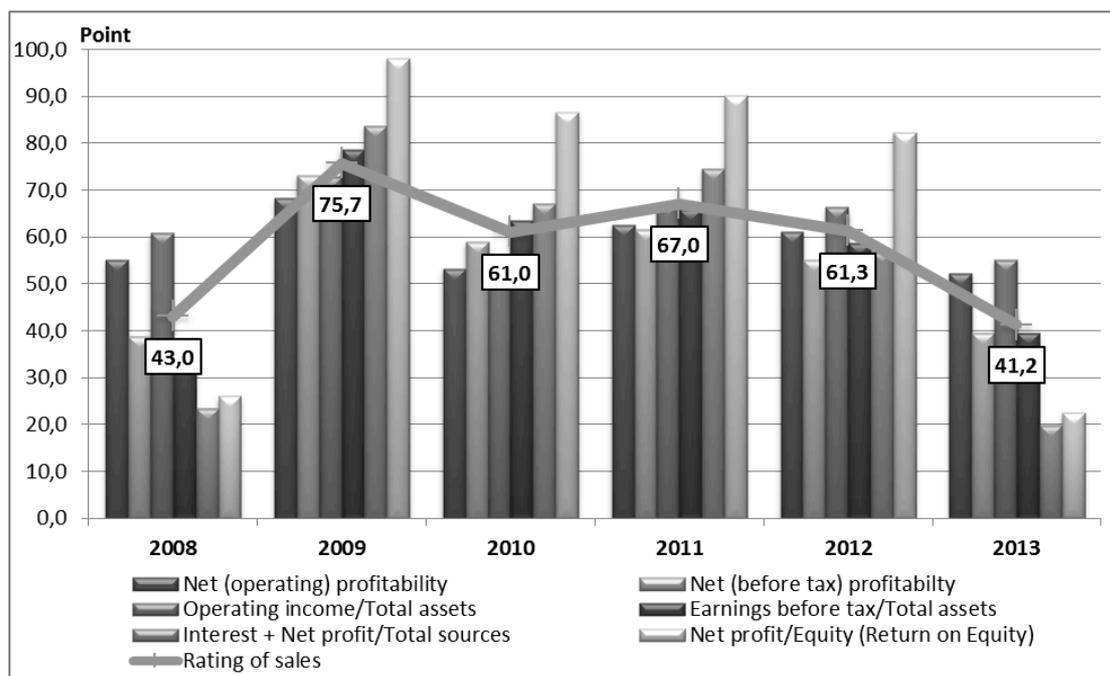


Figure 3 The Hungarian TOP 100's 21 greatest energy companies – rating of SALES (2009-2013), Source: Own construction based on the software EkoWIN

The rating of FINANCIAL REALIZATION the following:

- Good: 2008, 2010, 2011 and 2012.
- Excellent: 2009. (Figure 4).

Thus, the performance of greatest energy companies in 2009 is excellent, but in 2013, the favorable rating, although only a hair breadth below the excellent qualification.

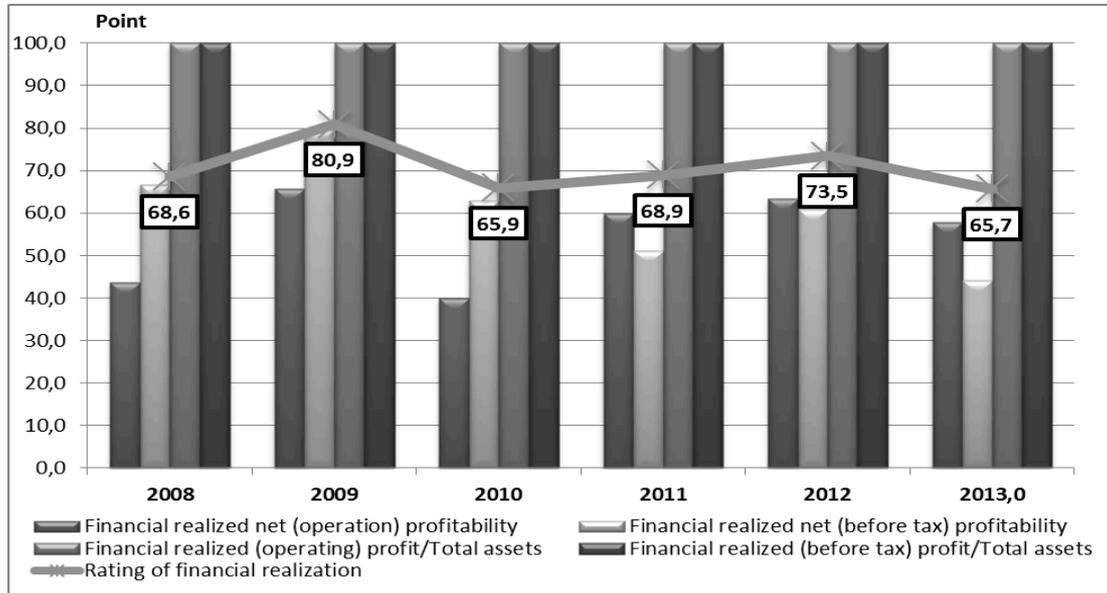


Figure 4 The Hungarian TOP 100's 21 greatest energy companies – Rating of FINANCIAL REALIZATION (2008-2013). *Source:* Own construction based on the software EkoWIN

21 greatest Hungarian energy companies – total rating of PROFITABILITY the following:

- Acceptable: 2008 and 2013.
- Good: 2009, 2010, 2011 and 2012. (Figure 5).

Thus, the performance of greatest energy companies in 2008 and 2013 is acceptable, but in 2013 less favorable than in 2008.

In summary: From 2008 to 2011 rising trend, then we see a downward trend, but it gets a acceptable rating between 40-60 points (Figure 5).

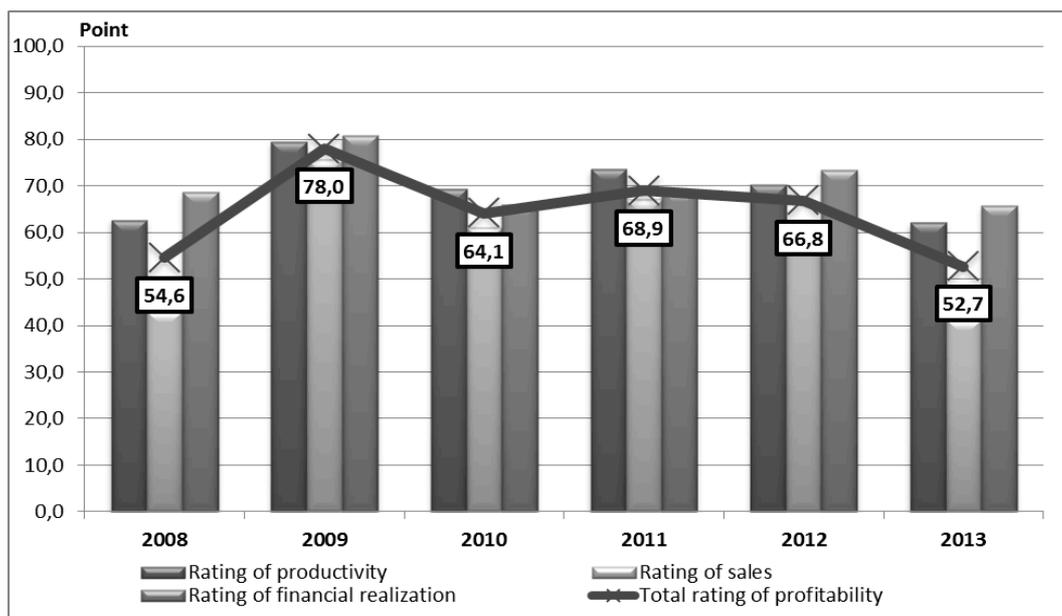


Figure 5 The Hungarian TOP 100's 21 greatest energy companies – Total rating of PROFITABILITY (2008-2013). Source: Own construction based on the software EkoWIN

#### 4. CONCLUSIONS

If we compare the results obtained in the evaluation of the profitability mix with net sales development (Figure 1), it we can ascertain that, despite the rise in net sales revenue in the mix of profitability values are reduced. So the profitability mix of values presented in spite of the downward trend in net sales revenue growth rates (Table 1 and Figure 5).

The results in Table 1 showed a low operating and net profitability levels achieved. Do not forget two things here! One is that the net income (should) provide coverage for the creditors repayment requirements, ownership's dividend expectations more growth-enhancing investments as well! The other is that the relatively high levels sales revenue in no way reflect the high profit generating ability of the company.

In my analysis, we close, it is a mixed picture, in fact, somewhat contradictory conclusions were reached on the basis of the evaluation of the results of calculations, which is the greatest energy companies investigated,

- extremely high (90-95 percent) operating cost ratio,
- high breakeven sales revenues (BESR),
- internal growth rate (IGR) reached a low income according to the balance sheet,
- rating of profitability from 2008 to 2011 rising trend, then we see a downward trend, but it gets a acceptable rating between 40-60 points

Corporate political significance of the growth today is even more critical light. Internal growth is 'normal', the natural way, because the external growth way can be excluded the lack or insufficiency of the capital. However, it seems a reasonable way of internal growth due to production programs or even considerations of return on the examined companies. Conversely resources allow you to do this with a combination of external growth ways implement. The stagnant growth companies in the external growth way trying to move due to market-strategic necessity and should not remain in a critical, objective and merciless base examination.

The essential value drivers, growth indicators such as the definition and as warning signals functioning to avoid potentially incorrect way and the identification of the sector "benchmarks" serve.

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## APPENDIX

### I. PRODUCTION

Net sales revenues

+ Changes in self-produced inventories at market value  
– Cost of goods sold and subcontractor performance value  
+ Other revenues and expenses items balance, if +

NET (OPERATING) PRODUCTION REVENUES

+ Profit of financial operations

+ Extraordinary profit

TOTAL NET PRODUCTION REVENUES

Operating expenses (excluding activated own performance and other expenses)

+ Changes in self-produced inventories at cost price  
– Cost of goods sold and subcontractor performance value  
+ Other revenues expense items balance, if –

NET (OPERATING) PRODUCTION COSTS

+ Loss of financial operations

+ Extraordinary loss

TOTAL NET PRODUCTION COSTS

Net (operating) production revenues

– Net (operating) production costs

PRODUCTION (OPERATING) PROFIT

+ Profit of financial operations

+ Extraordinary profit

PRODUCTION (BEFORE TAX) PROFIT

### II. SALES

Net sales revenue

– Cost of goods sold and subcontractor performance value  
+ Other revenues and expenses items balance, if +

NET (OPERATING) SALES REVENUES

+ Profit of financial operations

+ Extraordinary profit

TOTAL NET SALES REVENUE

Operating expenses (excluding activated own performance and other expenses)  
– Cost of goods sold and subcontractor performance value  
+ Other revenues expenses items balance, if –  
NET (OPERATING) SALES EXPENSES  
+ Loss of financial operations, if loss  
+ Extraordinary loss  
TOTAL NET SALES EXPENSES

Net (operating) sales revenues  
– Net (operating) sales expenses  
SALES (OPERATING) PROFIT  
+ Profit of financial operations  
+ Extraordinary profit  
SALES (BEFORE TAX) PROFIT

### III. FINANCIAL REALIZATION

Net sales revenue  
– Cost of goods sold and sold (mediated) services  
+ Other revenues and expenses items balance, if +  
– Changes in customer receivables  
+ Change in advances received from customers  
FINANCIALLY REALIZED NET (OPERATING) REVENUES  
+ Net change in current source, if growth  
+ Profit of financial operations  
+ Extraordinary profit  
TOTAL FINANCIALLY REALIZED NET REVENUE

Operating expenses (excluding activated own performance and other expenses)  
– Cost of goods sold and subcontractor performance value  
+ Other revenues expense items balance, if loss  
– Depreciation and amortization  
– Change in accounts payable  
+ Change in inventories purchased  
+ Changes in self-produced inventories +  
+ Change in advances to suppliers  
FINANCIALLY REALIZED NET (OPERATING) EXPENSES  
+ Net change in current source, if the decrease  
+ Loss of financial operations  
+ Extraordinary loss  
TOTAL FINANCIALLY REALIZED NET EXPENSES

Financially realized net (operating) revenues  
– Financially realized net (operating) expenses  
FINANCIALLY REALIZED (OPERATING) PROFIT  
+ Net change in current source  
+ Profit of financial operations  
+ Extraordinary profit  
FINANCIALLY REALIZED NET (BEFORE TAX) PROFIT

# SOME REMARKS ON THE REGIONAL DISPARITIES OF PREDICTION MODELS CONSTRUCTED IN THE VISEGRAD COUNTRIES

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## ABSTRACT

The main goal of each business is to generate profit, respectively to increase the market value of the company. The success of this fundament is determined by the relatively large number of factors, both at the macro level, micro level and especially at enterprise level. During the life of the company inevitably turn successful periods with a less successful and every business has to calculate in its strategy with a period of decline of relevant business indicators. It is extremely important that this decline doesn't have a fatal character and will not lead to the destruction of the company itself. The issue of predicting the corporate failure is among the most discussed issues of business theory and practice. The first prediction models were constructed half a century ago and are associated with names such as: H. Beaver, E. I. Altman, J. A. Ohlson, M. Tamari, P. Kralicek, J. G. Fulmer, M. Beerman, L. V. Springate, M. E. Zmijewski, C. Y. Shirata, Ch. Zavgrenen and others. Currently, there are several hundred prediction models that have been developed at a particular time and in conditions of particular economies. Many of them are used in economic practice (whether by financial institutions, companies or government and local governments). The subject of discussion on the suitability of foreign prediction models of financial distress is whether the model constructed on the basis of data characterizing companies of one country can be successfully used to predict the financial situation of companies in other countries. This issue was already dealt by British economists Argenti and Taffler in constructing the model which correspond to conditions of the English economy. Through the analysis they came to the conclusion that for example limits of Altman's model Z score for US market are different from values corresponding to the market in England. Also for example another conclusion was that differences occur not only between different countries but also between different sectors within the same country, while they are also subject of changes over the time. Corporate failure can be found in all economies in the world (not only market). This is the same also in the case of economies in transition. The aim of the presented paper will be the indication and the detection of specifics of prediction models developed in countries of the Visegrad Four. Specifically, it will be 33 prediction models. The main detected facts will be compared with the prediction models developed in advanced economies. Data of relevant models will be obtained from studies of Bellovary et al., Ravi Kumar and Ravi and Dimitras et al.

## KEYWORDS

Bankruptcy, prediction models, Visegrad countries, business, explanatory variable.

## JEL CLASSIFICATION CODES

C53, C3, C4

## 1. INTRODUCTION

Business failures can be found in all types (not only market) of economy in the world. These failures can have various forms, as well as various manifestations and consequences. Mainly consequences are the driving force of research and development of methods and models that enable to predict the failure with in advance. While in the centrally planned economy the state as a whole has to cope with these consequences, in

market economies are related directly with all subjects entering the relationship with particular business. In other words, in the market economy are interested all market participants (owners, creditors, suppliers, customers, employees, competitors, state, etc.). Each stakeholder applies wide range of tools, algorithms and methods, but the goal of their effort is identical, i.e. to predict the future trend of the financial health of businesses. The prediction of the financial health includes the detailed analysis of financial statements, which indicate the imminent failure of the business for several years in advance. It is extremely important to constantly assess the financial position, because of the risk that the continuously aggravate financial situation of the business will lead at some point to a stage where it is not possible to implement corrective measures.

Better ability to predict the insolvency of a business partner, of applicant for a loan or bond issuer clearly leads to a significant competitive advantage. One of the way to achieve a competitive advantage is the use of the knowledge gained through the prediction models. The construction of these prediction models is connected with a lot of problems and issues. The primary question is how many and what variables are needed to use for the construction of prediction models. The aim of the presented paper is based on the comparison of variables involved in existing prediction models widely known in the world with variables involved in existing prediction models developed in countries of Visegrad four to indicate and detect specifics of these models and subsequently to select variables with the highest classification capability. So based on this detection it is possible to remove those variables which are irrelevant and redundant for the actual classification and prediction accuracy of the potentially constructed models.

The first works dedicated to the prediction of the financial health began to appear in the 30's of the 20<sup>th</sup> century during the Great Depression. Among the studies dedicated to the selected issue is included the work of P.J. Fitzpatrick (1932) dealing with the major differences between successful and unsuccessful businesses. This work had become the inspiration for many of applied studies that began to emerge in the middle of 60's of the 20<sup>th</sup> century. The most important studies include: W.H. Beaver (1966), E.I. Altman (1968), J.A. Ohlson (1980), M. Tamari (1976), P. Kralicek (1990), J.G. Fulmer (1984), M. Beerman (1982), L.V. Springate (1978), M. E. Zmijewski (1984), C. Y. Shirat (2002), Ch. Zavgren (1985) and others. Nowadays there are several hundreds of prediction models that have been developed at a particular time and in terms of specific national economies.

Based on the above mentioned can be detected the main subject of the discussion about the suitability of foreign prediction models of financial health of the company. So the question is whether the model based on the data characterizing companies from one country can be successfully used to predict the financial situation of companies in other countries. This issue was already dealt by British economists Argenti and Taffler (1982) in drawing up the model which correspond to specific conditions of English economy. The analysis concluded for example that limits of Altman Z Score model are different for the US market from the values which are suitable for England market. Another important conclusion was that differences occur not only between different countries but also between different sectors within the same country, while they are also subject of time change. In addition, there are other arguments against uncritical acceptance of results of foreign prediction models. For example, in the case of Altman Z Score model exists objectively different explanatory power of the indicator market value of equity in a developed American economy and Slovakia. This is given by the fact that the domestic capital market is boldly less developed (respectively is not developed at all) than the capital market in the United States and also does not reflect market expectations. It is likely that the ratio of market value of equity / book value of total debt will be in condition of Slovak republic for many businesses biased and will not contribute to the correct discrimination against businesses.

## 2. LITERATURE REVIEW OF FOREIGN PREDICTION MODELS

Based on the mentioned above nowadays there exist several hundreds of prediction models which differ particularly in:

1. the mathematical and statistical methods used,
2. the time of creation,
3. the place of formation,
4. variables used or in factors used for the prediction of financial health.

Within the basic methods used for the construction of prediction models belong discriminant analysis, logit analysis, probit analysis. However, recently the interest of researchers shifts from the use of statistical

methods to neural networks and Soft Computing. Based on the study conducted by Ravi Kumar and Ravi (2007) this fact is given by the lower predictive ability of statistical methods. They also state that the potential is in a combination of various methods of soft computing into one complex classifier. However, the issue of application of the appropriate prediction methodology will not be the primary object of our interest. Logically also the time and place of the formation of models are not the subject of our interest. We will focus mainly on the relevant input variables of prediction models. These can be classified into:

1. Qualitative variables – the way of business management, communication and conflicts between stakeholders, the quality of the business environment, law enforcement, etc.
2. Quantitative variables –
  - Macroeconomic – GDP, inflation, purchasing power, the degree of openness of the economy, the economic cycle, etc.
  - Microeconomic – different attributes of competitors,
  - Business – indicators of financial – economic analysis.

Our research will be based mainly on the examination of three studies: Bellovary et al.: A Review of Bankruptcy Prediction Studies: 1930 to Present (2007); Ravi Kumar and Ravi: Bankruptcy prediction in banks and firms via statistical techniques and intelligent – A Review (2007) and Dimitras et. al.: A survey of business failures with an emphasis on prediction methods and industrial applications (1995). Authors of the first study analyzed 165 prediction models until the 2004. They note that in models were used 752 different variables, and only 674 of these variables were used in only one or two models. At the end of the study they state 42 variables which have been used in more than 5 models (Table 1).

Table 1. The most significant variables included in more than 5 models based on the first study. (Bellovary et. al., 2007)

<i>Explanatory variable</i>	<i>Number of models that include</i>
Net income / Total assets	54
Current ratio	51
Working capital / Total assets	45
Retained earnings / Total assets	42
Earnings before interest and taxes / Total assets	35
Sales / Total assets	32
Quick ratio	30
Total debt / Total assets	27
Current assets / Total assets	26
Net income / Net worth	23
Total liabilities / Total assets	19
Cash / Total assets	18
Market value of equity / Book value of total debt	16
Cash flow from operations / Total assets	15
Cash flow from operations / Total liabilities	14
Current liabilities / Total assets	13
Cash flow from operations / Total debt	12
Quick assets / Total assets	11
Current assets / Sales	10
Earnings before interest and taxes / Interest	10
Inventory / Sales	10
Operating income / Total assets	10
Cash flow from operations / Sales	9
Net income / Sales	9
Long – term debt / Total assets	8
Net worth / Total assets	8
Total debt / Net worth	8
Total liabilities / Net worth	8
Cash / Current liabilities	7
Cash flow from operations / Current liabilities	7
Working capital / Sales	7
Capital / Assets	6
Net sales / Total assets	6
Net worth / Total liabilities	6
No – credit interval	6

Total assets (log)	6
Cash flow (using net income) / Debt	5
Cash flow from operations	5
Operating expenses / Operating income	5
Quick assets / Sales	5
Sales / Inventory	5
Working capital / Net worth	5

The authors of the second study followed up the already published studies by T. G. Calderon, J.J. Cheh (2002), A. I. Dimitras, S. H. Zanakis, Zopounidis C. (1996), D.E. O'Leary (1998) and Scott, J. (1981). Subsequently they completed these studies by their research. So totally they analyzed 62 prediction models. Their findings are shown in the table 2.

Table 2 The most significant explanatory variables based on the second study. (Ravi Kumar, Ravi, 2007)

<i>Explanatory variable</i>	<i>Ranking</i>
ROA	1
Retained earnings / Total assets	2
Sales / Total assets	3
EBIT / Total assets	4
Current ratio	5
Working capital / Total assets	6
Quick assets / Current liabilities	7
Market value of equity / Total debt	8
Total debt / Total assets	9
Current assets / Total assets	10
Current ratio	11
Net income / Total assets	12
Working capital / Total assets	13
Quick ratio	14
Total assets	15
Cash flow / Total debt	16
Cash / Total assets	17
Cash / Current liabilities	18
Cash flow / Total assets	19
Current liabilities / Total assets	20

We consider as appropriate for further research to add also results of the study provided by Dimitras et. al. (1996). They analyzed 47 prediction models and summarized them by country the most commonly used (variables used in more than 4 prediction models). Their findings are shown in the table 3.

Table 3. The most significant explanatory variables based on the third study. (Dimitras, et. al., 1996)

Explanatory variable	Number of models that include	Number of countries
Working capital / Total Assets	16	5
Total Debt / Total assets	15	4
Current Assets / Current Liabilities	12	6
EBIT / Total Assets	12	6
Net Income / Total Assets	11	4
Cash Flow / Total Debt	9	3
Quick Assets / Current Liabilities	9	3
Cash Flow / Sales	8	3
Retained Earnings / Total Assets	7	5
Sales / Total Assets	7	5
Gross Profit / Total Assets	6	1
Net Income / Shareholders Equity	6	4
Cash / Total Assets	5	3
Earnings Before Taxes / Sales	5	1
Sales – Trading Profit / Total Capital	5	1
Inventory / Sales	4	3
Quick Assets / Total Assets	4	2
Total Assets / Gross National Product	4	2

### 3. LITERATURE REVIEW OF PREDICTION MODELS CONSTRUCTED IN THE VISEGRAD COUNTRIES

The presented paper focuses mainly on the prediction models constructed in the Visegrad countries (Slovak Republic, Czech Republic, Poland and Hungary). These countries are referred as countries with transition economies. Transition economy is an economy which is changing from a centrally planned to a market economy. This structural transformation includes the economic liberalization, removal of trade barriers, macroeconomic stabilization, restructuring and privatization of state – owned enterprises and resources, legal and institutional reforms. Given the mentioned above we expect there are some discrepancies between variables used in the well-known prediction models constructed abroad and variables used in the prediction models constructed in the Visegrad countries.

So we decided to analyze prediction models constructed in the countries with transition economies. Our analysis were based on the review of overall 33 prediction models developed in Visegrad countries. The research was conducted on:

- *15 Czech prediction models* – Neumaierová-Neumaier model IN 95, 99, 00, 01, 05, Grunwald model, Jakubik-Teply model, Aspekt Global Rating, Czech National Bank Index, Doucha model, Reznakova-Karas models (3 models), Janova-Vavrina-Hampel model, Rohacova-Kral model,
- *10 Polish prediction models* – Gajdka-Stos model, Gruszczynski model, Maczynski model, Witkowska model, Michaluk model, Prusak model, Wrzosek and Ziemba models (2 models), Michaluk model, Witkowska model,
- *6 Slovak prediction models* – Chrastinova CH-index, Gurcik G-Index, Delina and Packova (2 models), Binkert's model, Kovac's model,
- *2 Hungarian prediction models* – Virag-Hajdu models (2 models).

Altogether in these prediction models were used 63 different variables while 45 variables from these were used only in one or two models. From our point of view can be the variable considered as significant if it is used in more than 3 prediction models. The table 4 shows 18 variables which were used in more than 3 prediction models constructed in the Visegrad countries.

Table 4. The most significant explanatory variables used in prediction models constructed in Visegrad countries.

Explanatory variable	Number of models that include
Net income / Total assets	14
Current assets / Current liabilities	12
Retained earnings / Total assets	11
EBIT / Total assets	10
EBIT / Interest	10
(Current assets – Inventory) / Current liabilities	9
EBITDA / Sales	8
Total debt / Total assets	8
Net Income / Sales	7
Total assets / Total debt	6
Net Income / Shareholders Equity	6
Resources / Daily sales	5
Liabilities against suppliers / Daily sales	5
Sales / Total assets	4
Cash flow / Total assets	4
Equity / Total assets	3
Cash flow / Liabilities	3
Total Liabilities / EBITDA	3

From the table 4 is obvious that some variables used in prediction models constructed in Visegrad countries are similar with variables used in well-known prediction models. On the other side there are significant differences between these variables and the multiplicity and importance of them. Based on this fact we can confirm our assumption that there exists discrepancies between variables used in various models and that for different countries with different type of economy should be developed an unique model with appropriate variables used.

## 4. CONCLUSION

The number of variables used in the prediction model affects the accuracy of the prediction. Theoretically can be a model with a larger number of variables used in a classification algorithm considered as a model with better discriminatory ability, but as practice notes this assumption is not confirmed. Most of the constructed models have between four to ten explanatory variables. Therefore it is appropriate to remove some irrelevant variables and variables with high degree of correlation without losing the prediction accuracy of the model. Tables 1 to 4 presented in the paper show the most significant variables used in the prediction models. Tables 1 to 3 represent reviews of well-known prediction models constructed abroad in developed economies and as we can see these variables exhibit relatively high degree of conformity. On the other side variables used in the prediction models constructed in Visegrad countries with transition economies, which are shown in the table 4, don't indicate such a high degree of conformity. This fact confirms our previous assumption and therefore these results should be taken into consideration during the construction of prediction models for each kind of economies.

## ACKNOWLEDGEMENT

This research was financially supported by the Slovak Research and Development Agency – Grant NO. APVV-14-0841: Comprehensive Prediction Model of the Financial Health of Slovak Companies.

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# COMPARISON OF BANKRUPTCY MODELS BY CONFORMITY IN DETERMINING THE PROBLEMATIC SLOVAK ENTERPRISES

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## ABSTRACT

In the paper we apply two models on the three samples of Slovak firms. Although the models were designed generally for Europe companies, on data from the year 2007 to 2010, still show a relatively high prediction ability. There is also showed that companies from various regions of Slovakia have similar characteristics in terms of prediction of bankruptcies. Data are obtained from the register of the financial statements, which provides the financial statements of Slovak companies from 1 January 2014.

## KEYWORDS

Default, financial distress, default prediction model

## JEL CLASSIFICATION CODES

There G17, C52, C53

## 1. INTRODUCTION

The history of bankruptcy prediction started probably in 1932, when FitzPatrick published his study of 40 firms (20 failed, 20 not failed). Despite that he did not make a strict statistical analysis, his interpretation of conditions and the trends resembles the multi-variable analysis. Beaver made next step in 1967, when used t-tests to evaluate importance of accounting ratios.

Multiple discriminant analysis was introduced by Altman in 1968. It was perhaps first application of the multiple variable analysis (MDA). Altman also (like FitzPatrick a Beaver) firms divided to two groups (failed vs not failed). His Z-Score model is so far the most cited and it have been very widely adapted in different contexts for different purposes (Misankova, M. and Kral, P., 2015). This original Z-score model is calculated as:

$$Z = 0.012 \cdot X_1 + 0.014 \cdot X_2 + 0.033 \cdot X_3 + 0.06 \cdot X_4 + 0.999 \cdot X_5 \quad (1)$$

where

$X_1$  = Working capital/Total assets

$X_2$  = Retained Earnings/Total assets

$X_3$  = Earnings before interest and taxes/Total assets

$X_4$  = Market value of equity/Book value of total liabilities

$X_5$  = Sales/Total assets

Z = Overall Index

MDA is based on ordinary least squares method (OLS) and thus requires assumptions of multinormality, homoscedasticity, and linearity which are not often met in empirical financial ratio analysis (Cisko, S. and Kliestik, T., 2013).

That was the reason why researchers started using logistic regression analysis (LRA). LRA, also called a logit model, is used to model dichotomous outcome variables (Kliestik, T. et al, 2015). In LRA, multivariate normality of the independent variables, homoscedasticity, and linearity are not required. Logistic regression measures the relationship between the categorical dependent variable and one or more independent variables by estimating probabilities using a logistic function, which is the cumulative logistic distribution. In the logit model the log odds of the outcome is modeled as a linear combination of the predictor variables. LRA models provide a way represent more complex relationships between variables than linear regression models but still assumes log-linear relationships between target and predictor variables (Kocisova, K. and Misankova, M., 2014). Logistic regression is useful when we are predicting a binary outcome from a set of continuous predictor variables. Now, it is frequently preferred over discriminant function analysis because of its less restrictive assumptions (Kliestik, T. et al, 2015).

For the sake of OLS, MDA can be more useful than LRA for small samples, such as the original sample of 66 firms used in the estimation of the Z-score model (Misankova, M. et al 2015). However, in a large sample LRA may potentially perform better.

Logistic regression was developed by statistician David Cox in 1958. In 1980, James Ohlson applied logit regression with nine explanatory variables in large sample of 105 failed and 2058 non-failed firms - he did not involve pair-matching. The accuracy of his model was 96%.

Until recently, it was not easy to get to relevant data about the Slovak enterprises. Since 2014, however, is possible to use the register of the financial statements (register). The register was established with the aim of improving and simplifying the business environment and reducing the administrative burden of the business. Simultaneously the Register improves accessibility and quality of the information about the accounting entities (Kliestik, T. and Majerova, J. 2015).

The Register started to fulfil its tasks from January 1, 2014 obligatorily publishes documents which have been drawn up to the 31 December, 2013 or later. The users of the website can search and browse in the list of accounting entities and their financial statements. There is the possibility of using automated programs to download financial statements from the public part of the register via API, which enables automated mass download of public data. Data are in JSON format.

The aim of our research is to validate Altman's original model (1) and especially logit model (2) to analyze three samples of Slovak enterprises in order to evaluate the success of classifying businesses three years after the creation of the model. We also compare differences in models results for each sample.

## 2. COMPARISON OF BANKRUPTCY MODELS

We selected for comparison of models three samples of Slovak companies divided by region: Zilina region, Bratislava Region and Kosice region.

(Altman et al, 2014) introduced LRA version of the Z-score:

$$Z = 0.035 + 0.495 \cdot X_1 + 0.862 \cdot X_2 + 1.721 \cdot X_3 + 0.017 \cdot X_4 \quad (2)$$

where

$X_1$  = Working capital/Total assets

$X_2$  = Retained Earnings/Total assets

$X_3$  = Earnings before interest and taxes/Total assets

$X_4$  = Book value of equity/Book value of total liabilities

Z = Overall Index

This model (and next also) was constructed from a sample of 31 European and 3 non-European countries (China, Colombia and the U.S.) companies from years 2007 to 2010 with the requirement that the total assets must have exceeded 100 thousand EUR at least once in the available time series for a firm. In the base sample of this model was 7856 non-failed and 120 failed Slovak firms. In test sample was 7788 non-failed and 124 failed firms. AUC for test sample of Slovak firms was 0.776.

From figure 1, we can see that receiver operating characteristic curves almost identical, it means that the model gives approximately equal results for each of the three regions.

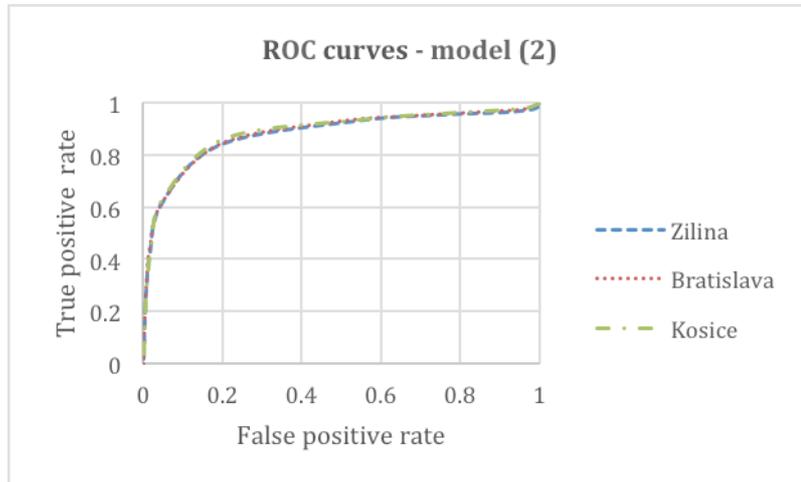


Figure 2 ROCs for all three regions, model (2)

AUCs (area under curve) are also very similar Zilina AUC = 0.71, Bratislava AUC = 0.72 and Kosice AUC = 0.74.

Altman et al, (2014) published also slightly modified version of the previous model:

$$Z = 0.007 + 0.487 \cdot X_1 + 0.846 \cdot X_2 + 1.757 \cdot X_3 + 0.017 \cdot X_4 + AD \quad (3)$$

where

$X_1$  = Working capital/Total assets

$X_2$  = Retained Earnings/Total assets

$X_3$  = Earnings before interest and taxes/Total assets

$X_4$  = Book value of equity/Book value of total liabilities

AD=Age dummies, less than 6 years = 0.135, over 12 years = -0.058

Z = Overall Index

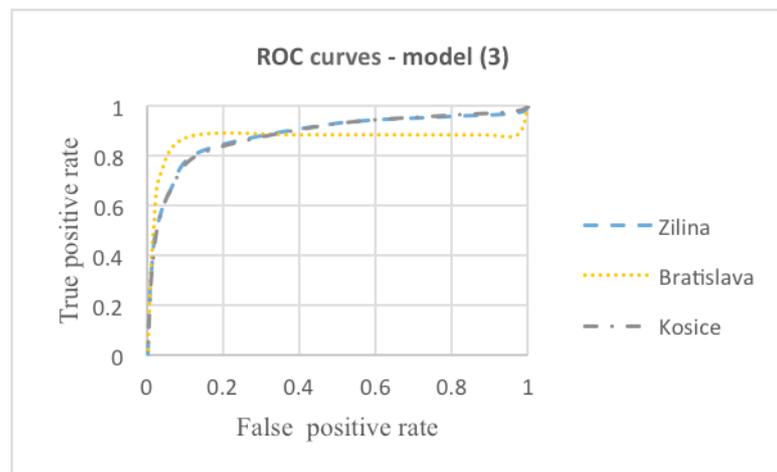


Figure 2 ROCs for all three regions, model (3)

AUC of model (3) for Altman's test sample of Slovak firms was 0.769 what is better than in our tests. Also with model (3) are AUCs very similar Zilina AUC = 0.73, Bratislava AUC = 0.73 and Kosice AUC = 0.75.

Table 1. Summary of samples by number of failed/non-failed firms

	Reality		Model(2)		Model(3)	
	Failed	Non-failed	Failed	Non-failed	Failed	Non-failed
Bratislava	9 292	25 179	7 829	20 340	8 175	22 358
Kosice	2 901	8 986	2 503	7 164	2 354	7 713
Zilina	2 742	8 672	2 300	7 010	2 239	7 494

### 3. CONCLUSION

We compared two Altman's models on the three samples of Slovak firms. Although the models were designed generally for Europe companies, on data from the year 2007 to 2010, still show a relatively high prediction ability. We also showed that companies from various regions of Slovakia have similar characteristics in terms of prediction of bankruptcies.

### ACKNOWLEDGEMENT

This research was financially supported by the Slovak Research and Development Agency – Grant NO. APVV-14-0841: Comprehensive Prediction Model of the Financial Health of Slovak Companies.

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# OPPORTUNITIES FOR PRIVATE PENSION FUNDS DEVELOPEMENT IN ALBANIA

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## ABSTRACT

The social insurance system in Albania has been designed based on three pillars. The first and the third columns are actually put in practice according to the respective laws. The first column is a compulsory one and is based on "pay as you go" scheme. It guarantees a secured pension because it is publicly managed from the Institute of Social Insurance and it is financed from the state budget. The third column is a supplementary one and it includes the involvements of the private pension funds. It is privately managed. Unlike the first column, the payment made by the contributors, are not defined by the law, but by the contributors. The benefits are proportionally related to the individual contributions. According to the statistics of the Albanian Financial Authority, which regulates and supervises the private pension funds, the volume of the private contributions has been continuously increased. But the further development of the private pension funds depends on the implementation of the second pillar, i.e. participation of the private pension funds in the compulsory scheme. The law on private pensions has been continuously improved, especially regarding the fiscal facilities. The paper describes the present problems of the actual social insurance system and the significance of the real involvement of the private pension funds in the pension system, through the second column. The data used in the paper are of secondary type, based on the statistics published by the respective official institutions. The paper concludes with the importance of the second pillar implementation in the Albanian pension system.

## KEYWORDS

Social insurance system, private pension funds, contributions.

## JEL CLASSIFICATION CODES

G22, G23.

## 1. INTRODUCTION

Unlike the transfer programs that provide assistance to the specific group of population, social insurance programs generally are financed through payroll taxes, general revenues or both of them. Social insurance contributions whether in the form of taxes or contributions, are obligatory and vary by income or wealth, but they or not proportionally related to the contributor's benefit. In several countries, the target population is obligated to participate in private plans that provide social benefits, as in France for example, where all workers are compelled to participate in their employer's private pension plans (Skipper 2000). The private pension plans are considered as a relief to the state burden and as an investments for retirement age. The second section of the paper describes the types and the element of the pension system. The features of the social insurance system, operating as a first pillar, are presenting in the third section, according to the data published by the Social Insurance Institute of Albania. The fourth section describes the existing voluntary pension market, operating as the third pillar. The reasons for the possible establishment of the second pillar are given in the fifth section. The last section covers the conclusions and recommendations about the voluntary pension funds development.

## **2. ELEMENTS OF PENSION SYSTEM**

There are several types of pension systems applied in the countries all over the world. Two basic models are single pillar schemes and multi-pillar schemes. The studies have shown that single pillar schemes are less effective than multi-pillar schemes. According to the World Bank Pension Conceptual Framework, the pension system may be based on five pillars, implemented according to the specific conditions of the country.

The "zero" pillar is a non-contributory scheme, offered in form of the social pension or a general assistance form in order to provide all of the elderly with a minimum standard of living.

The first pillar is a mandatory, public financed and guarantees a minimum income in the old age. It is "defined benefits" plan, where the benefit payable at retirement is developed by a formula and the cost of the plan depends on the age, earnings distribution of eligible employees and the operating experience of the plan.

The mandatory "second pillar" is typically an individual savings account with a wide set of design options including active or passive investment management, choice parameters for selecting investments and investment managers and options for the withdrawal phase. It is a defined contribution plan, which determine a clear relationship between contribution and benefits.

Third pillar implies individual savings and supplementary contribution by the employer. This scheme provides supplementary incomes for individuals who are willing to benefit higher pensions when they retire. Experience from several countries has indicated that investing a part of savings in pensions private funds is a good way of investment for retirement. The income from supplementary schemes are a very important component for the retirees. It is a voluntary, private management, fully funded individual and occupational schemes. It is a defined contribution plan, where the amount of benefit provided at retirement depends on the amount accumulated in the employee's account, which varies according to the age, contribution amounts, investment returns earned on the accumulated contributions and the length of time covered by the plan.

The "fourth pillar" is a non-financial scheme which includes access to informal support or other formal social programs.

The first pillar protects the elderly from the absolute poverty (consumption below a minimum level), whereas the second and third pillars protect them from relative poverty (a fall in consumption following retirement) (Willmore L. 2000).

The pension system in Albania is foreseen to be constructed on three pillars. The first and the third pillar actually are put in practice according to the respective laws. The first pillar is implemented through the social insurance program, which is managed by the Social Insurance Institute of Albania. The third pillar is implemented through voluntary private market, which is supervised by the Albanian Supervisory Financial Authority.

## **3. PUBLIC MANDATORY PENSION SCHEME - FIRST PILLAR**

Social insurance programs are developed primarily in response to the demand of the society to cover certain risks for which neither individuals nor private insurance can provide adequate coverage. Social insurance program in Albania has its roots since 1927, during the Zogu's government. As the other countries, Albania has adopted the Bismark model, based on the "pay as you go" scheme. The law " On civil pensions" no. 129, is considered as the first legal act, dated on 28.10.1927. The law defined the state contributions for the civil workers and armed forces in Albania. In order to benefit from the plan, the contributor should have an insurance period of 25 years and an age of 60 years old. After the Second World War, the communist government followed the soviet model established in all the countries of the Eastern Europe. According to the law of 1947, only the state workers have the right to be involved in the social insurance scheme and only in 1972, the collective farms workers became part of the social insurance program. From 1945 to 1990, the pension age has been decreased from 65 (60) years old for males (females) to 60 (55) years old. The pension benefit depended on the wage of the last years and the pension age was lower for some "difficult" professions.

After 1990, the radical political and economic changes in Albania, a major part of the state enterprises have been closed down and the unemployment rate was high. The number of the contributors in the urban and rural areas has been drastically decreased, as result of the closing of state enterprises and agriculture cooperatives. A new law no.7703 "On social insurance" has been approved by the parliament in 1993, in

order to adapt with the new market economy conditions. Several legal acts have followed this law during the following years. The Albanian government have introduced several policies related to the pension system in order to provide better benefits to its retirees and to improve old-age income security. The pension age has been gradually increased, reduced pensions have been introduced, the minimal income retirees have been compensated by additional incomes, contribute tariff has been gradually decreased etc. But, as result of high unemployment, informal labor market, high system dependency ratio and the aging trend of Albanian population, the social insurance scheme experienced a growing deficit as the Figure 1 shows. The policy changes were made without a comprehensive approach in order to solve the existing and the future problems of the pension system in Albania. The pension level is low. In 2014 the minimum urban pension was Euro 87, while the maximum urban pension was Euro 174.

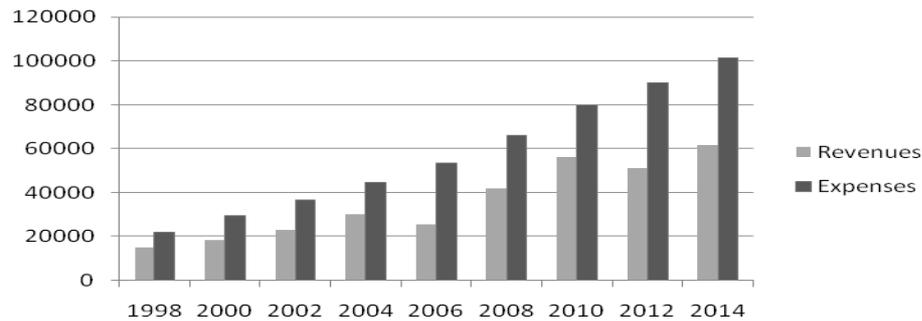


Figure 1 Social insurance revenues and expenses. Source: Social Insurance Institute & Ministry of Finance

Social insurance system in Albania, managed by Social Insurance Institute, provides the following schemes for pensions.

*Mandatory scheme*, which is functioning on the scheme "pay as you go" that means that the tax revenue collected is used to pay out current benefits. This is a non-profit scheme, and the law requires the involvement of all active labor forces in both public and private sector. It is financed from the contributions of employers, employees, self-employed and the state budget. In 2014, 94.3% of total contributions belong to the mandatory scheme.

*Voluntary scheme* protects the individuals who, for reasonable causes and specific time, cannot be involved in the obligatory insurance scheme, but they would voluntary like to be insured.

*Supplementary scheme* offers a sooner and/or a larger amount of pension to a certain category of individuals, who exercise special state functions or have academic titles.

The law "On social insurance" provides special treatments for individuals who have special merits and a social pension for individual who cannot benefit from the above mentioned schemes. In 2014, some changes have been made to the law "On social insurance" of 1993, aiming to provide a better link between contributions and retirement benefits.

#### 4. PRIVATE VOLUNTARY PENSION SCHEME - THIRD PILLAR

The voluntary pension market in Albania is supervised by Albanian Financial Supervision Authority. Regardless the adaption of the Law "On Supplementary Pensions and Private Pensions Institutions" in 1995, the activity of the first companies in private pension market started in 2006. Three Pensions Private Institutes started their activity - two of them as private domestic and foreign stock companies and one of them as private domestic stock company. In 2006, the number of supplementary private pensions market contributors was about 2621, thus accumulating a fund of about ALL 15.15 million. But the shortcomings of the existing legal framework regarding the licensing requirements, investment policies and supervision elements have suspended the licensing procedures in terms of issuing new licenses. On December 2009 entered in force the Law no. 10197 "On Voluntary Pension Funds". The Voluntary Pension Law aimed:

- the effective management of voluntary pension funds through diversification of investments;

- the supervision of the business of the voluntary pension funds with defined contributions, in order to ensure protection of pension fund members;
- the promotion of stability, security and good governance of pension fund assets; and
- licensing and supervision of pension funds, occupational pension funds, management companies and the depositary of the pension fund assets.

*Pension fund* is a pool of assets derived from voluntary contributions, return on investments, and decreased for fees and charges. It is established under a contract signed among members (employer and employee) and the management company. Regarding the structure, it has no legal personality, owned jointly by several persons in a partial ownership and the ownership shares are represented by units in the pension fund. The pension fund should be managed by a management company according to a pension fund contract with the unit-holders, with the objective to increase the assets for the unit-holders.

*Occupational pension fund* is a pension fund under a contract between an employer and a management company, for the purpose of providing retirement benefits for its employees.

*The management company* is a joint-stock company established in accordance with the company law and licensed by the Authority to manage one or several pension fund. The activities of the management company include collecting, managing and investing of the assets of voluntary pension fund and optionally providing benefits.

*Depositary of the pension fund assets* is a bank that holds a license issued by the Bank of Albania to provide custodial, depositary and fiduciary services, and a license issued by the Financial Supervisory Authority in order to provide depositary services, in relation to the assets of a pension fund.

An important element of the law is the inclusion of tax incentives related to pension fund members' contributions, in order to make voluntary pension funds more attractive to contributors and employers. Under the law no. 10343, contributions paid by employers to voluntary pension funds are recognized as deductible expenses and the contributions that individuals pay to voluntary pension funds are recognized as deductible expenses in their annual tax income returns. The law enabled approximation with international standards and European directives on the third pillar of defined contribution voluntary pension funds. The law on Voluntary Pension funds has been followed by several regulations approved by AFSA in order to improve the current voluntary pension system in Albania. But until 2014, private voluntary pension funds have not managed to attract many members because the tax incentives provided for "On the Voluntary Pension Funds" law have not been entirely implemented by the tax legislation.

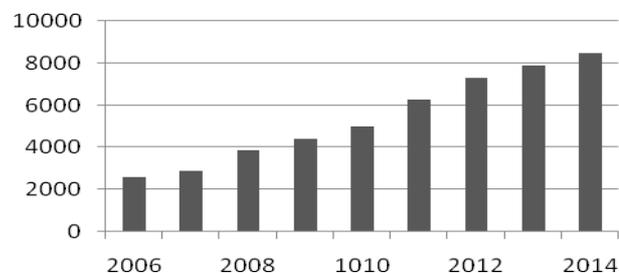


Figure 2 Number of contributors in voluntary pension funds. Source: Albanian Supervisory Financial Authority

In 2014 the structure of voluntary private pensions market consists of three administration companies, one of which (Raiffeisen Invest sh.a.) manages a voluntary pension fund and two investment funds. The other two companies ("Sigal-Life Uniqa Group Austria" sh.a. and "Siced" sh.a.) administer a voluntary pension fund. Pension market is less developed than two other markets supervised from Financial supervisory Authority: insurance and securities markets. In 2014 three pension funds operated in the voluntary pension market. The amount of total assets was ALL 629.15 million with an increase of about 44.69% compared with the end of 2013. The total net assets were EUR 4.49 million. The number of members in pension funds, in 2014, was 8,491 members, with an increase of 7.66% compared with the previous year (Figure 2 & Figure 3).

Regarding the investments, 97.97% of the investment portfolio was invested in treasury bills and bonds of the Government of Republic of Albania and 5.03% was invested in bank deposits.

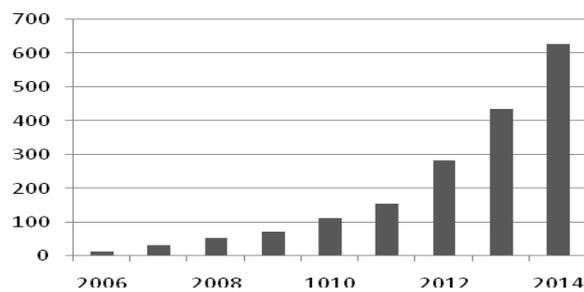


Figure 3 Total assets of voluntary pension funds. Source: Albanian Supervisory Financial Authority

## 5. OPPORTUNITIES FOR MANDATORY PRIVATE PENSION SCHEME - SECOND PILLAR

The analysis of the actual pensions schemes in Albania showed that the mandatory scheme managed by the Social Insurance Institute (first pillar) has become overly redistributive and fiscally unsustainable. The deficit is expected to increase in the future years, as the population is becoming more older, as the unemployment rate is increasing, and as the dependency ratio is going to increase. Therefore, the public mandatory pension scheme needs to be supported by the private pension market.

On the other hand, voluntary pension market (third pillar), although underdeveloped, has been continuously increased, especially during the last years as the Figure 3 shows.

However, the voluntary contribution in both social insurance plan and voluntary pension market by Albanian people is still low. They still think that government should and has the duty to provide them with financial security in case of misfortune and in case of longevity too. This kind of mentality has its roots to the communism past, when the government fulfilled (at least had the duty to fulfill) all the needs of an individual. Therefore Albanians people have a low culture level of self-security. On the other hand, they demonstrate a weak confidence on non-banking financial institutions, due to the bad experience they have with pyramid institutions during the middle of ninety's.

The Supervisory Authority should promote the development of voluntary pension funds by educating the consumer base, while the government should intervene by introducing some compulsory mechanism, such as the second pillar - the mandatory private pension scheme. The contribution in the mandatory public scheme may be divided: a part of contribution to be made in the public mandatory scheme and the rest of contribution to be made in the private mandatory scheme. As result the burden of social insurance deficit will be shared between state and private operators, and the population will be more familiar to the private pension schemes.

## 6. CONCLUSIONS

Historically, Government of Albania has played an important role in providing economic security for individuals and their families. During the communism period all the workers and the members of the collective farms were subject to compulsory social and state economic benefits. After the transformation of the state-planned economy into the free market economy, due to the shutdown of the state enterprises and collective farms, the unemployment rate has been increased. Also due to the migration, informal economy and high dependency system ratio, the social system based on the "pay as you go" was operating in deficit. The policies undertaken by the government have not been compressive. As result the benefits from this scheme are still low. Voluntary private pension funds have been established in 2006, in order to provide a certain category of individuals with higher retirement incomes. However the voluntary participation in this market is low, due to the low level of self-security culture and the lack of confidence in the non-bank financial institutions. The first factor may be changed by introducing some compulsory devices, such as imposing by law the second pillar of pension system - the mandatory private scheme. Regarding the other

factor, the confidence, it may be increased by educating the consumer base, promoting, supervising and consolidating the legal framework of the private voluntary funds by the respective supervision authority.

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- [www.issn.gov.al](http://www.issn.gov.al) Official webpage of Social Insurance Institute of Albania
- [www.mf.gov.al](http://www.mf.gov.al) Official webpage of Ministry of Finance of Albania

# IMPACT OF KNOWLEDGE AND HIGHER EDUCATION ON THE DEVELOPMENT OF INNOVATION IN CROATIA

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## ABSTRACT

Last year was planned as the year of knowledge and achieving significant results with the aim of creating a knowledge-based society as a comparative advantage in the region; however, it should be pointed out that the planned goal was not achieved at the scheduled rate, especially as far as Croatia is concerned. The European Commission has developed a strategy (from 2010 onwards) aimed at creating a compatible and competitive region that will lead the way in knowledge and capabilities based on smart growth, sustainable development and inclusive growth. Smart growth means growth and development of the economy based exclusively on knowledge and innovation, and sustainable development means the promotion and creation of more economical, "greener" and thus more competitive economies, while inclusive growth is encouraging high-employment economy delivering economic, social and territorial cohesion. The paper provides a brief overview of the current situation and the position of Croatia with respect to the foregoing, and of the knowledge society through the allocation for science and education and the global economic crisis.

The main objective of the paper is to show the relationship and impact of higher education on the level of development of innovation in companies of the European Union, but also on enterprises in the Republic of Croatia. The primary source of data is the Flash Eurobarometer 415 from 2015, which shows as essential the role of enterprises as a primary source of innovation and engines for growth and job creation. The Flash Eurobarometer focused on the analysis and detection of the basic style of behaviour and business trends in companies of the European Union in relation to their innovation activities. Studies have been conducted in 28 Member States, as well as in Switzerland and the USA; it is a survey designed to gather information on profiles, innovative companies, to analyse obstacles to commercialization of innovations, as well as to identify areas where public funding can best support innovation. In the context of this paper, authors use the original data in the Flash Eurobarometer and analyse individual segments demonstrating knowledge and higher education as key variables to increase innovation in enterprises in both the European Union and Croatia.

**KEYWORDS:** knowledge, higher education, innovation, enterprises, Eurobarometer

**JEL CLASSIFICATION CODES:** I230, I250, L230

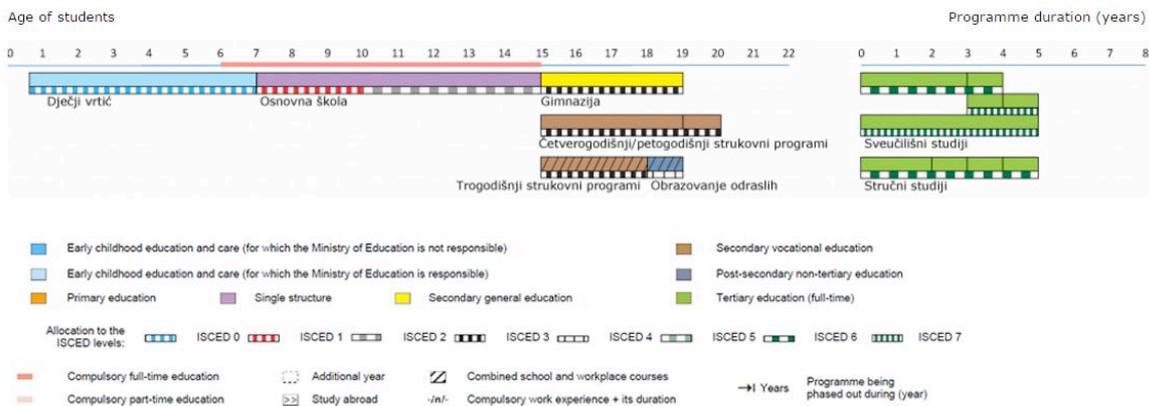
## 1. INTRODUCTION

In modern, knowledge-based societies, the role of education is becoming vital for the functioning of their economies. Knowledge is becoming a key factor of economic development and competitiveness of products on the market. In the contemporary economic models, knowledge and information have a double role: on the one hand, they show the nature and level of information of economic entities in the society in which they operate, while on the other hand they show to what extent these entities are capable of processing this information for their advantage. In today's society, knowledge is viewed as an asset, but unlike physical property, knowledge as an asset perpetuates itself, and in the society it can appear both as an input (competence, skills etc.) and as an output (Lundvall 1994, OECD 2000).

From the methodological aspect, this work is based on the data which define the basic premise concerning the specific character and importance of knowledge, higher education and innovation, and their impact on the development strategies of regional and economic policy. The information was gleaned from the studies based on different theoretical and empirical research, of which the most important is the Flash Eurobarometer 415

study – The Innovation Trends at EU Enterprises. Along with the primary sources of data, this paper uses a secondary set of data listed in the bibliography.

### Structure of the national education system



source: Eurydice 2016

Figure 3 Structure of the national education system – Republic of Croatia. Source: Eurydice, 2016

Essentially, this work is a theoretical analysis in the field of innovation policy and it reflects certain fundamental issues of contemporary socioeconomic analysis of development trends in the Republic of Croatia and the European Union. It is apparent that the theoretical analysis presented in this paper cannot cover all relevant aspects of the theme with such a wide scope, but it should highlight the importance of investment in the education system as the fundamental driving force of new ideas and the generator of added value in the present economy.

The knowledge economy views knowledge as the highest-quality good, i.e. the means of production and the model of competitive advantage on the market. Therefore, knowledge can be:

- put to use (in the production process),
- procured on the market (acquisition, recruitment of knowledge workers, purchase of patent rights etc.), and
- stored (libraries, databases), etc.

If we analyse knowledge as an asset in the context of the knowledge economy and innovation policy, we should address the following question: Is knowledge a public or private good? The public aspect is contained in the fact that the production of knowledge in the form of education is a public good, and it serves the public purposes.

Involvement of the line ministry in supporting the education system represents a rational allocation of knowledge as a resource of production in the society (Arrow, 1962). Consequently, the implied conclusion is that knowledge itself is a public good, and therefore economic entities are not required to provide additional investment in knowledge as a form of strategy for market competitiveness. On the other hand, the objectives of public financing of schools, universities and generic technologies in the society are long-term, and are not necessarily only economic.

By definition, innovation is the introduction of something new, meaning a new insight to existing knowledge, thus also entailing the extension of this existing knowledge. According to Schumpeter, the process of innovation can be presented as the process of creative destruction where at the same time, while inventions are creating new markets, new business systems and new work places, they are irrecoverably annihilating the old markets, work places, production facilities etc., as well as the previous technologies and products inherent thereto. For example, with the rise of computers, the demand for mechanical typewriters at most offices disappeared, thus representing a destructive outcome for the production of these machines. Inventiveness is not exclusively the characteristic of brilliant individuals. The innovation structure can be established in the systems with more stakeholders who are interrelated. The stakeholders in the process of creating innovations can be business systems, universities, technological institutes, education centres and others.

In the present conditions, learning is a process which is not limited to a defined time period; it is a life-long learning and training process and it is conducive to the level of inventiveness of the national economy and the European Union as a whole.

## 2. IMPORTANT FACTORS FOR THE DEVELOPMENT OF INNOVATION

Globalisation and the development of science and technology have caused a closer-knit relationship to be established between the academic and scientific community and industry in most developed countries in the world. The development strategy effected new forms of cooperation between these two sectors by creating a number of new forms of integration of science and industry as the points where scientific and technological innovations are achieved. The commercialization of the intellectual property by filing patents represents the basic paradigm of the use of knowledge for the purpose of economic development in today's post-industrial developed societies. In the age of globalisation and strong market pressure worldwide, the time between the creative idea and its realisation in practice must be as short as possible. According to Schumpeter, apart from the employees in the business system, their experience and knowledge, there is a number of other factors that bear upon a successful application of innovation in industry.

These factors include:

- The link between other business systems (competition, suppliers, business services etc.),
- Local science and research and development infrastructure (schools, universities, research laboratories, software, libraries, the Internet etc.),
- Additional education and other institutions (engineering, agents, brokerage firms, availability of venture capital and other forms of project financing).

Thus, although the original idea and scientific basis of the project are important, they comprise just one of the stages in the implementation of a business project in the industry sector. Today, large business systems and concerns have their own universities, research laboratories and scientific institutes, whereby the time link between the idea and its realisation is reduced to the greatest possible extent. In the sectors such as, for example, the pharmaceutical industry, several tens per cent of the total turnover are earmarked for R&D. Simultaneously with the strategic investment in R&D, these business systems also invest in the management and business operation control systems. The motivation of industry to cooperate with the academic and scientific institutions was elicited by H. G. Schuetze (2000). Unlike European universities, American universities are more decentralised and focused on meeting the local and regional development requirements. Business systems are additionally motivated to cooperate with the universities because the cost of use of research laboratories and science staff at the universities is included in the universities' expenditure, and the agreements between the business sector and the universities are mainly in the form of bilateral agreements for providing consultation services and similar.

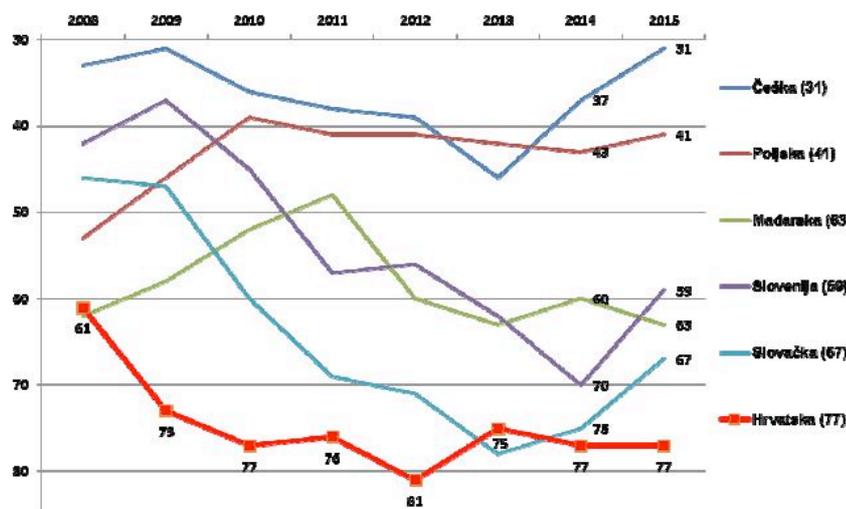


Figure 4 Croatia and comparable EU countries. Source: National Competitiveness Council,

In the case of the Republic of Croatia, situation analysis shows a negative trend in further investment in knowledge and higher education that would facilitate the innovation climate and achieve profitability for at least part of inventions that are realised under the given circumstances.

It is obvious that the Republic of Croatia is stagnating, especially compared to its surrounding environment. The combination of efficiency and innovation factors still comprises the basis for economic development of Croatia, which is still in transition. (Global Competitive Report 2015 – 2016, WEF)

However, in the case of innovation and education on the part of business entities, the situation is somewhat different. Namely, business entities are aware of the importance of knowledge and creating new insights and skills in order to maintain the current market position or to achieve better results. Croatia has thus recorded growth and improvement in allocating financial resources to the specific areas of education and application of new solutions.

It is clear from the Flash Eurobarometer 415 that the financing has increased for some forms of training for own employees.

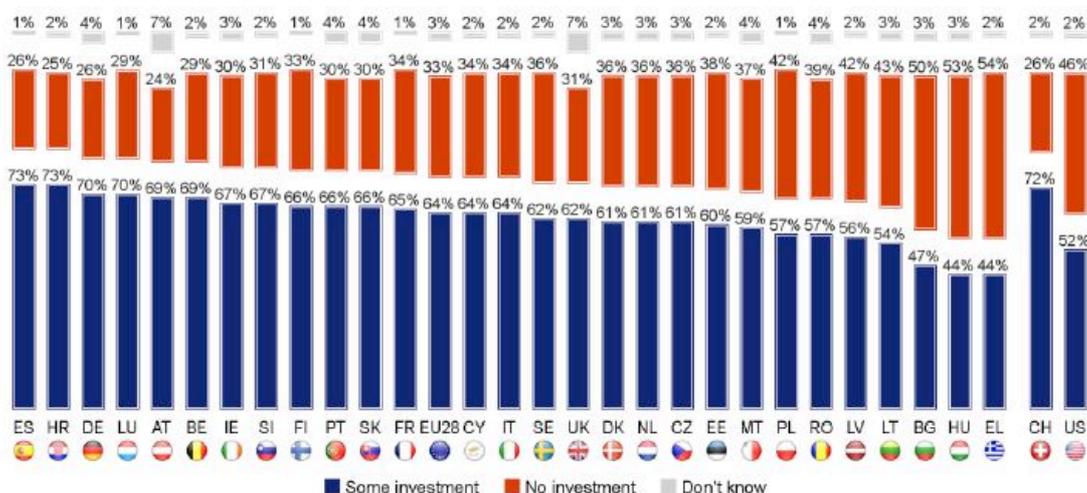


Figure 5 Percentage of investment in staff training relative to the total turnover (from 2012). Source: Flash Eurobarometer 415, 2015

A significant growth relative to all EU Member States is recorded by the business systems in the Republic of Croatia in the field of development of new software solutions. The majority of business systems in Croatia (63%) dedicate resources (i.e. invest) in the development of software solutions, which fall in the category of innovative products (services).

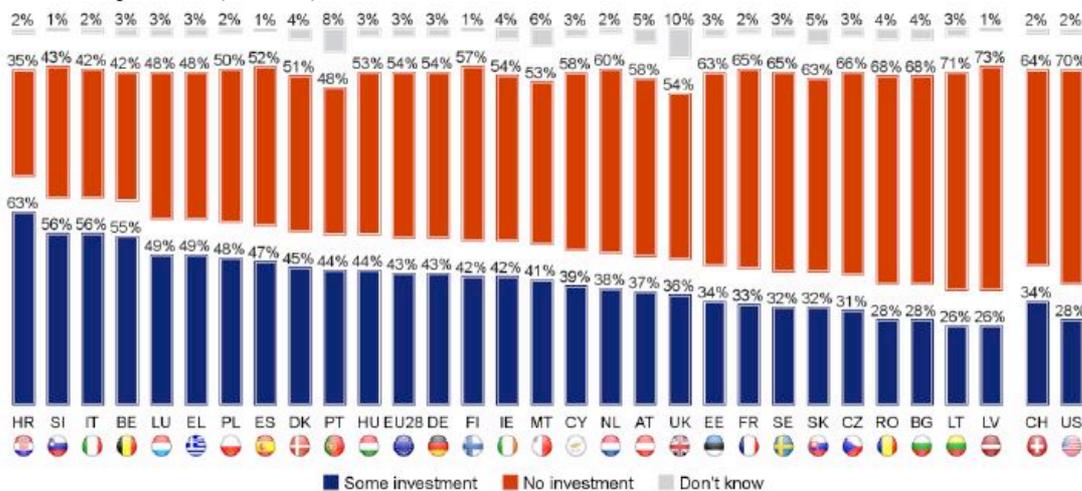
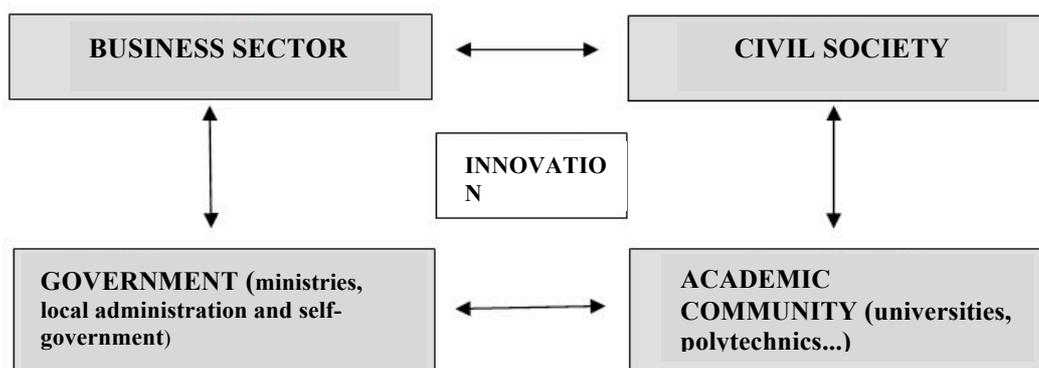


Figure 6 Percentage of investment in the development of software relative to the total turnover (from 2012). Source: Flash Eurobarometer 415, 2015

Economic inequality (wealth gap) between the developed countries and those that are not, to a great extent corresponds to the technology gap. Reducing the technology gap in countries such as Croatia should be implemented by stimulating the establishment of technological centres and R&D technological parks. Certain authors (Švarc, 1997; Ćosić, 2001) state that in order for the smaller and transition countries to catch up with the developed countries, it is important to fulfil several key requirements: the possibility to utilise new generic technologies; accept and modify technological innovation of others for the purpose of own development; make a breakthrough in the specific niche offering high-quality products. To achieve all three conditions, and in the interest of increasing the rate of return in the overall national economy, the technological policy should focus on the stimulation of and incentives for the investment in R&D activities within certain industries. The methods for this are known: temporary tax exemptions, tax credits, subsidies etc. (Ćosić, 2001).

The problem of too modest investment in the Croatian science and R&D has already been underlined. The required technological changes are not incidental in nature. They are the result of an intentional and long-term economic policy. Technical development requires an appropriate initiative by individuals and companies to create new products, services and production technologies. However, the role of public administration is also important. The strengthening of R&D activities in own territory is very important because the countries that apply these activities also reap the greatest benefits. One should bear this in mind when making decisions that concern supporting and launching advanced technology projects and investment. Croatia has to create its own innovation technology policy, comprising the institutional infrastructure, implementation tools and innovation technology policy control mechanisms.

The processes presented in the "Quad Helix" model could contribute to an increase in innovation.



In

Figure 7 "Quad Helix" innovation process model. Source: Created by the authors

order to create the conditions for implementing the theoretical model, significant developments should be made in the academic community and at government level (line ministry) to create the conditions for the establishment of "entrepreneurial universities" or "entrepreneurial polytechnics". This segment is possible by stimulating this type of activity, by additional allocations for science and higher education from the budget of the Republic of Croatia, and by promoting the growth of "spin-offs" and similar business entities.

### 3. CONCLUSION

Based on the official statistical indicators, the Republic of Croatia has great possibilities to increase and further develop its innovation potential. The main precondition is to establish a practical relationship between the business sector, polytechnics and universities, and public administration, which will provide for mutual cooperation, the exchange and realisation of ideas through synergistic activity of all stakeholders. The business sector, according EU statistics, is allocating an increasing proportion of own income to increase own innovation capacities and knowledge of their staff. The problem occurs in the higher education institutions which, due to the continuous decline of investment in science and higher education and other aggravating circumstances, are still dealing with their own primary problems and not with the development projects and projects in cooperation with the business sector. If certain progress is achieved in this segment, it will

undoubtedly lead to an increase in the innovation capacity of the Croatian higher education institutions, as well as of the Republic of Croatia in general. This approach is the only possible way to achieve a better competitive position in the market niches, to promote significant economic growth, and to reduce migrations from Croatia.

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# **BUSINESS ETHICS AND CORPORATE SOCIAL RESPONSIBILITY RELATIONS IN PUBLIC RELATIONS: INSTITUTIONAL REPRESENTATIVE IN TURKEY**

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## **ABSTRACT**

Compared with the private sector, public institutions have more cumbersome structure. Structural changes are very important at the state institutions that have intense bureaucracy and cannot be effectively managed. In our country, at the beginning of 2000s public reforms were initiated. This study aims to resolve many problems in public institutions. In particular, issues such as strategic management and performance management began to be considered carefully. As a result of this study, our country has come up with a new understanding of public administration. Concepts such as justice, equality and objectivity have also been effective in putting public business ethics and social responsibility concepts on the agenda. In this study, we have attempted to reveal the effects of the judicial reform strategy in our country. For this purpose, a review has been conducted over the Court of Justice Kırıkkale organization unit. In the study, business ethics and social responsibility perceptions of the staff working in various departments were analyzed. Goal is to reveal the importance of these two concepts within service. In interviews and survey performed with 111 staff, relations with variables such as gender, length of service and duty have been analyzed. At the results of the research part of the study; it was revealed that business ethics and social responsibility have a significant impact over the formation of the organizational image.

## **KEYWORDS**

Ethics, Moral, Business Ethics, Organizational Responsibility, Social Responsibility, Ethics, Corporate Governance

## **JEL CLASSIFICATION CODES**

M12, M14, M38

## **1. INTRODUCTION**

In the business life, business ethics and social responsibility concepts occupy an important place at the relationships in between employees and the environment. In the long term, strengthening of this matter with systematic staff regulations issued by private and public institutions shall have a reinforcing impact on their position in either social or economic processes. In order to create a positive impact over social image as well as on the development of corporate image it is necessary to improve work ethic behavior on both staff and the institution. The concept of social responsibility and business ethics in this respect will have an effect of increasing the level of credibility of the institutions.

### **1.1 Overview of Business Ethics and Social Responsibility Concept**

The concept of social responsibility; is to manage the company's economic activities without harming the interests of the entire community. In other words, social responsibility means to pursue an appropriate strategy of the company with the economic and legal conditions, business ethics, organization and expectations of internal and external groups. Business ethics is the sum of the rules based on the principles of belief about what is right and what is unfair and what's right and wrong behavior on the job. (DEMİR and SONGÜR, 1999:151-160).

Business ethics is closely associated with social responsibility. Because of the effect of the business ethics on socio-economic relation system process it can be said that it shall contribute to the development of social responsibility awareness. Indeed, a social context dominated by business ethics principles shall obliges the companies rather than their own selfish interests centered approach towards a responsible approach that takes into account the interests of all segments of society. In other words, business ethics requires considering other segments of the society rather than profit in spite of everything of the administrations / entrepreneurs. Although the main condition for the survival of the company's vitality is financial gain and success based on financial gain, certain responsibilities towards the society in which it lives and uses the resources should not be ignored (İlhan, 2016:266).

## **2- RESEARCH METHODOLOGY**

### **2.1- problems, purpose and importance of the research**

Business ethics and the concept of professional ethics are among one of today's most controversial cases. In fact these two concepts are closely related to social responsibility perceptions of employees in public institutions. A study performed in the literature assessed these two concepts in terms of relations between employers and staff. But today increasingly growing importance of corporate clients, the evaluation also revealed that customer perception of corporate activities is an important concern. In this context, the research is to answer the following problems;

- a) What is the level of business ethics and social responsibility related with their institutions of the courthouse employees in Kırkkale?
- b) Is there a significant difference at the business ethics and social responsibility of the courthouse employees according to the variables such as gender, tasks, total work life and work life at the institution?

The aim of the study is to analyze business ethics and social responsibility fact within public institutions and to show the result of review about the degree of obeying ethical principles at public institutions by a local implementation. For this purpose, evaluation of business ethics and social responsibility of the staff that works in various positions on the institution of the Court of Kırkkale have been made.

### **2.2 Main subject and sampling of the research**

At the Kırkkale Courtyard, to perform legal services for a total of 279 personnel including 24 judges, 15 prosecutors, 115 the clerk, 41 Director, 32 Bailiff, 17, janitor and 35 other employees are working. 111 staff who are 10 Judges and Prosecutors, 11 Director, 59 the clerk, 17 Bailiff, 9 Administrators that means % 39, 78 of the total staff participated to our research.

The Court of Kırkkale's corporate profile is as follows; Kırkkale Courtyard is a public institution that has entered into service in 1996. There are 1 Office of the Prosecutor, 1 High Criminal Court, 1 Magistrates' Court, 5 Criminal Court of First Instance, 2 Civil Court of Peace, 4 Civil Court of First Instance 2 Family Court, 1 Enforcement Court, 4 Enforcement Office, trial rooms for each court and a 100-seater dining hall for the purpose of realization of social services at the Kırkkale Courtyard.

### **2.3 Research methods and acquisition of data**

Research is a descriptive study. Data were obtained through a survey. Personal experience and observations are included in the interpretive process by using open-ended questions at the evaluation and analysis of the data. Quintet Likert Scale and Ranges that are used at the study is as follows;

Table 1 Likert Scales

Weight	Options	Limits
1	Strongly Disagree	1,00-1,80
2	Disagree	1,81-2,60
3	Partially Agree	2,61-3,40
4	Agree	3,41-4,20
5	Strongly Agree	4,21-5,00

## 2.4 Research range and reliability analysis

Research could only be achieved by 40% of the staff that works at Kırkkale Courtyard. An important part of the personnel made a negative approach to participate in the study or in answering some of the questions. The biggest factor here, is the idea that they shall be indicted because they are government official. On the other hand the lack of enough practice of business ethics and social responsibility concept and definition in public institutions leads to the subjective evaluation of the subject. Therefore, the responses reflect the situation that should be, rather than the current situation. Therefore, intensive care has been taken in the evaluation of these factors in the study. Cronbach's alpha value of the study was found to be 0.697. At the surveys conducted in the social sciences the lowest reliability value is accepted as 0.70 therefore the value obtained in this study was considered to be sufficient for the internal consistency of the scale used. In order to demonstrate the significance of the difference between variables Independent Samples T and One Way Anova tests were used. In the evaluation of the data SPSS 13.00 software package is used.

## 2.5 Demographic characteristics

Demographics of the staff participating in the study are as follows. As can be seen from the Table, a substantial part of employees are from support services male staff and their time in the organization are in the ratio of 45% in 5 years.

Table 2 Demographic Variables

Variable	Level	N	%
Gender	Female	28	25,2
	Male	83	74,8
	<b>Total</b>	<b>111</b>	<b>100,0</b>
Duty	Judge / prosecutor	10	9,0
	Manager	13	11,7
	Clerk	59	53,2
	Bailiff	16	14,4
	Servant	4	3,6
	Others	9	8,1
	<b>Total</b>	<b>111</b>	<b>100,0</b>
Total Service Time	<b>Total</b>	<b>22</b>	<b>19,8</b>
	6-10 Year	24	21,6
	11-15 Year	16	14,4
	16-20 Year	23	20,7
	21 Year and Up	26	23,4
	<b>Total</b>	<b>111</b>	<b>100,0</b>
Working Time in the organization	0-5 Year	50	45,0
	6-10 Year	22	19,8
	11-15 Year	20	18,0
	16-20 Year	8	7,2
	21 Year and Up	11	9,9
	<b>Total</b>	<b>111</b>	<b>100,0</b>

## 2.6 Research findings

## 2.6.1 Assessment of business ethics in the workplace and social responsibility of the judiciary staff

Table 3 : Personnel Assessment

		N	Ort	SS
1	Kırkkale Courtyard creates Positive Relationship Between Staff	111	2,991	1,022
2	At the courthouse, the behaviors that are contradictory to the Business Ethics have Adverse Effects on the citizens.	111	3,414	1,304
3	Duties at the courthouse are in executed honestly and in time	111	3,649	0,921
4	During the Recruitment Process Ethics such as Integrity and Impartiality are taken into account	111	2,955	1,171
5	There are no profit from authority, discrimination between employees, and superiority of interests	111	2,739	1,204
6	Determining the ethical values will at least limits the crisis may be experienced	111	3,874	1,010
7	Accurate Information should be submitted to the citizens.	111	4,351	0,770
8	Premiums must be paid to the Judicial Personnel according to Business Density	111	4,568	0,782
9	Safe and Healthy Work Environment should be given to the Judicial Personnel	111	4,405	1,099
10	Kırkkale Courthouse should supports all the projects that are subjected to Business Ethics and Social Responsibility	111	4,036	1,044
AVERAGE			3,698	1,033

Average value of  $x = 3.698$  is located in the interval at the Likert scale "Agree". This result shows that business ethics and social responsibility are sufficiently developed in terms of staff. The data obtained shows that it is important to create positive relationships as well as fairness and justice in recruitment of employees ( $x = 2.955$ ). Therefore, recruitment is carried out in accordance with these principles. In terms of supplying this environment, corporate behavior such as creation of positive relationships between employees and not to allow personal interests are quite important ( $x = 2.739$ ). At the personnel management the values not to create conflicts between individuals or at least minimizing possible problems are taken in to account ( $x = 2.991$ ). All adverse events that may occur on the staff affects citizens directly ( $x = 3.414$ ). The activities that are not carried out within the framework of ethical principles will undermine confidence in the justice ( $x = 3.874$ ). Therefore all legal activities are based on fulfilling all the duties of the staff on time ( $x = 3.649$ ). Giving support to projects that are related with improving jurisdictional activities has gained significant support by the judicial staff ( $x = 4.036$ ). In this way accurate and reliable information that citizens needed will be given ( $x = 4.351$ ). To do so giving staff incentives with regarding transactions made ( $x = 4.568$ ) and he preparation of safe and healthy working environment ( $x=4,405$ ) will play an important role.

## 2.6.2 The assessment of the business ethics and social responsibility results of employees of the judiciary according to demographic characteristics

According to the T test and ANOVA test results no significant differences were observed ( $p < 0, 05$  following results were obtained) when business ethics and social responsibility in institutions of court employees compared with regard to demographic characteristics.

Table 4 Assessment by Gender

	Gender	N	Ort	SS	P
Item-1	Female	28	2,536	0,999	0,006
	Male	83	3,145	0,989	
Item-2	Female	28	3,357	1,339	0,789
	Male	83	3,434	1,299	
Item-3	Female	28	3,536	0,793	0,456
	Male	83	3,687	0,962	
Item-4	Female	28	3,036	1,261	0,675
	Male	83	2,28	1,145	
Item-5	Female	28	2,643	1,193	0,628
	Male	83	2,771	1,213	
Item-6	Female	28	4,000	0,981	0,447
	Male	83	3,831	1,022	
Item-7	Female	28	4,500	0,638	0,239

Item-8	Male	83	4,301	0,808	0,387
	Female	28	4,679	0,819	
Item-9	Male	83	4,530	0,770	0,129
	Female	28	4,679	0,819	
Item-10	Male	83	4,313	1,168	0,211
	Female	28	4,250	1,076	
	Male	83	3,964	1,029	

At the assessment made according to gender has been determined that there is a significant difference in only Article 1. For the proposal "Kırkkale Courtyard creates Positive Relationship Between Staff" women workers gave the answer ( $x = 2,536$ ) "Disagree" and male employees gave the answer ( $x = 3.145$ ), "Partially Agree".

### 2.6.3 Business ethics and social responsibility according to the task of employees

When we consider business ethics and social responsibility on the institutions of the courthouse employees according to their duty significant differences was detected between the groups for the statements in the first and sixth substance ( $p < 0.05$  level following results were obtained).

Table 5 Evaluation by Staff Duties

	One-way ANOVA test			
	Sum of Squares	Squares Avg.	F	P
Item-1	16,238	3,248	3,453	0,006
Item-2	17,709	3,542	2,198	0,060
Item-3	1,941	0,388	0,446	0,815
Item-4	17,920	3,584	2,832	0,059
Item-5	9,151	1,830	1,279	0,279
Item-6	17,329	3,466	3,834	0,003
Item-7	3,561	0,712	1,211	0,309
Item-8	5,385	1,077	1,828	0,114
Item-9	9,192	1,838	1,562	0,177
Item-10	3,118	0,624	0,561	0,730

Cross assessment of the first and sixth item are as follows ( $p < 0, 05$  following results were obtained). It will be seen that there is a difference between perceptions between the managers and clerks when first item asessed. As for the sixth item there are differences between clerks and prosecutors. Therefore, it can be said that there are no significant difference according to duty except determination of corporate ethics and positive impact on the institutional relationships.

Table 6 Assessment by Staff Duties (Anova)

Independent Variables	Duty (I)	Duty (J)	Difference Between Averages	P
Item-1	Manager	judge /prosecutor	0,015	1,000
		Clerk	0,954	0,021
		Bailiff	0,490	0,754
		Servant	0,365	0,986
		Others	0,393	0,937
Item-6	Bailiff	judge /prosecutor	-1,400	0,005
		Clerk	-0,692	0,378
		Bailiff	-1,051	0,002
		Servant	-1,000	0,419
		Others	-0,889	0,227

### 2.6.4 Assessment of business ethics and social responsibility of the courthouse employees by total service time

When we consider business ethics and social responsibility on the institutions of the courthouse employees according to their total length of service it was observed that there are significant differences for the first and eight items ( $p < 0.05$  level following results were obtained).

Table 7 Assessment by Service Time

	One-way ANOVA test			
	Sum of Squares	Squares Avg.	F	P
Item-1	12,320	3,080	3,180	0,016
Item-2	5,073	1,268	0,739	0,567
Item-3	1,462	0,365	0,422	0,793
Item-4	2,258	0,565	0,403	0,806
Item-5	7,612	1,903	1,329	0,264
Item-6	5,812	1,453	1,447	0,224
Item-7	1,608	0,402	0,669	0,615
Item-8	6,361	1,590	2,769	0,031
Item-9	5,373	1,343	1,118	0,352
Item-10	1,405	0,351	0,314	0,868

For the first proposal a significant difference was observed between the personnel that have over 21 year service time and the personnel that have 0-5 year and 6-10 year service time. For this item it is observed that business ethics and social responsibility perceptions of 21 Year and over personnel is higher than the 0-5 years of service time and 6-10 years of service time personnel. For the eight proposal a significant difference was observed between the personnel that have 6-10 year service time and 16-20 year service time. For this item it is observed that business ethics and social responsibility perceptions of the personnel that have 6-10 year service time significantly higher than the personnel that have 16-20 year service time.

Table 8 Assessment by Service Time (ANOVA)

Independent Variables	Total Service Time (I)	Total Service Time (J)	Difference Between Averages	P
Item-1	21 years and over	0-5 Year	0,909	0,06
		6-10 Year	0,792	0,042
		11-15 Year	0,438	0,630
		16-20 Year	0,457	0,488
Item-8	6-10 Years	0-5 Year	0,189	0,915
		6-10 Year	0,542	0,182
		11-15 Year	0,656	0,030
		16-20 Year	0,417	0,302

### 3. CONCLUSION AND GENERAL ASSESSMENT

To have business ethics and social responsibility or not is a result of trait and cultural heritage of human nature. Many of the problems posed by living together caused the expansion and diversification of moral issues. Therefore these increasing moral issues made necessary to the introduction of certain social arrangements in this regard. Education is the most important factor in social arrangements. The training of personnel is required for gaining and development of moral principles and concept of responsibility and the importance of it and added value of these two factors. The effectiveness and efficiency is always high at the institutions that have morally advanced and aware of its social responsibility personnel. In such work place there is harmony depending on the discipline. The level of conflict in relationships is very small and relationships based on trust and loyalty between staff and administrators are maximized. As a reflection of these two factors the relationship depends on trust shall be developed at all external environmental factors that are in relation with institutions.

In our study of business ethics and social responsibility a public institution Kırkkale Courtyard staff has been studied. In the survey although no institutional problem has discovered a trend towards the promotion of all the projects for the development of relations with citizens and professional integration has been observed. Although it is not seen a close relationship between business ethics and social responsibility by demographic factors since there are more male staff some results differs. For example as the authority and service time increases male staff approach to the concept of responsibility and ethics more positively with respect to the female staff. Similarly at the age and gender factors male staff perception for said two concepts are more positive with respect to the female staff. Because there are too much clerks at the courtyard there were problems for assessment of the staff according to their duties.

In our study it was observed that unethical behaviors may cause the court image loss and reliability will be adversely effected so it is required to fulfill the legal obligations honestly and on time. As a result business ethics and corporate social responsibility of the courthouse employees of Kırkkale is on the middle level and business ethics and social responsibility perception of the employee changes by demographic variables.

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## **SUPPLEMENTARY SAVING FOR RETIREMENT IN POLAND – PREMISES AND SOCIAL PERCEPTION**

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### **ABSTRACT**

The role of supplementary pension schemes in the light of reducing the relative level of benefits from public pension schemes in the recent years has been increasing. In Poland, only a small percentage of people participate in additional security schemes for old age although many of them realize that it is necessary in order to maintain the same standard of living. The aim of the present article is to indicate premises for additional saving for retirement in Poland and evaluate the awareness and attitude of the Polish society to participation in the market of supplementary pension schemes.

According to the results of the study, though currently the risk of poverty among young people is higher than among the elderly, who rarely are troubled by financial problems, in the future the financial status of the elderly will get worse. Polish society is gradually becoming aware of that and declares the willingness to save for retirement in the future. Yet, the percentage of participation, especially young people, in supplementary pension schemes is rather low. In the social perspective, pay rise, tax incentives, engaging employers in additional saving schemes as well as comprehensible, transparent and cheap pension products constitute the main factors which influence the development of supplementary pension schemes.

### **KEYWORDS**

Retirement, poverty, supplementary saving.

### **JEL CLASSIFICATION CODES**

H55, I3

## **1. INTRODUCTION**

The basic purpose of pension schemes is to deliver adequate retirement incomes and to allow older people to enjoy decent living standards and economic independence. European Commission formulated such assumptions in the White Paper presented in February 2012: An agenda for adequate, safe and sustainable pensions where one of major directions of pension reform in the European Union is to support supplementary retirement savings. According to this document, ageing population is a big challenge to all Member States. If their citizens live longer but without remaining professionally active and without supplementary retirement savings, it may be impossible to guarantee them adequate pension benefits as the required growth of expenditures could not be financed (European Commission 2012). Therefore, providing financial security on pension is and will be a challenge to pension schemes in the EU. Such tendencies as lowering total fertility rate, declining population in working age, in longevity, prospective retirement of baby-boomers generations (Zaidi, Grech 2007; Figari, Matsaganis, Sytherland 2011) cause changes in the demographic structure of the society. According to the forecasts of the European Commission, the EU population in working age (15–64) will lower by 48 million by 2050 and age dependency ratio will double and amount to 51% in this period (European Commission 2006). Having in mind ageing population, despite various solutions already functioning in pension schemes, assuring financial sustainability of pension schemes and adequate income on pension without too much burden for future generations poses a challenge to the EU and many countries round the world. As a result, states introduce numerous changes like: raising retirement age, introducing automatic mechanism or sustainability factors, benefit freeze, reducing privileges in special pension schemes (like for instance civil servants). Nonetheless, irrespectively of these changes, the need of complementary saving for retirement needs to be stressed (OECD 2013). It is essential since according to the study of A. Zaidi et al., by 2050 more than 30% of Europeans aged over 75 will be at risk of poverty (Zaidi, Grech 2006). For the elderly, material and financial well-being is linked to physical, social, moral or aesthetic aspects of life and greatly determine their quality of life (Flanagan 1978).

The aim of the present article is to indicate premises for additional saving for retirement in Poland and evaluate the awareness and attitude of the Polish society to participation in the market of additional pension schemes.

## 2. JUSTIFICATION FOR ADDITIONAL SAVING FOR RETIREMENT

Development of additional pension security in Poland is desired due to a number of reasons, i.e. the necessity to complement pension from the mandatory scheme and maintain the standard of living from the time of professional activity, unburden the finances of mandatory scheme (also in respect to subsidies to minimum pensions) and to make the whole pension scheme more individualized and flexible (Rutecka et al. 2014). From the individual member's perspective the key premise for participation in additional pension schemes is to assure income of expected level, particularly due to the fact that common pension schemes should fulfill only basic needs and offer a particular, but usually lower than desired, standard of living after finishing work. In this context the major goal of complementary, occupational and individual schemes is to make the pension system flexible, perceive it in a complex way and enhance the level of income over the level assured by the basic pension scheme (Rutecka 2014). Such perspective is in accordance with the theory of T. Szumlicz (2010) who defines retirement security system as a set of institutional solutions aimed at providing adequate financial resources to its members in old age.

System of complementary pension schemes realizes individual, but also social aim by protecting society from poverty and facilitating replacement of income from work with pension benefit. The role and meaning of private pension security in the recent years have been growing due to reduced old age security guaranteed by mandatory systems (Rutecka 2014; Łyskawa 2007).

Replacement rates<sup>18</sup> from the mandatory pension scheme in Poland will be low in future which results from the pension reform of 1999 with pension calculated according to the formula of defined contribution (replacing the formula of defined benefit), limited redistribution and occurrence of various career breaks during professional activity. There is also concern that due to inappropriate minimal security pension benefits from the mandatory state pension scheme may not fully protect against poverty (Rutecka et al. 2014). Replacement rate for a person aged 60 participating only in the basic, mandatory pension scheme with average income will reach only 35%. Although increasing retirement age to 67 in 2012 improved this ratio by increasing replacement rate to about 50% (Rutecka 2015), the disproportion between pension benefits calculated according to the so-called old rules (on the basis of defined benefit) and new rules (on the basis of defined contribution) is significantly higher. In 2014 the mean rate of pension benefit granted in accordance with the new rules was lower by about 1200 PLN from the one granted on the basis of the old rules (Bielawska, Pieńkowska-Kamieniecka 2015).

The issue of low pension benefits will concern mainly women who obtain lower income during their professional activity (Zaidi et al. 2006) and have longer career breaks. Above all it needs to be stated that in majority of OECD countries the issue of poverty concerns mostly young people. Relative poverty rate (defined as an income below half the national median equalised household income) among the elderly in OECD countries is lower even than in the case of the whole population (OECD 2013), though in this group more at risk are "older old" (aged 75 and more) than "younger old" (aged 66–75) and, of course, women. The figure below presents differences in AROPE – at risk of poverty or social exclusion<sup>19</sup> rates between women and men, where value over 0 means that women in this age group are at greater risk of poverty or social exclusion than men.

In the group aged below 65, the difference in poverty and social exclusion rate between women and men is insignificant. In EU-28 countries it is lower than 1.5%. In some countries (including Malta, Spain, Hungary and Finland), the risk of poverty among women aged below 65 is even lower than among men. Nonetheless, taking into consideration the mean for EU countries, poverty rate among women in relation to men grows with age and equals 4% for those aged 65–74 and over 6% for people aged over 75. In some countries the differences in the oldest age group are significant, for instance in Slovenia, Sweden and Lithuania where they reach 20%. In Poland, poverty rate among women from the oldest age groups is higher by 9% than among men.

Therefore, it is worth considering which factors have impact on this situation and why women should pay more attention to additional retirement savings. Essentially, it needs to be noted that pension benefits of women are lower than those granted to men. In 2012 in all EU countries they constituted only about 60% of pension benefits collected by men. Yet while comparing its level between countries, one may observe significant dispersion. The biggest gender gap in pensions is observed in the Netherlands (46%), Luxembourg (46%) and Germany (45%) whereas the lowest in Estonia (4%) and Denmark (7%). In Poland it accounts for 24% (Tionios

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<sup>18</sup> Relation between the first pension benefit and the last salary.

<sup>19</sup> The AROPE rate, the share of the total population which is at risk of poverty or social exclusion, is the headline indicator to monitor the [EU 2020 Strategy](#) poverty target.

et al. 2015). Also, it is worth stressing the fact that women receive lower salary and have longer career breaks due to childbirth and maternity leave as well as caring for elderly family members. Moreover, the issue of singularisation among elderly women occurs (Błędowski et al. 2012) as they live longer than men. As a result, elderly women more frequently have to incur all costs of maintaining a household which used to be shared (particularly the rent). In the European Union, 40% of women (as compared to 19% men) aged over 65 run a single-person pensioner household<sup>20</sup>.

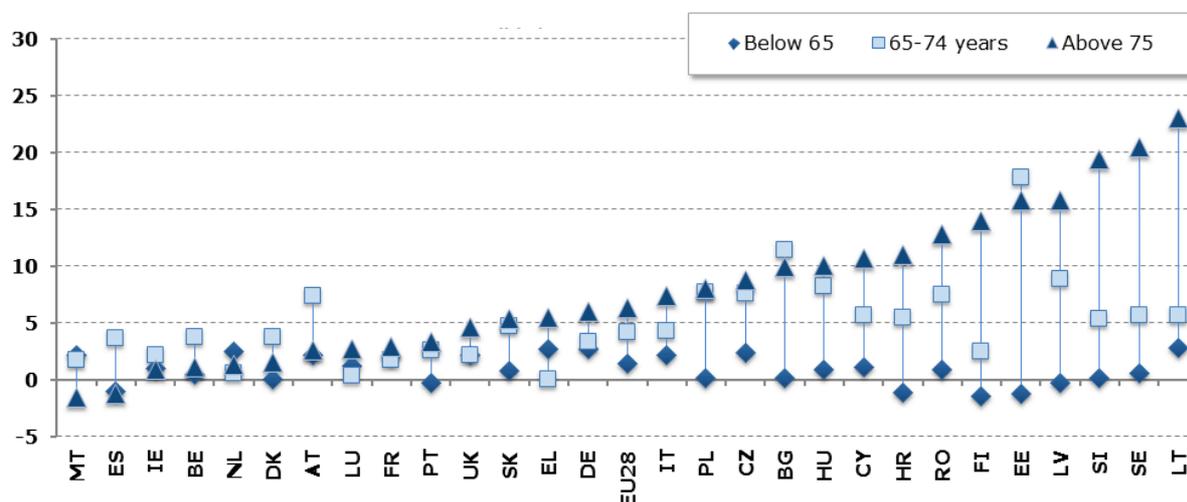


Fig. 1. Gender gap in AROPE, 2013. Source: [www.ec.europa.eu](http://www.ec.europa.eu) (21.04.2016)

While trying to answer the question whether elderly people need additional retirement security, one ought to evaluate their financial status, i.e. analyse the incomes and expenditures of this socio-economic group in the light of other social groups (Kalinowski 2014). Above all it needs to be stated that the level of available incomes in Poland (including all material and non-material incomes lessened by taxes) is growing annually. In 2010–2014 the average monthly income per person in a household increased by 8.5%. Analysing the degree of diversification of this income per capita between various socio-occupational groups it may be observed that in pensioner households<sup>21</sup> its level (1,458 PLN in 2014) is higher than the average in Poland (by 8.8%) (GUS 2015). Therefore, financial situation of households living off a pension seems relatively better as compared to others (excluding the self-employed). Nevertheless, economic evaluation cannot be based not only on the level of income, but also needs to include the level of expenditures (Błędowski 2011). Their share in the available income of pensioners reached 82.5% (this ratio was higher only among disabled pensioners – 90,1%).

However the occurring financial surplus among pensioner households does not mean that all their needs are fulfilled and their material situation is satisfactory. Also, as J. Rutecka (2015) stresses, the level of these needs changes depending on the period of occupational inactivity. The biggest pension gap reflecting the difference between the desired level of benefit and the actual pension benefit offered from the basic pension scheme is noticeable in the first stage of old age (65–75) when the pensioner tries to maintain the same standard of living as during professional activity, and in the last stage of old age, the so-called frail old age (over 85) when bigger costs are incurred for drugs and health services as well as long-term institutional care. On the other hand, expenditures associated with health, mostly treatment and drugs in Poland, in the case of pensioner households account for majority of all spendings as compared to working households. Their average monthly value per person in pensioner households in 2014 reached 99.82 PLN and it was almost two times lower than in working households (41.81 PLN). These expenditures ought to be perceived as permanent and necessary. In the face of lower financial security level from the mandatory pension scheme in Poland functioning in accordance with the new rules introduced in 1999, the concern regarding their financing is fully justified. As a result, it may be concluded that even though the financial situation of pensioner households in Poland (Szczepański 2015) is currently relatively good, in the future it may worsen in the light of ageing population (Szukalski 2008).

<sup>20</sup> [www.ec.europa.eu](http://www.ec.europa.eu) (27.04.2016)

<sup>21</sup> Pensioner households are such households for which pension benefits constitute the only or main source of income.

### 3. AWARENESS AND ATTITUDE TO ADDITIONAL SAVING FOR RETIREMENT

While studying the attitude<sup>22</sup> to retirement insurance among Poles one may cite the studies of external research centres in Poland as well as from abroad.

In 2015 Aegon for the 5th time (Aegon 2015) tried to evaluate the degree of retirement readiness among the inhabitants of selected 15 countries worldwide<sup>23</sup>, including Poland, by creating ARRI index (*Aegon Retirement Readiness Index*). Assuming such criteria as: personal responsibility for income in retirement, level of awareness of need to plan for retirement, financial understanding of financial matters regarding plans for retirement, retirement planning, financial preparedness for retirement and income replacement (level of projected income replacement), the results of the study indicate that the median of ARRI index value in the researched countries reached 5.86 (growth from 5.76 in 2014) in the scale from 1 to 10.

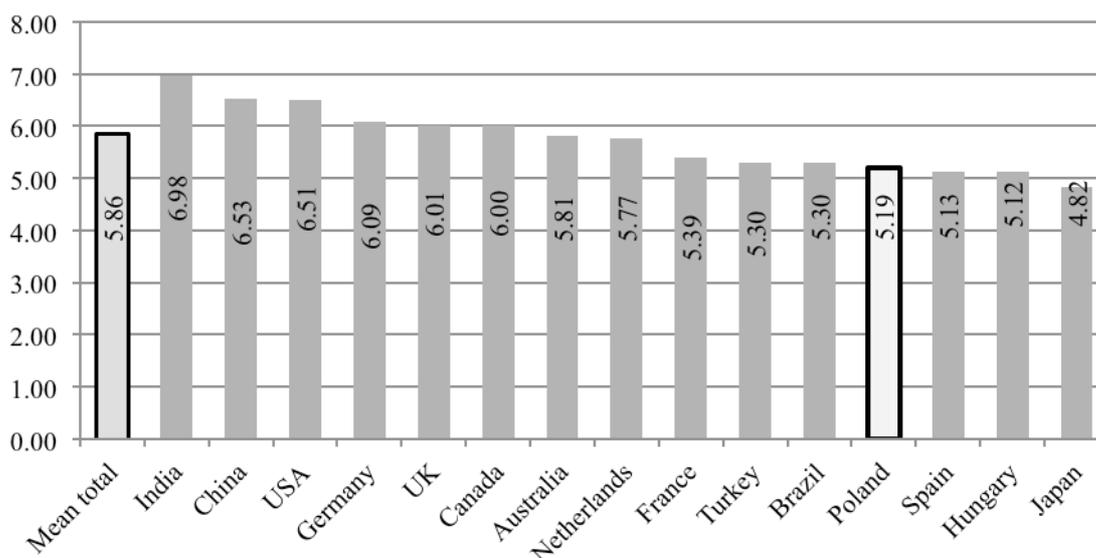


Fig. 2. ARRI index of retirement readiness in 2015.. Source: own elaboration on the basis of (Aegon 2015).

It needs to be stressed that in none of the analysed countries the index exceeded the level perceived as high (8 points), which means that one cannot claim that their societies are well prepared for the old age. The value of this index for Poland, reaching 5.19, was one of the lowest in all analysed countries, though it improved from the level of 4.63 in 2013. anxiety

Also, the latest research of TNS Poland for Nationale-Nederlanden (from March 2016) presented in the report entitled "*Skłonność Polaków do dodatkowego oszczędzania na emeryturę – mit czy rzeczywistość? (The willingness of Poles to additional saving for retirement — a myth or reality?)*" shows that it is low. Yet, on the other hand, the awareness of low old age security provided by the mandatory pension scheme is high. What is more, 75% of the subjects claim that basic pension will not suffice to cover all basic costs of living. Only one out of ten Poles claim that this benefit will assure the standard of living comparable to the one from the period of professional activity. These results may be satisfactory having in mind the findings of the Social Diagnosis 2015<sup>24</sup> according to which financial problems rarely trouble the elderly (Table 1) as compared to other age groups ( $\chi^2=697.326$ ;  $p<0.001$ ;  $V\text{-Cramer}=0.126$ ). Similar results were obtained only among people aged below 24 which may result from the fact that they are often dependants of their parents and do not need to worry about finances.

<sup>22</sup> According to the Polish dictionary (online), perception is a complex cognitive process which leads to reception of a phenomenon or process by a person.

<sup>23</sup> The study conducted on a sample of 14.4 thousand employees and 1.6 thousand pensioners from these countries in February 2015.

<sup>24</sup> It is a complex, representative Polish research on conditions and life quality of Poles in their own perspective, conducted periodically since 2000. In 2015, 34.9 thousand subjects participated in the 8th edition of the study. Poles aged over 16. See <http://www.diagnoza.com/index.html>.

Table 1. The results of relations between age and anxiety regarding financial situation (in %)

Age	Often in %	Sometimes	Never
up to 24 (n=2 432)	12.6	45.3	42.1
25–34 (n=2 887)	14.1	53.2	32.6
35–44 (n=3 349)	16.7	53.7	29.6
45–59 (n=5 859)	21.1	54.2	24.7
60–64 (n=2 265)	17.2	48.8	34.0
over 65 (n=5 238)	10.8	44.1	45.1

$\chi^2=697.326$ ;  $p=0.000$ ;  $V\text{-Cramer}=0.126$

Source: own elaboration on the basis of the Social Diagnosis 2015 study.

Nonetheless, the awareness regarding financial products for retirement saving is not satisfactory. The Poles themselves evaluate their general knowledge of investment and saving means as very low. About 44% do not have any knowledge on this subject and for 34% this awareness is very low. Only few subjects (3%) evaluated their financial knowledge as very good (CBOS 2012). This is well reflected in the results: about 50% do not have any institutionalised ways of saving for retirement (TNS Polska 2016) and among young people (aged 23–34) this percentage is even higher (reaching about 60%). This evaluation seems to fit the reality as Poles when asked about ways of collecting savings for retirement, often point to purchase of real estate, land, bank deposit or savings account. Only some of the subjects have some knowledge regarding long-term retirement saving products like investment funds, individual retirement accounts or occupational pension schemes (CBOS 2010).

While considering the willingness to save for retirement it is crucial to observe whether Poles save at all and if yes, how much they can save. The results of the Social Diagnosis 2015 indicate that in 2015 about 57% of households did not have any savings. Nonetheless, there is a positive aspect while comparing the results with 2013 — the percentage of people declaring savings increased from 40% to 43%. These savings usually do not exceed monthly income (8,1%) or income from 1–3 months (7.6%), which are foremostly collected for unexpected circumstances. Although saving for retirement is one of three major goals of saving, it needs to be observed that only one out of three saving people save additional resources for old age after they stop working.

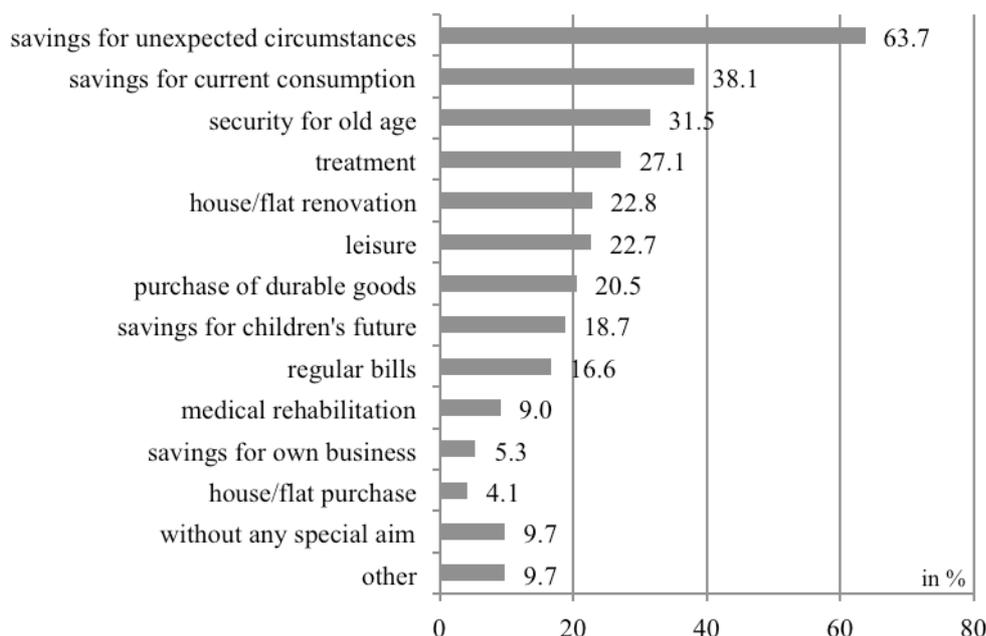


Fig. 3. Aim of collecting savings by studied households in Poland (in %). Source: own elaboration on the basis of the Social Diagnosis 2015 study.

Among those who save for future retirement, only 7.7% of the subjects save with the use of Individual Retirement Account (IKE) or Individual Retirement Security Account (IKZE) whereas only 2.9% use occupational pension schemes. These findings are intact with the data of the Polish Financial Supervision Authority (pl. KNF). According to their data, at the end of 2014 barely 824.5 thousand people owned IKE and 528.1 thousand IKZE, which constitutes 5.2% and 3.2% respectively of the whole working population. As for

occupational pension schemes, about 380 thousand Polish employees participate in little more than one thousand programs (i.e. 2.4% of the working population).

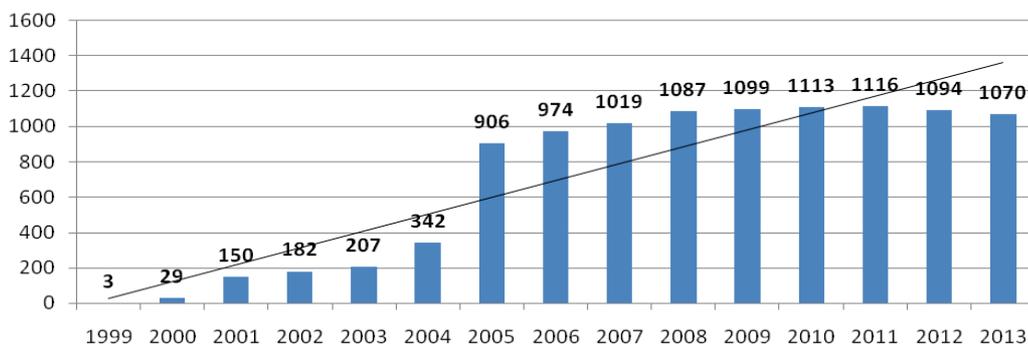


Fig. 4. Number of employee pension programs in Poland. Source: (Rutecka et al. 2014)

An optimistic observation concerns Aegon (Aegon 2015) study findings: 30% of Polish subjects are not saving for retirement at the moment, but they intend to do it in the future. Apart from Turkey and Hungary, this is third highest ratio among 15 analysed countries regarding willingness to save for retirement in the future.

Since saving for retirement ought to be started as early as possible and in Poland the issue of participation in supplementary pension schemes concerns mainly young people, it should be determined which factors could generate their greater interest in additional saving for retirement. Aegon study results (Aegon 2013) indicate that from the social perspective the best incentives for additional saving include a pay rise, tax incentives and employer's support in the form of subsidies to contributions. This may increase the role of occupational pension schemes and lead to considerations regarding automatic participation in them like in other countries, for instance UK or New Zealand.

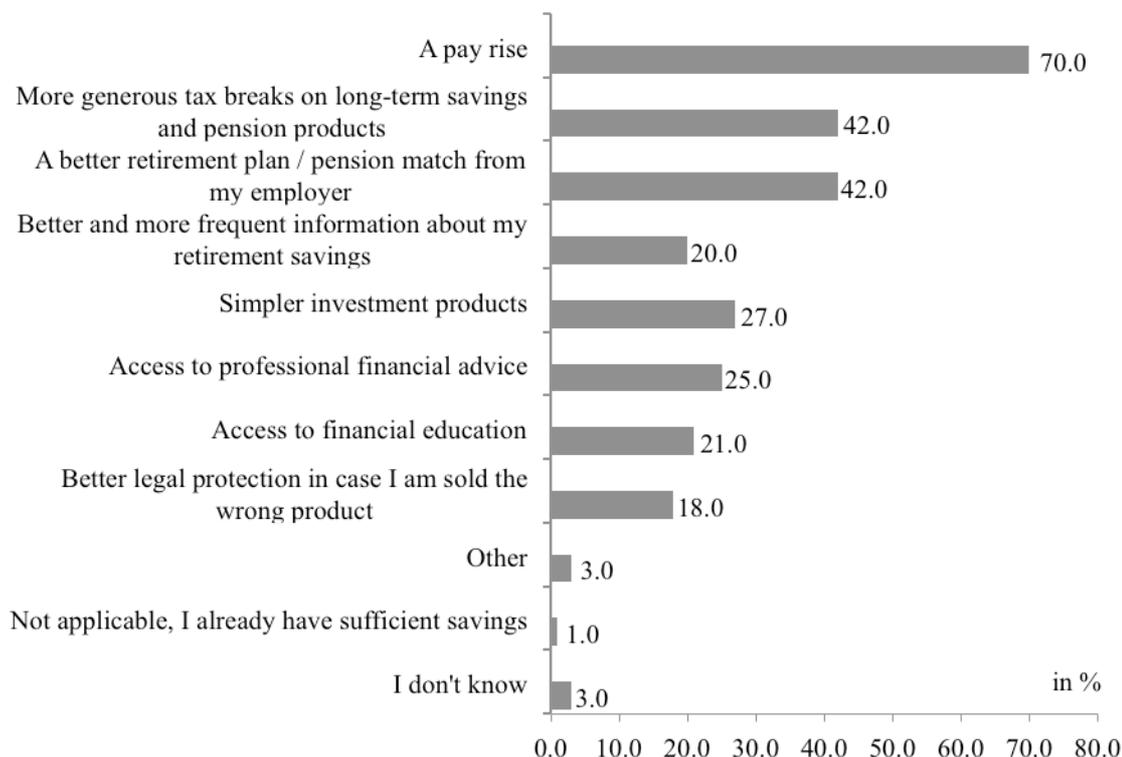


Fig. 5. Incentives to saving for retirement among young people (aged 20-29) in Poland (in %). Source: own elaboration on the basis of (Aegon 2013).

## 4. CONCLUSION

Ageing population has become a challenge to all EU countries. In the face of lowering replacement rates from mandatory pension schemes, the pressure connected with participation in additional retirement security scheme is growing. Thanks to them it will be possible to make pension schemes more flexible and adjust them to individual needs. If supplementary pension schemes do not become common, future pensioners will face a relatively difficult situation when compared to current pensioners because the gap between changed, not very high standard of retirement security and the desired benefit level will continue to widen with time (Szumlicz 2005). In additional saving for retirement and assuring adequate income in old age of key importance is the awareness of systematicity and the need to save for as long as possible. Polish society is gradually becoming aware of that and declares the willingness to save for retirement in the future. Yet, the percentage of participation, especially of young people, in supplementary pension schemes is rather low. Pay rise, tax incentives, engaging employers in additional saving schemes as well as comprehensible, transparent and cheap pension products from their members' perspective constitute the main factors which influence the development of supplementary pension schemes.

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# EUROPEAN MODELS AT A GLANCE – THE COMPETITIVENESS OF THE EUROPEAN COUNTRIES. PROBABLE LINKAGES BETWEEN EMPLOYMENT AND INNOVATION

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## ABSTRACT

After we just passed the mid-term milestone of the Europe 2020 Strategy, it's obvious that - after virtually failing to achieve the main objectives of the Lisbon Strategy – the employment and innovation objectives of Europe 2020 are still at risk. More than ten years ago, André Sapir warned the European countries to be aware of the upcoming challenges. After the examination of social policies and labour markets, it was obvious, that the group of European countries can be divided into smaller groups, based on particular indicators. Thereby, the author also evaluated the efficiency and sustainability of each member state's system. Of course, at that moment no one was able to predict the upcoming financial crisis, which was going to be an even greater challenge for Europe than the global competition. Despite the hard economic times - compared to the years before the crisis - some of the member states were able to raise its employment rate. But now, we can see that several countries are going to have long-term problems.

For the reasons outlined above, the first part of this paper reviews the system of European models, compares the member states, and examines the recent changes. The second part of this paper examines the causes of the changes in employment rates – the probable connections between innovation and its effect on employment rate. Is it really timely to search for a quantitative (only) relationship between employment and innovation?

## KEYWORDS

Employment rate, European Union, Innovative enterprises, Competitiveness, Comparative analysis

## JEL CLASSIFICATION CODES

J21, O57, O11

## 1. INTRODUCTION

There are several ways to classify European countries, as we've seen it in the past few years. However, certain groups of the European countries show the same patterns, when we examine their employment and poverty rate at the same time. In his comparative analysis, André Sapir (2006) also used these two indicators. Using the employment rates, and poverty rates (more precisely the ratio of number of people who live above the poverty threshold)<sup>25</sup>, he also distinguished between groups made from the EU-15 countries, and outlined their main characteristics in a four-group model. These country groups are the following: Mediterraneans, Continentals, Anglo-Saxons, and Nordics.<sup>26</sup>

This paper first summarises the main quantitative changes in employment, and outlines the current changes in the previously mentioned Sapir-model. It then reviews the probable quantitative connection between innovation and employment, since this quantitative approach is still a current thinking about innovation at the policy level. The final section offers some probable explanations behind the changes in the numbers and rates.

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<sup>25</sup> Hereinafter "poverty avoidance" rate (100-poverty rate). In this paper, the poverty threshold is set at 50% of the national median equivalised income, although in several papers, the cut-off point is 60% of median equivalised income after social transfers. However, this paper doesn't strive to elaborate fiscal policy, or welfare issues.

<sup>26</sup> *Nordics* (Sapir, 2006): Denmark, Sweden, Finland, Netherlands. *Anglo-Saxons*: United Kingdom and Ireland. *Continental*s: France, Germany, Austria, Belgium, and Luxembourg. *Mediterraneans*: Spain, Portugal, Italy, Greece.

## 1.1 Literature review

Most of the papers related to innovation refer to Schumpeter and his work in introducing innovation into modern economics. Schumpeter's term "creative destruction" refers to the Janus-face of innovation, when innovation "incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one" (Schumpeter, 1983, first ed. 1934). Some of the studies on interrelations of innovation and employment may also include the acceptance of this complex and versatile nature of innovation as an axiom. The absence of a broader approach of innovation often appears on different policy levels. As Makó et al. (2016) point out, despite the fact that the EU regarded innovation as a key catalyst of growth since the last 20 years, the policy making often lags behind innovation research. The authors distinguish two approaches of innovation - namely the narrow, and broad approaches. Narrow approach emphasizes (only) the importance of radical and technological innovations, and focuses on the manufacturing sector, whilst broader approach also emphasizes the importance of incremental innovations, and does not focus on technology, or any sectors. The dissonance between these two approaches also affects the measurement of innovation, as measurement is still mainly based on R&D-based indicators, and rarely include non-technological, workplace innovation or job quality indicators.

Vivarelli (2012) also argues that it is hard to measure the final innovation impact on employment with the current indicators, because of three reasons. First, traditional input and output indicators are seldom relevant enough to represent the whole innovation process, thus they are unable to estimate the final employment-related consequences. Second, the employment impact of innovation depends on institutional mechanisms, and may vary on micro-, meso- and macro levels. The author also outlines the case of intellectual property rights, as its influence on employment outcomes may vary in different countries, for instance. Third, the final employment outcome is often intangible, as employment is also influenced by other factors, such as labour market trends, macroeconomic and cyclical conditions.

Finally, it is also worth noting that in the case of the innovation-employment interrelation, several different terminologies have been made in the recent years. In his *general classification*, Christensen (2013) distinguishes three types of innovations comprehensively. The first type is called empowering innovation, which transforms expensive products into affordable ones, and creates jobs. The second type is called sustaining innovation, which replaces old products with new ones, but does not have any effect on employment. The third type is called efficiency innovation, which reduces the costs of production and distribution, and has negative impact on employment. Using a different approach, Edquist et al (2001)[(see also Pianta (2004)] analyzed the different consequences of different *types of innovations* have on employment. The authors argued that on a theoretical level, product innovation implies generation of employment, whilst process innovation has a negative effect on employment - but the overall employment impact depends on sectoral composition, meaning it differs between sectors and countries. By the same token, Antonucci and Pianta (2002) carried out an analysis on 10 industries in 8 countries, and found out that product innovation had a positive, but not significant effect on employment, and process innovation had a negative and significant effect on employment. By contrast, Lachenmaier et al. (2007) carried out a meso-level analysis, using data on the German manufacturing sector covering 20 years, and found out that with certain time lags, both types of innovation have positive effects on employment. In order to tackle relations between innovation and the proportion of skilled workers, Acemoglu (1998) argues that technical change has a robust positive effect on skilled workers (in this paper, this kind of effect is called *skill bias effect* [Evangelista and Savona, 2001]). Moreover Acemoglu (1998) revealed a pull effect that is, the "direction of technical change is determined by the size of the market for different inventions. When there are more skilled workers, the market for technologies that complement skills is larger". On the other hand Vivarelli (2012) argues that "in presence of a labor-saving and skill-biased process innovation, the scarcity of skilled labor can easily generate unemployment among the unskilled workers". By the same token, in their empirical study on the Italian service sector Evangelista and Savona (2001) proved that, at sectoral level innovation had a negative impact on employment, but the negative effect concentrated among the least skilled personnel.

Without being exhaustive, the concepts on macro- and meso-levels are the following (see *Table 1*). The analysis carried out in this paper relies mainly on the second and third columns.

Table 1. A classification of literatures

<i>Probable classification</i>	<i>General terminology</i>	<i>Effects of different innovation types</i>	<i>Skill bias effect</i>
Author (date)	Christensen (2013)	Edquist et al. (2001), Antonucci and Pianta (2002) Pianta (2004) Lachenmaier et al (2007)	Acemoglu (1998) Evangelista and Savona (2001)

## 2. BODY OF PAPER

### 2.1 Materials and methods

To update the numbers behind the Sapir-model, this paper uses not only the data on the EU-15 countries, but the current rates of the EU-28 countries (from 2005 to 2014) as well. In this paper, the Eurostat charts on employment (Eurostat, 2016a) (Eurostat, 2015b) and poverty (Eurostat, 2016b), reports on innovation (Eurostat, 2015a), and the results of 8th Community Innovation Survey were used (Eurostat, 2015c).

In the case of the scatter diagram, this study is similar to the author's analysis (Sapir, 2006) - the x-axis displays employment rate, and the y-axis denotes the poverty avoidance variable (originally referred as 1-poverty rate). Using this kind of diagram, Sapir points out that the country-groups are the following (based on their employment and poverty values – see *Figure 1*):

Figure 1. The original four-group model (Sapir, 2006)

		EFFICIENCY	
		Low	High
EQUITY	High	Continental	Nordics
	Low	Mediterraneans	Anglo-Saxons

In section 2.1.2 in order to isolate the effects of *different types of innovations*, and *skill bias effect*, this paper uses partial correlation. In order to get a correct image about the proportion of innovative enterprises 2010-2012 (Eurostat, 2015a) and employment rate 2012 (Eurostat, 2016a), three control variables were involved. These control variables are the following: 'Product innovative enterprises 2010-2012' (regardless of any other type of innovation) (Eurostat, 2015c), 'Process innovative enterprises 2010-2012' (regardless of any other type of innovation) (Eurostat, 2015c) [related to *different types of innovation*]; and "Knowledge-intensive activities - business industries 2012" (Eurostat, 2015b) [related to *skill bias effect*]. The innovation variables refer to a 2 or 3 year-long period, thus employment variables were measured in the last year of the period.

Furthermore, in order to reveal the system of the relationships between the variables and brighten the underlining theoretical structure of the whole phenomenon a factor analysis was carried out. The single aim of this factor analysis is to identify the position of each variable in the system, thus to confirm and interpret the results of the partial correlation. Each of the calculations were carried out with the Excel, or SPSS programs. In favour of prudence, this paper strives to analyse the prerequisites of partial correlation (Vargha, 2011) and factor analysis (Williams, 2010) on each variable. For preconditions, see *Table 2*.

Table 2. Prerequisites of partial correlation and factor analysis

	<i>Emp. Rate 2012 (Y)</i>	<i>Inno ent. 2010-2012 (X)</i>	<i>KIA as a % of total emp. 2012</i>	<i>Product inno ent. 2010-2012</i>	<i>Process inno ent. 2010-2012</i>
Interval scale, or higher order	✓	✓	✓	✓	✓
Mean	63,36	45,83	13,63	21,64	21,62
Standard deviation	6,36	12,44	3,99	8,61	8,06
Outliers - (Thompson $\tau$ ) - Boxplot	<i>1 outlier</i> -	<i>1 outlier</i> -	<i>1 outlier</i> 1 mild outlier	<i>1 outlier</i> -	<i>1 outlier</i> -
Kurtosis	-0,72	-0,67	1,58	-0,88	-0,83
Linear rel. between Y, X ( $\alpha=0,05$ ) (Pearson corr.)	,429 (p= ,023)	,429 (p= ,023)	,390 (p= ,040) ,742 (p= ,000)	,571 (p= ,001) ,940 (p= ,000)	,288 (p= ,138) ,867 (p= ,000)
Shapiro-Wilk t ( $\alpha=0,05$ )	,583	,123	,266	,116	,067

\*  $n=28$  ( $N:p$  ratio: 5,6:1)

### 2.1 Results

### 2.1.1 Revision of the model

The first part of this section reconstructs Sapir's analysis. The results are shown on *Figure 2*. The two sections of the figure compare years 2005 and 2014, and indicate the results for the EU-25 and the EU-28 countries. The countries where employment rate was declined in the period of 2005-2014 are underlined and marked with italics. In addition, *Table 3* also outlines the main changes in these two variables, as seen below.

Table 3. Comparison of poverty avoidance rate and employment rate 2005 and 2014.

	<i>Top 3 / bottom 3 empl. rate</i>	<i>Top decliners/ gainers</i>	<i>Mean, EU-15</i>	<i>Mean, EU-28</i>	<i>St.dev, EU-15</i>	<i>St.dev, EU-28</i>	<i>Top 3 / bottom 3 poverty avoid.</i>	<i>Mean, EU-15</i>	<i>Mean, EU-28</i>
2005	DNK (75,9)	/	65,3	63,4	5,2	6,1	FIN (95,0)	90,7	89,9**
	NLD (73,2)						SWE (95,0)		
	SWE (72,5)						CZE (94,5)		
2005	SWE (74,9)	/	65,3	63,4	5,2	6,1	POL (85,5)*	90,7	89,9**
	DEU (73,8)						LTU (85,7)		
	NLD (73,1)						ESP (86,9)		
2014	SWE (74,9)	POL +8,9	65,6	64,9	7,7	6,3	CZE (94,8)	89,6	89,2
	DEU (73,8)	MLT +8,8					FIN (94,5)		
	NLD (73,1)	DEU +8,3					NLD (94,1)		
	GRC (49,4)	GRC -10,2	(+0,3)	(+1,5)			ROU (80,9)	(-1,1)	(-0,7)
	HRV (54,6)	ESP -7,6					BGR (84,1)		
	ITA (55,7)	CYP -6,4					ESP (84,1)-		

\*Cell not includes Romania, Croatia, and Bulgaria. \*\* EU-27 values

To sum up the main findings, we may say that this period - including the years of the crisis - were rather "turbulent". The Mediterranean countries had a lower than average performance in both of the indicators, and had a trailing edge position. By the end of the period, the employment rate of the Mediterranean countries turned moderate (the group average falls from 62,0% to 55,9%), whilst the newly joined Romania (61,0%), Bulgaria (61,0%), and Croatia (54,6%) reached the same level.

Figure 2. Scatter plot diagrams. Variables: Employment rate, Poverty avoidance. Years: 2005 and 2014.



Comparing the indicators of the ten countries which joined the EU in 2004 to those of the continental countries, a closing gap can be observed. The former group consists of Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia. The increase in employment was particularly strong in the case of Poland (8,9%p), Malta (8,7%p) Hungary (4,9%p), the Czech Republic (4,2%p), and Slovakia (3,3%p). Meanwhile, from 2005 to 2014, the employment almost stagnates in France and Belgium (the growth didn't exceeded 1 percentage points).

In contrast, the employment rate in Germany and Austria increased by a considerable extent (by 8,3 percent in Germany, 3,7 percent in Austria). Besides this, the group of Nordic countries shows a slight decrease in the same period of time (the group average falls from 73,5% to 72,6%). This increase and decrease at the same time once again result a closing gap, in this case between some continental countries and the Nordics group.

What's really interesting in this analysis is the case of the Anglo-Saxon country-group. Whilst in many countries, the poverty avoidance indicator decreased (EU-15 average 90,7% to 89,6%, EU-28 average 89,9% to 89,2%), in Ireland this indicator increased by 3,3 percentage points, while the employment rate sinks strongly - by 5,9 percentage points. Besides this, the former indicator also increased in the United Kingdom by 2,3 percentage points. As a conclusion, by the end of the period, the Anglo-Saxon group disappeared from the model. Their bottom right corner position in the model was taken over by a new group called the *Baltics*. Compared with the other countries which joined the EU in 2004, in most cases Latvia, Lithuania, and Estonia have moderately high employment (66,3% 65,7% and 69,6% respectively), beside lower poverty avoidance. Nevertheless, it's important to emphasize that in the most cases, analysing employment rate by itself could be misleading.<sup>27</sup>

<sup>27</sup> In *Figure 3*, it's advised to be cautious about the position of the Baltic countries. From 2005 to 2014, employment rates in Latvia and Lithuania were raised by 4,2 and 2,8 percentage points respectively, even though approximately 84 thousand and 124 thousand employed have "disappeared" from the system (Eurostat, 2016a). Hazans (2013) estimates that the net migration rate in Latvia was between 8,2 to 8,9 percent in the period 2000-

The absence of the other 13 member states, and the employment effects of the crisis have become the key reasons in order to review Sapir's model. The result (based on the second part of *Figure 2*) includes four country-groups<sup>28</sup> and can be seen on *Figure 3*.

Figure 3. The modified four-group model (based on Sapir, 2006; own computations).

		EFFICIENCY	
		<i>Low</i>	<i>High</i>
EQUITY	<i>High</i>	Continental	Northern Europeans
	<i>Low</i>	Southern Europeans	Baltics

### 2.1.2 Emerging from the crisis: Employment impact of innovation, or other factors?

The previous part included several observations on employment, for example how countries quitted from certain country-groups, and how employment rates changed in Europe in general. This part ascertains whether innovation had any impact on these employment changes. To summarize the main changes first see *Table 4*.

*Table 4* compares the percentage point changes in the proportion of innovative enterprises with the percentage point changes in employment between 2006 and 2012. In 13 cases (from 28), the two variables moved in tandem. In other respects, the table shows incoherency, and several anomalies can be found. Although Germany still incorporates the highest proportion of innovative enterprises, this proportion decreased by a considerable extent (13,0 %p), and yet, the employment showed a robust increase (5,8%p). It is also worth noting that Poland also showed a strong increase in employment (5,2%p), but in Poland vis-à-vis Germany, the share of innovative enterprises is rather modest (26<sup>th</sup>, 23,0%), and it also showed a decreasing trend over the years (-4,9%p). This is also true for another trailing-edge innovators, such as Romania (+1,4%p increase in employment vs. -12,6%p decrease in the proportion of innovative enterprises) or the Czech Republic (+1,2%p increase in employment vs. -12,1%p decrease in the proportion of innovative enterprises). However, the fall of employment rates were particularly robust in strong innovator countries like the United Kingdom (-1,7%p vs. 4,7%p) and especially in Ireland (-9,9%p vs. +2,2%p).

2010. Similarly, Sipavičienė and Stankūnienė (2013) revealed that the accelerating migration from Lithuania caused a 12,9% of population loss from 2001 to 2011.

<sup>28</sup> *Southern Europeans* (moderate employment rate, lower poverty avoidance): Greece, Croatia, Italy, Spain, Bulgaria, Romania, and Portugal. *Continental* (moderate employment rate, higher poverty avoidance): Slovakia, Hungary, Poland, Belgium, Cyprus, Malta, France, Slovenia, Luxembourg and Ireland. *Baltics* (higher employment rate, lower poverty avoidance): Latvia, Lithuania, Estonia. *Northern Europeans* (higher employment rate, higher poverty avoidance): Germany, Austria, Czech Republic, United Kingdom, Netherlands, Finland, Denmark, Sweden.

Table 4. Main changes in the proportion of innovative enterprises and employment rate, 2006-2012.

Country name	Change in employment (%p) , 2006-2012	Change in the proportion of innovative enterprises (%p) 2006-2012	Proportion of innovative enterprises 2012, ranking	Country name	Change in employment (%p) , 2006-2012	Change in the proportion of innovative enterprises (%p) 2006-2012	Proportion of innovative enterprises 2012, ranking
Germany	5,8	-13,0	1	Hungary	-0,7	3,6	24
Poland	5,2	-4,9	26	Estonia	-1,3	-8,8	16
Malta	5,2	14,0	12	Lithuania	-1,6	2,6	23
Austria	2,8	-1,8	8	United Kingdom	-1,7	4,7	15
Luxembourg	2,2	1,4	2	Italy	-1,7	2,9	4
Romania	1,4	-12,6	28	Croatia	-2,1	-6,3	20
The Czech Rep.	1,2	-12,1	18	Slovenia	-2,5	-3,8	17
Belgium	0,8	-2,5	6	Latvia	-2,9	6,1	25
Sweden	0,7	2,2	5	Denmark	-4,8	-0,8	14
France	0,3	3,2	9	Cyprus	-5,0	-14,0	19
Slovakia	0,3	-2,1	21	Portugal	-6,2	-3,2	7
Bulgaria	0,2	-3,4	27	Spain	-9,2	-9,9	22
Finland	0,1	0,4	10	Greece	-9,8	no data	11
Netherlands	0,1	6,5	13	Ireland	-9,9	2,2	3

After the examination of the table, the main causatives remained vague. So the clearly task therefore for this paper is to clear up the too vague, single relationship between employment and innovation, which still penetrates innovation measurement. In order to examine the relationships underlying the innovation-employment correlation, partial correlations were computed on the data of the 28 member states (for theoretical basis of the variables, see *Table 1*, for methodology see *Table 2* and Section 2.1). The result are the following (*Table 5*):

Table 5. Results of partial correlations.

Partial correlation	KIA as a % of total emp. 2012	Product inno ent. 2010-2012	Process inno ent. 2010-2012
coefficient (r)	,226	-,387	,376
p-value	,258	,046	,053

\* Zero-order correlation [between "proportion of innovative enterprises 2010-2012", "employment rate 2012"] results:  $r=,429$  ( $p=,023$ ),  $\alpha=0,05$ .

A partial correlation process was run to determine the relationship between proportion of innovative enterprises 2010-2012 (Eurostat, 2015a) and employment rate 2012 (Eurostat, 2016a)<sup>29</sup> whilst controlling for:

- "Product innovative enterprises 2010-2012" (Eurostat, 2015c). There was a moderate negative partial correlation between the initial variables whilst controlling for "Product innovative enterprises 2010-2012", which was statistically significant. This indicates that the control variable had a strong, distorting influence on the relationship between the initial variables.

- "Knowledge-intensive activities - business industries 2012" (Eurostat, 2015b). There was a very weak positive partial correlation between the initial variables whilst controlling for "Knowledge-intensive activities - business industries 2012". But after controlling for "Knowledge-intensive activities - business industries 2012", the relationship became statistically non-significant, and the initial relationship is no longer certainly detectable.

<sup>29</sup> Hereinafter: Initial variables.

• "Process innovative enterprises 2010-2012" (Eurostat, 2015c). There was a moderate positive partial correlation between the initial variables whilst controlling for "Process innovative enterprises 2010-2012" (Eurostat, 2015c). Although basically between this variable and the employment rate 2012 variable there were no statistically significant correlation (see Table 2), it can be said that that the control variable had a weak cohesive influence on the relationship between the initial variables.

To better understand these results, an additional factor analysis was ran (for results, see *Table 6 and Figure 4*). According to the factor analysis, the "Knowledge-intensive activities - business industries 2012" variable was listed to a separate factor from the first factor of innovation, and also from employment, surprisingly. On the one hand, it had a moderate positive Pearson correlation (.390) with "employment rate 2012" in the beginning. On the other hand, partial correlation did not resulted a detectable relationship between the initial variables, after controlling for this variable. After examining the above mentioned results of factor analysis, it can be concluded that, knowledge-intensive activities (as a proportion of employment) did not have any demonstrated effect on the quasi-relation between innovation and employment. Although, in their essay on the Italian service sector (based on CIS2, 1993-1995), Evangelista and Savona (2001) underpinned the skill-bias effect of innovation, this paper was unable to discover such dimming effect on employment impact at EU level, on most recent data. In order to make a match for the above mentioned Italian results, another study should be taken on meso-level data. For other comments and findings, see next section.

Table 6. Results of the factor analysis

<i>Rotation sums of squared loadings</i>				<i>Rotated Component Matrix</i>	<i>Component</i>		
<i>C.n.</i>	<i>Eigenvalues</i>	<i>% of Variance</i>	<i>Cumulative %</i>		<i>1</i>	<i>2</i>	<i>3</i>
1	2,475	49,497	49,497	Process inno ent. 2010-2012	,946		
2	1,197	23,932	73,429	Inno ent. 2010-2012	,842		
3	1,179	23,574	97,003	Product inno ent. 2010-2012	,831		
* Kaiser-Meyer-Olkin value: ,747				KIA as a % of total emp. 2012		,903	
Result of Bartlett's Test: ,000				Emp. Rate 2012			,969
"Variance explained criteria" satisfied				* Rotation method: Varimax (orthogonal) with Kaiser Normalization.			
"Kaiser criteria" satisfied							

### 3. CONCLUSIONS

Fostering innovation, and thus employment is likely the major aim for any member states. It can be assumed, that the singular, quantitative relationship between innovation and employment misled the policy makers. As Makó et al. (2016) point out, the EU policies had leant towards the quantitative approach in the case of employment and innovation before 2005, although qualitative relations were also recognised earlier. Moreover, in the second phase of the Lisbon Agenda, the "better jobs" aim was discarded. This thinking in policy making also had a robust impact on innovation measurement. It is certain, that relying only on the simple innovation-employment correlation, and not articulating a broader approach in measurement is ought to be unsustainable. The changes indicated on the reviewed Sapir-model (*Figure 3*) are caused by several factors, such as:

- First, the simple reason is the cyclical reason which we cannot forget about, despite the specificity of any research. The negative employment effects are probably caused by the slow recovery from the crisis, the positive effects are probably caused by government intervention (expansionary policies, public works).
- In parallel with the recent literature, product innovation seem to have a robust impact on the innovation-employment relationship. The partial correlation controlling for product innovation resulted a negative correlation between innovation and employment. Meaning, this kind of innovation has a strong effect on employment, as it is generally a major job creator. As Edquist et al. (2001) point out, the balance between product and process innovation differs between sectors. According to this "classic" concept, those countries where there is a decline in aggregate employment, the effect of product innovation cannot counterbalance the effect of process innovation.
- It is also worth underlining again the limitations of the current innovation measurement. For instance, in his empirical study about petroleum refining Enos (1962) underpinned that process improvements resulted nearly the half of the economic outcomes connected to a new technology. Again, Edquist et al. (2001) emphasize that, some product innovations became process innovations in the later stage of economic cycle.

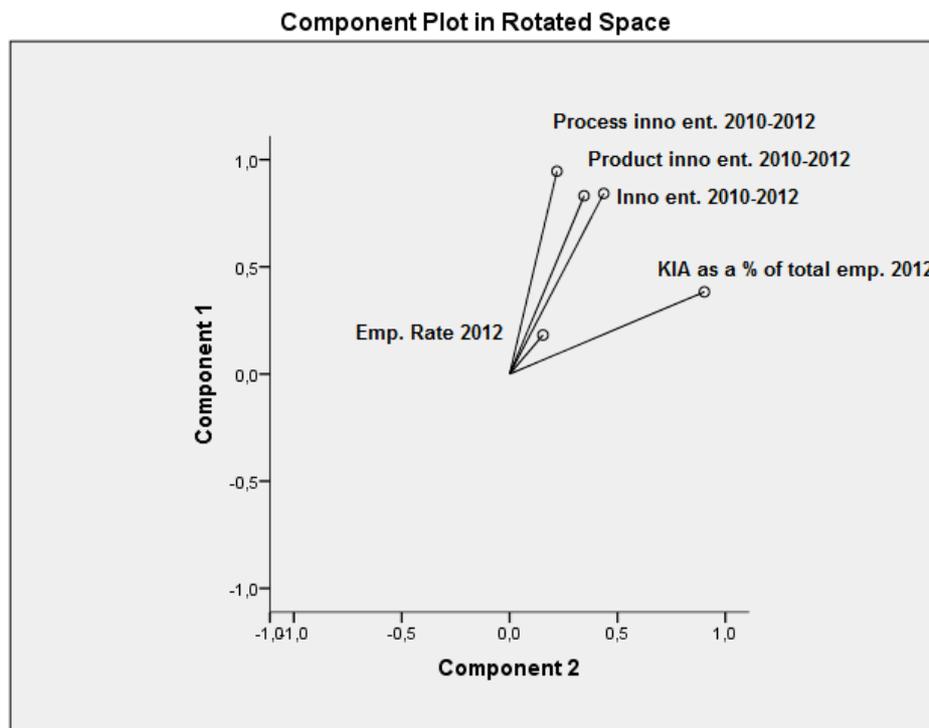
For instance, in case of investment goods, product innovations (when sold) may transform into process innovations (when used). It is also difficult to distinguish product innovation from process innovation in the service sector. The result of partial correlations and factor analysis in this paper (weak cohesive effect on initial relationship, same factor with product innovation) also underpins that process innovation therefore does not have a consequent negative impact on employment on aggregate level, moreover, the results show a slight positive impact. On the one hand, as Vivarelli (2012) rightly notes, some (microeconomic) studies cannot filter out the crowding-out effect of product innovation, called "business stealing effect" which may have a negative effect on employment at a sector-level. It's also worth noting that the aftereffects of process innovations can be compensated. For instance, on firm level, Womack and Jones (2009) or also Rother (2014) (in their essays on the proper usage of Lean) underline that, released (human)resources should be absorbed in such areas where the firm is going to grow, and they can produce value, even so it does not worth it in short term. By the same token, Edquist et al (2001, citing Johnson, 1995; and Bosworth, 1987) emphasize that on meso- and macro-levels, lowered production costs, and increasing incomes and consumption may result an increasing demand. In this case, the major factor is the size of price elasticity, which can compensate the immediate fall in employment - with time lags.

- d) This comment also is strongly connected to the above discussed case of process innovations. In the above mentioned study of Lachenmaier et al. (2007), certainly the key factor was time (covered 20 years, both types of innovation had positive effect on employment). As Christensen (2012) stated, about in the recent twenty years, investors generally concentrate on the efficiency and rapid return on investment. In other words, investors make decisions based on guidelines, which were prevalent when the capital was scarce, and despite the relative abundance of capital, they prefer efficiency innovations (which pay off in 1-2 years), instead of empowering innovations (which pay off in 5-8 years). Moreover, during the recent economic decline, certainly efficiency innovations more likely came into view. So as long as they concentrate on periods of 1 or 2 years, and measurement also applies this period, measured employment outcomes are certainly negative.

Although the single quantitative relation between innovation and employment became obsolete, and one has to deepen the research *at least* to innovation types level, the problem behind the mediocre performance in employment and innovation may lie within the other aspects of this relation. To sum up the main findings of this paper it can be said that there are three main results. First, in certain member states, increasing employment had not caused by innovation, or at least it cannot be measured with a common indicator. Second, according to the results, both types of innovation had positive effects on employment, in fact general effects of certain types of innovation (such as process innovations) are still unclear at macro-level, as outcomes may depend on sector, country, and period of investigation. Third, to identify the main problems, some parts of innovation measurement such as time factor, or aspects of innovation-employment relation - must be reformed.

The most important area for future work is to classify the countries in terms of innovation, and compare them with the reviewed Sapir-model. This would also result in a possibility to reveal the strengths and weaknesses of each countries, such potential areas, where the concept of qualitative thinking about innovation and employment will surely render effective responses.

Figure 4. Modified component plot, results of the factor analysis



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# DOES A SCHOLL PRINCIPAL HAVE A POTENETIAL FOR INNOVATIONS?

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## ABSTRACT

A global competition forces Countries to innovations. The ability or skill to generate ideas (be creative) have become an important competence of the individual. While the increase in the number of such individuals is a need for every state and each of the Companies. A creative atmosphere is very important for the innovative activity of school pupils in the future.

The study provides an answer to the question: does a school principle have a potential for innovations?

The study is carried out since 2011 to the present. It includes three areas: 1. A survey of school principals, heads of municipal education authorities and managers of other enterprises; school pupils and students; teachers and the staff of other companies. 2. The analysis of the questionnaires was both qualitative and quantitative. 3. This was accomplished a designing of a special education training for school principals. Three groups of competences were in the questionnaires:

- personal; - social (managerial ability); - managerial knowledge and skills.

Over 10 competencies were in each group for analysis. This is the result of qualitative analysis - an ideal "model" of the school principal was prepared for schools in Poland and schools in Russia. This ideal "model" includes 9 most important competencies: 3 - personal, 3 - social (managerial); 3 - knowledge and skills. Poland and Russia have differences in ideal "models". This is the result of quantitative analysis - competencies were assessed for the real school principal. Both in Poland and in Russia, the real school principal has insufficient potential for innovations: 1. creativity; 2. knowledge and skills in the theory of a managing of innovations. A result is like this: the average real school principal can't create a creative atmosphere in the school without special training.

It is the result of designing a program of special education – the program of special training was created. The training was called "Innovations in management". Goals of this training are: training creativity and training of a theory of an innovative management. The program duration is 30 hours. The program was based on the theory of an integral pedagogical process, theory of a personality structure, theory about the unity of a psychosomatic system, the theory of intertype relations, principles of intensification of training, the principle of universal giftedness, the author's method of interactive training. The program was created on the case-study, when participants generated many ideas to achieve educational goals. An experiment showed high efficiency of the special program. This is the tool of: - a development of creativity; - a training of school principals of the theory of the innovative management.

The experiment showed high efficiency a multi-purpose training as a tool to exercise creativity. The results of creativity development look fantastic. We received the growth of creativity in 4.2 times. The using of this program reduces costs of Finance and time in 3 times for a training and developing of creativity of school principals. The program is useful for creating a creative atmosphere at schools in other States: Albania, Belarus, Bulgaria, Greece, Spain, Ukraine, Croatia, etc.

## KEYWORDS

a school principal, a potential for innovations, an innovative potential, competences, a creativity, a training.

## JEL CLASSIFICATION CODES

O310, O320

## 1. INTRODUCTION

From October 2015, I was working as a Professor in Poland. And I noticed that the Polish students have no creativity at lectures and classes. They don't offer new ideas, new initiatives. It was very difficult to achieve the activity of students in the classroom. It was very interesting for me to know the cause of this problem.

Previously, I was a Professor in Russia for many years. Russian students were more active in lectures and classes, in General. I was interested: what are the reasons for passive behaviour of Polish students? Pedagogical practice has shown that Polish students can perform research and creative work. However, this requires extra effort.

It is very well known that creativity and potential for innovation are generated in the education system. The main social institution is the school where Personality is formed. I assumed that creative and innovative atmosphere is absent in Polish schools. Previously, my group and I researched key competencies of the school

principal in Russia. We found that creativity and potential for innovation are the perfect model of the school principal. The following study showed that the school principal is unable to create a creative atmosphere. He doesn't have enough knowledge and potential for innovations.

I asked myself 2 questions:

1. is there a difference in the innovative potential of school principals in the Russian Federation and the European Union?

2. does the school principal of the EU have potential for innovation?

Poland is an EU country. Therefore, a study was initiated in Poland.

The purpose of this paper was to evaluate the innovative potential of school principals in Poland. We have a good opportunity to compare the innovative potential of school principals in Poland and in Russia. This paper shows that the Polish and Russian school principals do not have the innovative potential. The expected result is the creation of a system of creativity development at schools of Poland.

The aim of further research is to assess the innovative potential of school principals in other EU countries. In other words, the next step is the extension of research to the territory of the European Union.

## 2. BODY OF PAPER

We see that the work is saturated with intelligence more and more (fig. 1).

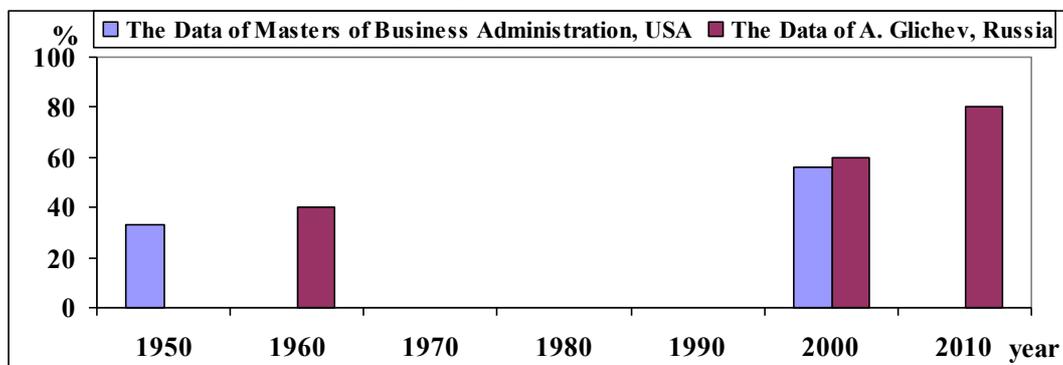


Figure 1 The growth of intellectual work, according to (Masters of Business Administration, 2009; A. Glichev, 2015)

Previously we found an interesting correlation. This is the reduction of "Creativity" with the Person's age (fig. 2.).

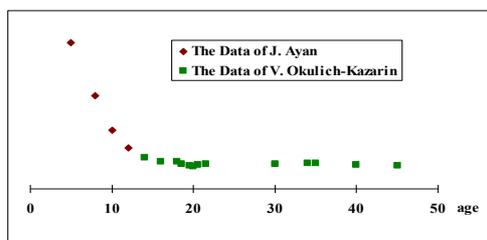


Figure 2 The dependence of "Creativity" from the age of the people (V. Okulich-Kazarin, 2008)

We see that, from 5 years to 20 years, creativity is reduced 5-6 times. And after 20 years it is reduced slowly. What is the fun in that? It is interesting and ironic that the teachers (who have more than 22 years and low creativity) to develop creativity in schoolchildren (who have less than 20 years and high creativity) (B. Окулич-Казарин, 2006). We see, who already has a low value of creativity (teachers), he/she teaches pupils and students who value creativity above. The result is in the same fig.2. There is a need to develop pedagogical innovations at school. It is necessary to explore the possibility of school principals to create pedagogical innovation at schools.

### 2.1 Methodology

While the exact methodologies used vary from field to field, the overall process is the same. We used well-documented and powerful methods of analysis. All of our methods were economically justified. We welcome alternative and non-traditional positions of researchers.

In general, we learn more than 100 scientific sources on an interesting topic. After that we choose the hot ones for a detailed analysis. The study was performed in Russia in 2011-2014 and Poland in 2015-2016. The study was performed in several stages. First, we defined the question – what exactly we were trying to find out. At this stage we made a plan of the experiment. Our key research techniques were: information research (my method is patent), theoretical research, statistical research (Masters of Business Administration, 2009), the Delphi method, polls and surveys, ranking and classification. Logical judgment was based on the principle «from details to General».

The next stage of the method is the design of an experiment. Usually a primary run of the experiment is conducted, and any changes to the experimental conditions made. Experiments are designed so that one or two variables are changed. And the effects of the change observed. In each experimental run data collection takes place, followed by data analysis.

The Delphi method was used to select the list of competences. These were selected 33 competence of the school Director for further analysis. We have divided these competencies according to the requirements of the educational standard into three groups:

1. personal competencies,
2. social competencies,
3. competencies (knowledge and skills) in the professional work of the school principal.

The competence «Creativity» (group 1) and the competence «Knowledge of an innovation theory» (group 3) were the top for us in our study.

Questionnaires for identifying core competencies of the school principal were made in accordance with the requirements of educational standards of Russia and Poland. Each of the 3 groups of questionnaires consisted of 10-12 competencies. Most of these competencies was borrowed from G. Selevko (Г. Селевко, 2016). Our questionnaires were adapted for school principals. Third, it was prepared a perfect model of the school Director. These were used questionnaires, statistical analysis and ranking to evaluate the importance of the competencies of "Creativity" and "Knowledge of an innovation theory" for the school principal in Russia (2011-2014) and in Poland (2015-2016).

Then these important competencies of the school principal were quantified. This stage showed that there is a difference between ideal and actual competencies of "Creativity" and "Knowledge of an innovation theory" in Russia and in Poland. Finally, the data is interpreted and from this, we are able to draw conclusions. And we have described a new powerful method of training and developing of the school principle's potential for innovations.

## 2.2 Literature review

Global competition has forced companies to innovate. Every minute many Companies are changing to save money. They change their structure or methods of operation, range or quality of the products, personnel policies or markets. They are doing all what we call «innovation» (В. Окулич-Казарин, 2012; V. Okulich-Kazarin, 2015).

**Innovations** is a new or significantly improved product (goods / services) or process, a new sales method or a new organizational method in business practices, workplace organization or in external relations (Федеральный Закон России, 1996, ст. 2).

The creation of a new product or service is possible through creative thinking («Creativity»).

**Creativity** is an ability to solve problems creatively, method of solution which fully or partially are not known (Энциклопедия социологии, 2009). The development of creativity is long-term, continuous process. The most important step is education. Modern mass education has not yet been able to provide conditions for realization of creative personality in the process of training and education.

It is a surprising fact: a cost "Yahoo" exceeds the value of the "General Motors" together with its factories, warehouses and staff" (Masters of Business Administration, 2010).

Therefore, it is in many economically developed countries - there is a constant demand for the services of companies, who organize corporate trainings and seminars towards the development of creative abilities of the staff. This is a more favorable solution – the formation of creativity at the education system (конова е., 2011). The uk government is focusing its education system to "ambitious but achievable task of turning the country into a world centre of creativity" (purnell j., 2006). In japanese universities programs of teachers training expanded to include special courses on theories of creativity and methods of its development (tatsuno sh., 1990). The united states also has a special strategy for the development of creativity in education (act, 1965). Innovative educational technologies are developed rapidly in other countries (конова е., 2011). We decided to investigate in eastern europe: does the school principle have a potential for innovation?

Enter the text here. Submitted papers should not be more than 6,000 words including abstract, keywords and references (the Harvard referencing rules need to be followed). Papers should be submitted in English as doc or pdf file attachments. Experts from Russia and Poland participated in the survey.

They were 414 people from Russia:

- 38 high school pupils (from the Vladimir and Rostov regions);
- 10 students, former pupils (Rostov region);
- 85 parents who work as managers (regions of Russia);
- 30 heads of Municipal education authorities (10 of the Orenburg region; 10 of the Republic of Tatarstan, 10 of the Tula region);
- 213 teachers (regions of Russia);
- 18 school principals and 1 assistant principal (regions of Russia).

They were 98 people from Poland:

- 27 students of level 1, former pupils (the region of Slaskie);
- 22 students of level 2 (the specialty of "administration");
- 49 parents are working in the public administration.

### 2.3.1 There are results of the qualitative assessment

Qualitative assessment of the competences of the school principal was carried out for Russia and Poland. An ideal model of the school principal was drawn up by the statistical research of competencies. It was as a mathematical expectation,  $M(x)$ . The ranking was used next.

The ideal model of the school principal includes 9 competencies. In the model were included competencies, which reached the top three line in each of the three groups of competences (personal competencies, social competencies, knowledge and skills in the professional work). Full the ideal model of the school principal is described in the works (Окулич-Казарин В., 2013; Okulich-Kazarin V., and Kaczyńska M., 2016) for Russia and Poland.

The model is a pedagogical fact. Statistical analysis suggests the results to be expected for society as a whole (Masters of Business Administration, 2009). This pedagogical fact has to be considered in the implementation of the state policy in education.

Next, we took into account two competencies only: "Creativity" and "Knowledge of an innovation theory". Only these two competencies were important in our study (Table 4).

Table 1. The results of qualitative assessment of key competences of an ideal model of school principals

Competencies	A rating in the model of the school Principal	
	in Russia	in Poland
Creativity (the group: personal competence)	3 (third)	8 (eighth)
Knowledge of an innovation theory (the group: knowledge and skills in the professional work)	1* (first)	7 (seventh)

\* - this is the dissenting opinion of school principals – it is an innovative component of management theory.

Table 1 reflects the demands of society on the role of the school principal.

In Russia, it is expected that the ideal school principal has an excellent knowledge of innovations in management theory – a first among the competencies for group 3 (knowledge and skills in the professional work). Also, in Russia it is expected that the school principal has a high level of creativity. The competence "Creativity" takes the 3rd line in the rating of the first group of competencies (personal competence).

These results correlate with a model of Manager in the global management systems (Окулич-Казарин В., Казаринов Ю. 2009). This ideal model is helpful to the Ministry of education of Russia and other countries. This Model helps to shape the personnel policy. It is useful to assign people to the position of the school principal and for reserve.

In Poland these two competencies are different from the model of Manager in the global management systems very much. The competencies of "Creativity" and "Knowledge of an innovation theory" is a 7-8 in the ranking of competencies (10-12 seats). We see that the Polish society has no demand for innovations from the school principal. Society in Poland is not waiting for innovative activity from the school principal. These two competencies do not correlate with the model Manager in the global management systems.

The reasons for the differences are the subject of a separate study.

Short results are:

1. The society in Russia expects the innovative activity of the school principal. This fact is consistent with global management systems.

2. The society in Poland did not believe that the innovative activity of the school principal is important. This fact is not consistent with global management systems.

### 2.3.2 There are results of the quantitative assessment

The results of quantitative evaluation are shown in table 2. This is the level of key competences at real school principals.

Table 2. The results of quantitative assessment of key competences of real school principals

Competencies	A real value as a mathematical expectation, M(x), % of the maximum value	
	in Russia	in Poland
Creativity (the group: personal competence)	56,25	60,50
Knowledge of an innovation theory (the group: knowledge and skills in the professional work)	70,50	50,34

Table 2 shows that the competence "Creativity" is lower by ~40% from the necessary level in Russia and in Poland both. The competence "Knowledge of an innovation theory" is lower by ~30% from the required level in Russia. This competence is lower by ~50% from the required level in Poland.

Table 2 gave us the answer to the question: does the school principle have a potential for innovation? We see that the school principle have no a good potential for innovation.

Short results are:

1. Competencies "Creativity" and "Knowledge of an innovation theory" are lower by ~30-50% from the required level in Russia and in Poland both. It is a fact that the school principle has no the potential for innovation. These results were obtained for Russia and Poland.

2. It is necessary to develop competencies of "Creativity" and "Knowledge of an innovation theory" for the school principal. It will develop innovations in school.

### 2.3.3 How to develop the potential of school Director for innovations

The difference between the actual competencies of school principals and requirements of the model (look at the table 2) formed the basis of a multi-purpose training. The purpose of this training is the development of creativity of school principals. This training has a duration of 30 hours. This multi-purpose training called "Innovations in management".

The basics of the training are: the theory of integral pedagogical process, theory of personality structure, the theory about the functional asymmetry of the cerebral hemispheres, the theory of the unity of the psychosomatic system, the theory of intertype relations, principles of intensification of training, the principle of universal giftedness, the author's method of interactive training. The training was created on the case-study, when participants generated many ideas to achieve educational goals.

The training was built on: the conscious creation of a tense situation; forcing participants to make decisions to achieve goals in terms of the incompleteness of the information provided; the limited time and other resources; counteraction of other participants and the teacher. Educational information is presented in such large quantities that exceed the subjective psychological capabilities of participants (Леванова Е., 2006; Миллер С., 1999; Окулич-Казарин В., Цыплакова Л., 2006; Петрусинский В., 1998; RU, патент, 2002; US, патент, 1999).

The training was tested in Russia. The results of creativity development look fantastic. We received the growth of creativity in 4.2 times. The experiment showed high efficiency a multi-purpose training as a tool to exercise creativity (Окулич-Казарин В., 2013). The cost of time and money has decreased in 3 times for the development of competencies of the school principal (Окулич-Казарин В., 2013).

Short results are:

1. The training provides an increase of creativity Director of the school very quickly and efficiently. It was received the growth of creativity in 4.2 times.

2. The cost-effectiveness of training reduces the costs of time and money for training and development of school principals in 3 times.

3. The results of the study are useful to education authorities and school principals.

## 3. CONCLUSION

These was given the answer to the question of our study: does a school principle have a potential for innovations?

1. The society in Russia expects the innovative activity of the school principal. This fact is consistent with global management systems. The society in Poland did not believe that the innovative activity of the school

principal is important. This fact is not consistent with global management systems.

2. It is a fact that the school Principle has no a potential for innovations. Competencies "Creativity" and "Knowledge of an innovation theory" are lower by ~30-50% from the required level. These results were obtained for Russia and Poland both. Therefore, these results have limited application in Russia and Poland.

3. It is necessary to develop the competencies of "Creativity" and "Knowledge of an innovation theory" for the school principal. It will develop innovations in school. The program for training and development was established for this purpose.

This multi-purpose training called "Innovations in management". The program duration was 30 hours. It was received the growth of creativity in 4.2 times.

The cost-effectiveness of training reduces the costs of time and money for training and development of school principals in 3 times. This training was implemented in Russia. And this is perhaps to use it in Poland.

4. The results of the study are useful to education authorities and school principals. The training will useful for developing of a potential for innovations at schools in other States: Albania, Belarus, Bulgaria, Greece, Spain, Ukraine, Croatia, etc.

5. It is interesting to organize joint research in other States: Albania, Belarus, Bulgaria, Greece, Spain, Ukraine, Croatia, etc. Our further goal is the organization of joint research in States: Albania, Belarus, Bulgaria, Greece, Spain, Ukraine, Croatia, etc.

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# OPERATING ROOM PROCESS: STRATEGIC GOVERNANCE TO SUSTAINABLE HEALTH SYSTEM

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## ABSTRACT

The economic and financial crisis has an important impact on the healthcare sector. Available resources have decreased, while at the same time costs as well as demand for healthcare services are rising (Mladovsky, 2012; Oduncu, 2012). Hospitals are essential components in providing overall healthcare. Hospitals consume, on average, between 50% (in Western Europe) and 70% (former Soviet Union) of the overall country's healthcare budget 'makes them the obvious targets for governments trying to cap public expenditure or to slow the rate of growth' (McKee, 2002). Management of operating rooms is a critical cost factor. Over the years, the cost of supplies in the operating room has increased. This study aims to understand whether the strategic approach proposed is able to reduce cost expenditures and to ensure the same health quality. As Agnoletti et al. demonstrated in his research, the efficiency of the Operating Room Block (ORB) can be increased by the introduction of a practical IT system which aims to analyze the Operating Room performances. This report suggests that it is possible to reduce or control inefficiency even in an efficient system. This may be also possible by translating the problem of efficiency/inefficiency to surgical lists. On a similar tone, Pandit et al. introduce the concept of "capacity" as expression of the surgical operating lists described by the minutes or hours of surgical time per week available to it. To optimize OR utilization, the surgical operating list should be based on historical surgical timing. Research in the management of operating rooms makes possible to reduce the costs of the services involved and to raise the efficiency standards of the service for the individuals and the community. However, this is only possible if the systems of data analysis and presentation are able to provide the correct information in the correct form. Knowledge is at the basis of improvement but it must be clearly understandable and easily accessible.

## KEYWORDS

Health system; Operating Room Management System, strategic governance

## JEL CLASSIFICATION CODES

M10, L23, I18

## 1. INTRODUCTION

The economic and financial crisis in Europe has an important impact on the healthcare sector. Available resources have decreased, while at the same time costs as well as demand for healthcare services are rising (Mladovsky, 2012; Oduncu, 2012).

Hospitals are essential components in providing overall healthcare. Hospitals consume, on average, between 50% (in Western Europe) and 70% (former Soviet Union) of the country's healthcare budget 'makes them the obvious targets for governments trying to cap public expenditure or to slow the rate of growth' (McKee, 2002).

Healthcare organizations are actually facing a paradoxical situation where resources are decreasing while costs and demand for services are increasing (Callahan, 1999).

Operating rooms (ORs) are critical hospital units both in terms of patient safety and in terms of expenditure. Indeed, understanding OR procedures in a hospital provides important information about how a consistent portion of healthcare resources is used (Elixhauser, 2010).

In recent years, scientific and legislative landscapes have focused their attention on the activity of the hospital surgical unit, considering it to be high risk, in terms of economic and financial consequences and in terms of patient quality concerns. This resulted in the necessity to closely monitor all tasks performed by the various health professionals who are involved in the complete surgical path of the patient. In this way, all available resources can be better allocated and managed.

It is believed that innovation leads to the introduction of the latest technology and therefore to higher costs. However, innovation can also involve organizational changes. Indeed, the problem of financial sustainability for the public health service may be enhanced with organizational rather than technological changes.

This research aims: (i) to investigate how a strategic approach arising from scientific literature could put under control the Operating Room (OR) process; (ii) to understand how this process could be sustainable through its optimization.

## **2. BODY OF PAPER**

### **2.1. Background**

A decrease in the availability of resources in the healthcare industry can be attributed primarily to negative effects of the economic and financial crisis (De Belvis, 2012). Also there has been an increase in demand for healthcare services due to demographic ageing and a rise in public expectations (demand side changes). (McKee, 2012; Rachel, 2009; Young, 2008).

The Surgical process absorbs a large amount of the facility, around 25% and the increase in costs will continue in the coming years due to the evolution of the technologies used in Operating Rooms.

But how can we foster efficiency if we don't know precisely the processes that absorb resources? How can we aspire to this widely spread management formula: 'if you can measure it, you can understand it. If you can understand it, you can control it, you can improve it' (Harrington, 1987).

Hospital managers are faced with the challenge of providing adequate healthcare services with limited resources through striving for improvements in quality. Coalescing negative impacts on the availability of healthcare resources are heightened by a widespread ignorance of management accounting matters. But little knowledge about costs is a strong source of cost augmentation (Young, 2013).

Healthcare costs are already poorly understood because there is a widely spread 'myth' that many healthcare costs are too complex to be measured accurately. This belief coupled with a general unwillingness to spend time to break down the costs of every patient's treatment is detrimental since there is clear evidence that "[p]oor costing systems have disastrous consequences" (Kaplan, 2011).

The healthcare sector is more complex than other public administration field because there are some actors involved to obtain an "health product" for the citizens. That context is normally resistant to change more than others.

An issue of great importance in a change effort in healthcare organizations is what Pettigrew and Lapsley (1994) call the "context" for change. This context encompasses the key factors influencing change, especially in organizations facing similar environmental and policy pressures. Whipp et al (1987) agree that it is important to examine not only the process of change but the context in which it occurs. This is one of the underlying principles of Pettigrew et al.'s (1992) study of the British National Health Service.

In Pettigrew and Lapsley's (1994) model, context refers to the "why" and "when" of change, including influences of both the outer context (such as economic, social and/or political events) and the inner context of each specific organization. This latter context involves an examination of how the needed changes are formulated, by whom, and how the change effort itself is managed. Such an approach distinguishes between "receptive" and "non-receptive" contexts for change.

A receptive context is one in which all parties are favorably disposed toward the change. When the reverse – a non-receptive context – exists, some parties seek to block the change. One result is an attempt to connect features of context and action to rates of adoption and change, but also to posit a relationship between capabilities for change and differences in the competitive performance of firms (Smith, 1987; Pettigrew, 1991). The Pettigrew and Lapsley (1994) model consists of a set of eight factors that must be considered in a change effort of an healthcare organization.

1. Identification of a high quality and coherent policy
2. Availability of key people to lead the change

3. Existence of long-term environmental pressures
4. Presence of a supportive organizational culture
5. Development of effective managerial and clinical relations
6. Existence of cooperative inter-organizational networks
7. Articulation of simple and clear goals
8. Stipulation of a change agenda

The development of Strategic Governance Model to better measure performance, improve efficiency, and increase accountability for results is on the agenda of many healthcare organizations. Actually nearly 41% of 3.088 respondents of the IT Survey by Teach Target (Burns, 2014) says that their companies would consider deploying projects in that field. The goal of improving efficiency and effectiveness is not only a matter of managerial rationality but is also a political issue in many OECD (Organization for Economic Cooperation and Development) countries. Indeed, more than two-thirds of OECD countries include non-financial performance data in the documentation available to managers and policy makers (internal use), and also provide reports on performance to the public (external use) (OECD, 2005).

Internally, much of the recent effort has been focused on key performance indicators (KPIs). Designed properly, KPIs not only measure performance, but create incentives that help to align individual goals with the objectives of the organization, provide valuable feedback on the progress towards these objectives, and form the basis for internal and external accountability (Cavalluzzo, 2004; Kravchuk, 1996).

Strategic Governance Model needs to be built above three milestones:

- the first one is about the knowledge of the OR process described from time perspective in order to understand the performance;
- the second one concerns costs, in order to know the cost of each phase and solution of every surgical procedures;
- the third one is the scheduling model, in order to know the best solutions to achieve the sustainability of the process for the large number of surgical procedures performed.

## 2.2. Operating Room Process Knowledge and Time Performance ORMS

As Agnoletti et al demonstrated in his research the efficiency of the Operating Room Block (ORB) can be increased by the introduction of a practical IT system embedded in an Oracle Business Intelligence Environment called ORMS (Operating Room Management System). To appreciate the advantages arising from the introduction of this IT system, we analyze the implementation of ORMS in the Forlì hospital.

ORMS approach is based on the necessity to understand the surgical path of a patient in order to know *when*, *where* and *who* takes an action on the patient. In this way was developed the IT system to record the patient pathway based on what Rotondi demonstrated (Rotondi et al. 1997) in terms of timestamps necessary to describe the Operating Room process.

Data is recorded by DRS as output made up of a series of 12 to 16 steps along the pathway from the ward to the operating room and reverse. The number of outputs depends on the path the patient follows during the OR process and data are sent to ORMS as a series of outputs. The system is able to read every step of the surgical path (McIntosh, 2006; Guerriero, 2011) and all the fractions of time between every step. Data quality is guaranteed by the introduction of data quality rules. These data quality rules overcome basic data introduction problems by excluding non-reliable data before their analysis (Agnoletti et al, 2013).

In Figure 1 is showed the view of a OR process from an Engineering point of view. The entire chart is depicted as an industrial production process where *Out* is "patient leaving", *In* is "patient entering", *ORs* is operating rooms or surgical block, *GA* is general anesthesia, *Pt/s* is patient/s, *R.R.* is recovery room, *ICU* is intensive care unit and *A or B* is different solution from the same position.

The data collected from the "production process" are analyzed by a performance model called ORMS (Operating Room Management System) that represents a clever system which aims to transform numbers in available information to healthcare managers in order to allow managerial control on the process.

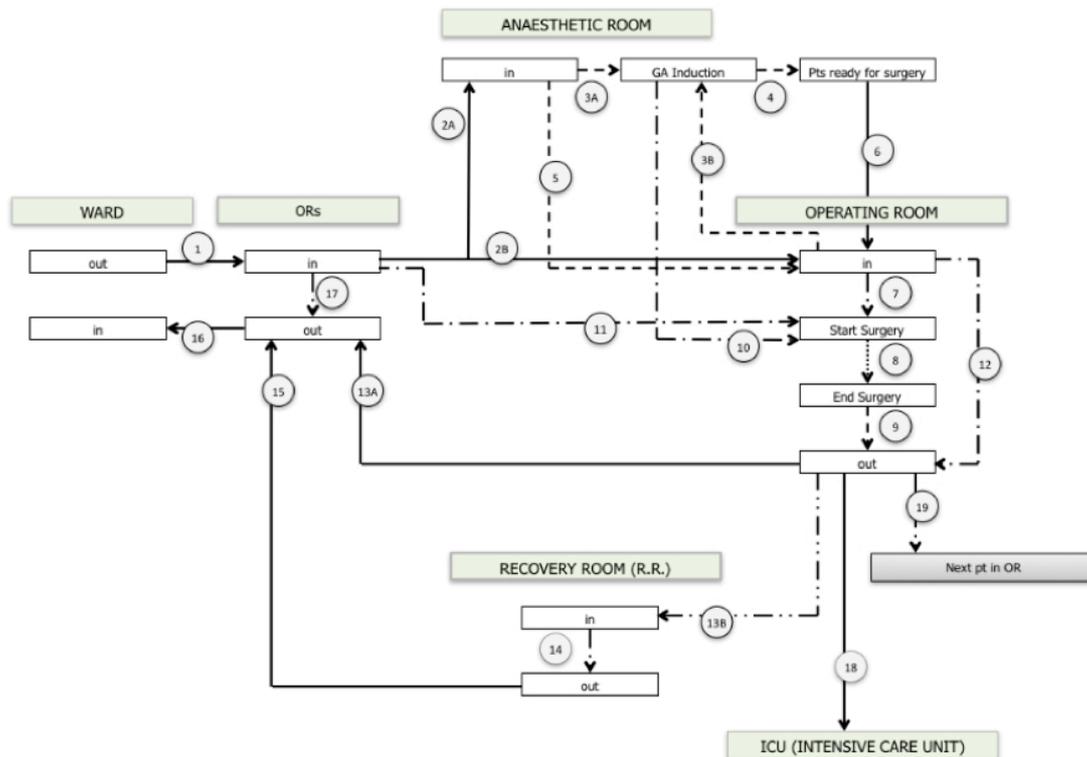


Figure 1 Flow chart of the OR process by an Engineering perspective

ORMS is built on scientific literature (Dexter et al, 2005; Macario 2006) and the approach is oriented to achieve the most information sharing between healthcare operators in order to put under the process under control. The system is divided in three main profile types: M (manager), A (anesthesiologist) or S (surgeon); each profile type can access required information in the profile content. Each profile comprises a series of subcategories where operators can access more detailed data analyses. The first data output screen shows general information and guides the user towards more detailed data analysis such as the precise surgical procedure time of every single surgical unit. The hierarchy inside the software enables the user to have a complete insight of data regarding his/her profile in a very simple and clear way. The manager's profile is accessible for hospital managers and presents data concerning the entity of operations. Within the surgeons profile the business software elaborates data which is important for both surgeons and anesthesiologists.

The driver of each analysis is the time consumption. Under the flowchart depicted in Figure 1 ORMS is able to divide the OR process into 22 pieces and each of them are analyzed in terms of average, median, minimum, maximum and standard deviation.

### 2.3. Cost Calculation Model e-HCM

The e-HCM **cost calculation** approach (Buccioli et al, 2014) is a hybrid approach situated between the traditional cost accounting method (where the accounting of resource consumption is related to bases of allocation not strictly related to the production process) and activity-based costing methods (where the accounting of resource consumption is related to the activities of the production process). Resources can be generally defined as economic elements that are applied or used to produce products or services (Young, 2008). Activities are hence recognized as causes of costs. Activity-based costing (ABC) methodology is based on the idea that **cost objects** generate activities that in turn need resources. ABC allocates costs to activities based on their resource consumption. In a second cost calculation step, activity **costs are allocated** to products or services in proportion to a selected measure of their individual workloads (cost drivers). The concept of cost driver is important in activity-based costing, where cost drivers can be defined as factors that cause changes in the cost of an activity. The internal management focus is streamlined through this accounting methodology whereas its advantages are especially evident in multi-product environments (Baker, 1998) (Chan Yee-Ching, 1993).

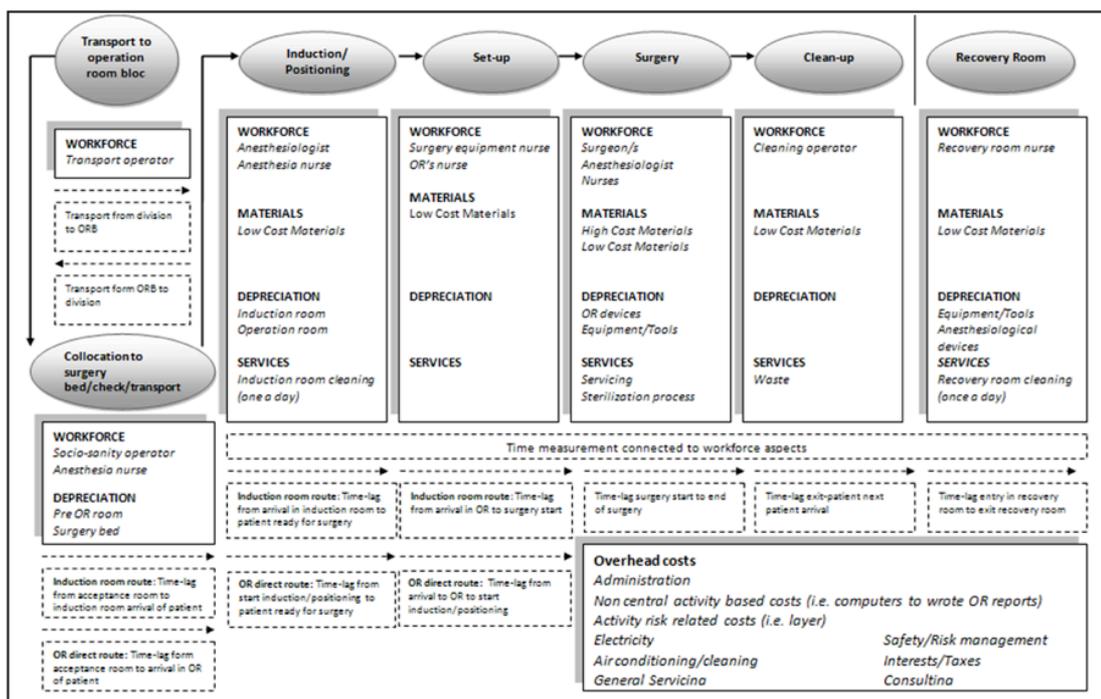


Figure 2 Flow chart of the surgical process by a costs perspective

## 2.4. Scheduling Approach

Tactical and operational planning decisions are classified as separate problems both in terms of time frame and in terms of decision making. The tactical planning process is performed, on a monthly or quarterly basis, by the hospital management board and defines the assignment of operating room slots to medical specialties. The operational planning process is performed, on a weekly basis, by the head physician which defines the scheduling of patients in the assigned operating room slots.

The approach regards the usage of time performance data produced by ORMS as the basic input to a strategic planning for the Healthcare Manager.

A tactical optimization model that calculates, on a monthly or quarterly basis, the assignment of operating room slots to medical specialties in order to minimize: (i) the length of specialties waiting lists weighted by their relative importance for patients safety, (ii) the cost overrun, and (iii) the gap between the negotiated case mix and the final one. The final objective is a tradeoff between (i) and (ii), (iii).

Then the "hospital" needs an operational optimization model that calculates, on a weekly basis, the subset of patients in the waiting list that will be scheduled for surgery treatment in order to: (a) comply with the regional guidelines related to maximum waiting time per pathology, and (b) significantly reduce the violation of time slots (overtime) and the misuse of surgical time (under-utilization) (Lodi, Tubertini, 2016).

## 2.5. Results

By the end of 2013, the system was able to track 23.503 entire patient flows from the beginning to the end. It was also able to identify the individuals who were involved in each step, and the locations where the different activities took place. The relevant key performance indicators were reported in a simple but comprehensive scorecard, which regularly shared by the OR Board with the OR Blocks's Healthcare professional.

The evaluation of the performance indicators by ORMS (Macario, 2014) showed that there is firstly an increase in the number of surgical procedure from 2009 (4574) to 2010 (5015) than an assessment since 2011 up to 2013. Indeed the raw utilization increases from 52% in 2009 to 59% in 2013. The unscheduled procedure decrease from 23% in 2009 to 11% in 2013. The overtime occurrence decrease from 30% in 2009 to 20% in 2013. The underutilization increase from 22% in 2009 to 27% in 2013.

**Table 1** Evidence from the ORB

	<b>n of surgical procedures</b>	<b>unscheduled (1)</b>	<b>overtime (2)</b>	<b>underutilization (3)</b>	<b>raw utilization</b>
<b>2009</b>	4574	23%	30%	22%	52%
<b>2010</b>	5105	16%	24%	25%	63%
<b>2011</b>	4621	14%	21%	27%	58%
<b>2012</b>	4626	13%	22%	27%	58%
<b>2013</b>	4577	11%	20%	27%	59%

**Notes:**

(1) In operating rooms the clinical risk for the patient is always very high and the first rule should be to increase the level of standardization of the process; when the surgical team works in an unscheduled way there is a lower level of standardization and thus the clinical risk increases

(2) Delay from the scheduled time to end the surgery of the last procedures of the day and the real time

(3) Time for cleaning and setting up of the operating room between two patients - benchmark in literature is 25 min

Table 2 shows the impact of the principal efficiency indicators on the raw utilization from 2009 to 2013.

**Table 2** ORB Efficiency indicators

	<b>raw utilization</b>	<b>raw utilization + start time tardiness</b>	<b>raw utilization + turnover time</b>
<b>2009</b>	52%	57%	58%
<b>2010</b>	63%	70%	69%
<b>2011</b>	58%	65%	64%
<b>2012</b>	58%	65%	64%
<b>2013</b>	59%	67%	64%

The main actor in OR is "time" and the main management goal is to allocate the right amount of time to each service on every given day in order to reduce the cost of OR process. Wang et al. described how the majority of OR cases have a normally distributed life time. According to this what is needed to improve the OR efficiency is an IT system able to record useful data to describe the Surgical Patient Pathway.

### 3. CONCLUSION

This report suggests that it is possible to reduce or control inefficiency even in an efficient system. This may be also possible by translating the problem of efficiency/inefficiency to surgical lists (Panditt et al. 2009). On a similar tone, Pandit et al. [7] introduce the concept of "capacity" as an expression of the surgical operating lists described by the minutes or hours of surgical time per week available to it. To optimise OR utilization, the surgical operating list should be based on historical surgical timing.

Research in the management of operating rooms makes possible to reduce the costs of the services involved and to raise the efficiency standards of the service to the individuals and the community. However, this is only possible if the systems of data analysis and presentation are able to provide the correct information in the correct form. Knowledge is at the basis of improvement but it must be clearly understandable and easily accessible.

There are several contributions in the international scientific literature (Landor, 1990; Dexter et al, 2005; Macario 2006) highlighting the benefits of a system able to monitor the processes that take place in the operating room and to put hospital managers in a position where they can make decisions on evidence-based collected data. Information through technological systems designed according to the theory described above allows to base decisions on objective and high quality data.

The key innovation of the project is the managerial approach based on the IT system developed to transform numbers in available information for healthcare managers. Indeed, the objective is the creation of ergonomic systems. The ergonomics of the global system is the result of pre-existing knowledge and re-engineering processes. Thanks to this aim, the methodology will be able to provide

high quality data that will guide the decision making process within the organizational structures. The concept of analysis and understanding of the processes in healthcare, after demonstrating its importance for the management of the surgery stages, could without doubt be used in other medical processes or, more precisely, in all medical processes that require quality, efficiency, economic evaluation and recording of information. An accurate account on the average time taken to complete each stage of the surgical process will allow a more precise planning, based on real-time costs and allowing better preparation of surgery lists. (Buccioli et al, *in press*)

There are many processes in healthcare that are still unclear and cannot be assessed by standard methods. However, by applying the Data Management Culture approach these processes can also be accessible and clear, allowing the improvement of the quality of service and the reduction of costs.

There isn't a single right answer for a performance dashboard in order to cover healthcare managers information needs. The core issues with any process analysis are the audience needs, the problem to be solved, the effort to get the data and the data's value. There is a balance between providing too much information and not enough. On one hand, too much information might be too dispersive like searching for a needle in a hay stack, while providing too little information might result in the lost of something important and relevant. Without a long term strategy – what decisions those numbers would enable – it's impossible to build a correct analysis and look for questions that would support those decisions. That kind of thinking is called goal, question, and metric. The use of Information Technology allows for the gathering of high-quality and objective data, able to guide hospital managers to identify the best strategies and to improve the risk management of patient safety in response to the guidelines of the World Health Organization.

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# MEANING OF THE MARKET VALUE OF COMPANY IN THE AREA OF CREDIT RISK ESTIMATION

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## ABSTRACT

Credit risk is the biggest risk which investor undergoes when he makes an investment. Generally credit risk can be defined as a risk that debtor does not pay for his debts in the total amount at the date of their maturity. It is clear that lot of factors have influence on the debtor's failure. In this paper we try to determine that one of the facts which has influence on the debtor's failure is the market value of its company. If we want to verify this hypothesis we have to use several calculations, indicators and methods for testing the dependence between variables. Testing of this dependence we will carry out in the Slovak companies which shares are public trading. As basic values which we will use for examination we chose the market value of company and ratio indicator which is known as a creditor payment period. As a test statistic we will use correlation coefficient. After we will make a decision about reject or acceptance the hypothesis whether there is a statistically significant relationship between the market value of company and the probability of debtor failure. It follows that the main sense of this paper is captured the relationship between the debtor's failure and the market value of its company. This dependence could be very important in the area of credit risk estimation.

## KEYWORDS

Credit risk, Market value of company, Creditor payment period

## JEL CLASSIFICATION CODES

G31

## 1. INTRODUCTION

Nowadays, the issue of company default is very actual topic not only in Slovak Republic but also in abroad. In the business transaction it is necessary to estimate the probability with which the debtor will repay his commitments. The situation when the debtor does not pay for his commitments is very closely linked with the issue of company's default. It is clear because we can assume if probability of company default is high, then the probability of debtor failure is also higher. (Adamko, Klietstik & Birtus, 2014), (Spuchlakova, Frajtova-Michalikova & Birtus, 2014)

In the literature we may encounter with the opinion, that the market value of company is one of the factors which have impact on the bankrupt of company. Because if the market value of company, market value of its shares and volume trading of its shares are high we can assume that the probability of default of company is low. It means when the probability of default of company is low we can estimate that the debtor failure is also low. (Frajtova-Michalikova, Klistik & Musa, 2015)

These are the reasons why in our paper we will try to capture and determine the relationship between the market value of company and the probability of debtor failure. In our paper we will test the hypothesis whether there is a statistically significant relationship between the market value of company and the probability of debtor failure. As we say above credit risk is the risk of debtor failure. This is the reason why we chose the financial ratio "creditor payment period", for determine the debtor failure in the area of credit risk estimation. (Misankova, Koscicova et al., 2014), (Cisco, 2006)

## 2. THEORETICAL BACKGROUND AND METHODOLOGY

In this part of this paper it is necessary to describe basic theoretical background of this issue. In our paper we will work with several elementary terms. As we say above *credit risk* is the probability of loss from a debtor's failure. Credit risk is the first important term with which we will work in our paper. (Misankova & Kral, 2015) The issue of debtor's credit risk will be represented by financial ratio which is known as a *creditor payment period* in this paper. (Knapkova & Pavelkova, 2010), (Dengov & Gregova, 2010) Creditor payment period is the ratio which measure the time at which a company average pays its commitments from business transaction. This ratio provides information about expected debtor payment discipline which resulting from its financial statements. Creditor payment period reflects liquidity situation of company and this ratio is depend on the following factors:

- turnover of current assets,
- working capital,
- amount of bank loans and other current liabilities.

If the company has a long maturity of account payables this condition generally indicates a problem with liquidity. Indicator of the maturity of account payables is one of the most important indicators for the creditor. It is a mirror of control of operational funding of company. Even without knowledge of sophisticated rating tools, if you sort your customers by their maturity of account payables, with a high probability you express the liquidity situation of these companies. For our calculations it was necessary to calculate financial ratio creditor payment period in every of our selected company. (Kollar & Bartosova, 2014), (Cisco & Kliestik, 2013) Formula for creditor payment period calculation is following:

$$\text{Creditor payment period} = \frac{\text{Accounts Payable}}{\text{Total Revenue}} \quad (1)$$

The second important term with which we will work in our paper is the *market value of company*. Market value of company is the value which company has on the market. In literature we can find the definition that the market value of company is the highest estimated price that a buyer would pay and a seller would accept for an item in an open and competitive market. (Koller, Goedhart & Wessels, 2010) Accounting definition says that the market value of company is the replacement cost of an item arrived at by deducting estimated carrying, delivery, and selling costs from its estimated selling price. (Damodaradan, 2011) Another definition says that the market value of company is the price at which a security is trading and could presumably be purchased or sold. We can also define the market value of company as what investors believe a firm is worth. It is calculated by multiplying the number of shares outstanding by the current market price of a company's shares. (Szilagyi & Sedlakova, 2002)

In our paper we will test the hypothesis whether there is a statistically significant relationship between the market value of company and the probability of debtor failure. This hypothesis we will test in the Slovak companies which are public traded on the foreign stock exchanges. Specifically, we will test this hypothesis on a sample of seven companies. For our calculations we chose data about their market value and their creditor payment period. Our calculations will be based on these two basic data.

The way how we calculated the market value of company shows following formula number 2:

$$MC = N \times P \quad (2)$$

Where:

MC market capitalization  
N number of shares outstanding  
P price per share

As we say above we will test the hypothesis whether there is a statistically significant relationship between the market value of company and the probability of debtor failure. Hypothesis testing will consist of the following five steps:

1. Formulation of the null hypothesis ( $H_0$ ),
2. Formulation of alternative hypothesis ( $H_1$ ),
3. Determine the level of significance,
4. Calculation of the test statistic and P-value,
5. Decision to reject the null hypothesis or its acceptance. (Rimarcik, 2007)

### 3. DATA AND RESULTS

First of all in this practical part of this paper we provide the data with which we will calculate our hypothesis. Our input data are captured in the next table number 1.

Table 1. Basic data for calculation 1 from investing.com [15.04.2016]

Company	Market Capitalization [€]	Creditor Payment Period [days]
Best Hotel Pro	112 080 000	33,51
Biotika	44 000 000	371,32
OTP Banka	5 400 000	267,20
SES TImace	3 780 000	122,75
Tatry Mountain	157 620 000	30,55
Vseobec Uver B	591 330 000	19,63
Slovnaft	1 340 000	42,49

Table number 1 shows basic data for our calculation. Table captures the market value of selected companies. Market value of company is represented by market capitalization. Creditor payment period was calculated based on the data from financial statements of selected companies. We used annual data about account payables and annual data about total revenue. At the first glance we can see that among market capitalization and creditor payment period are inverse proportional. It means that we can assume when the market value of company is high the probability of its failure is low.

Another practical part of this paper is testing the hypothesis about market value of company and its failure. This part is consisted of five steps:

1. step (Formulation of the null hypothesis ( $H_0$ )) - there is not a statistically significant relationship between the market value of company and the probability of debtor failure,
2. step (Formulation of alternative hypothesis ( $H_1$ )) - there is a statistically significant relationship between the market value of company and the probability of debtor failure,
3. step (Determine the level of significance) – our level of significance was set at 95 %,
4. step (Calculation of the test statistic and P-value) – because we had two numerical variables as basic data we used correlation coefficient as a test statistic. For the valuation of test statistic we used trial version of program SPSS statistics. Result of our P-value is captured in figure number 1:

Figure 1. Result of P-value. Own processing from trial version of SPSS statistics

		marketcapitalization	creditorpaymentperiod
marketcapitalization	Pearson Correlation	1	-,439
	Sig. (2-tailed)		,324
	N	7	7
creditorpaymentperiod	Pearson Correlation	-,439	1
	Sig. (2-tailed)	,324	
	N	7	7

5. step (Decision to reject the null hypothesis or its acceptance) – in this step number five we had to made a decision about our hypothesis based on the results from SPSS statistics. Based on these results we can state that hypothesis  $H_1$  there is a statistically significant relationship between the market value of company and the probability of debtor failure will be rejected. We had to reject hypothesis  $H_1$  because our level of significance was lower that P-value. This situation is captured in formula number 3:

$$\text{Sig. (2-tailed)} > \text{level of significance} \quad (3)$$

$$0,324 > 0,05$$

Based on the information which we state about we accepted hypothesis  $H_0$  there is not a statistically significant relationship between the market value of company and the probability of debtor failure.

In case that we change our level of significance at the 99 % we can see that the situation will be the same. This case is captured in formula number 4:

$$\text{Sig. (2 tailed)} > \text{level of significance} \quad (4)$$

$$0,324 > 0,01$$

Based on our calculation and our testing of hypothesis about relationship between the market value of company and probability of debtor failure we can state that there is not a statistically significant relationship between the market value of company and the probability of debtor failure. It means that the market value of company can be one of the factors which have impact on the failure of this company but this influence is not primary. This factor can be one of the many of secondary factors.

We will try to do one more test whether it can be assumed that the smaller difference between the market value of company and book value of its liabilities the risk of its failure will be higher. We can assume this relationship because we can say that company failure when its market value does not cover its liabilities. (Kliestik, Musa & Frajtova-Michalikova, 2015) For this calculation we need the difference between the market value of company and book value of company liabilities. And information about their creditor payment period will be the same. We use data from our selected company. Our basic data are captured in following table number 2:

Table 2. Basic data for calculation 2 from investing.com [15.04.2016]

Company	Difference between market capitalization and book value of liabilities [€]	Creditor Payment Period [days]
Best Hotel Pro	2 159 770 000	33,51
Biotika	4 050 000	371,32
OTP Banka	1 429 720 000	267,20
SES Tlmace	84 620 000	122,75
Tatry Mountain	203 300 000	30,55
Vseobec Uver B	12 034 130 000	19,63
Slovnaft	2 270 510 000	42,49

Based on the data from table number 2 we will test our second hypothesis. Our calculations will be the same as at the first hypothesis. We will have five basic steps:

1. *step (Formulation of the null hypothesis (H<sub>0</sub>))* - there is not a statistically significant relationship between the difference between market capitalization and book value of liabilities and the probability of debtor failure,
2. *step (Formulation of alternative hypothesis (H<sub>1</sub>))* - there is not a statistically significant relationship between the difference between market capitalization and book value of liabilities and the probability of debtor failure,
3. *step (Determine the level of significance)* – our level of significance was set at 95 %,
4. *step (Calculation of the test statistic and P-value)* – because we had two numerical variables as basic data we used correlation coefficient as a test statistic. For the valuation of test statistic we used trial version of program SPSS statistics. Result of our P-value is captured in figure number 2:

Figure 2. Result of P-value. Own processing from trail version of SPSS statistics

		difference MCand BVofliabilities	creditorpaymentperiod
differenceMCand BVofliabilities	Pearson Correlation	1	-,421
	Sig. (2-tailed)		,347
	N	7	7
creditorpaymentperiod	Pearson Correlation	-,421	1
	Sig. (2-tailed)	,347	
	N	7	7

5. *step (Decision to reject the null hypothesis or its acceptance)* – in this step number five we had to make a decision about our hypothesis based on the results from SPSS statistics. Based on these results we can state that hypothesis H<sub>1</sub> there is not a statistically significant relationship between the

difference between market capitalization and book value of liabilities and the probability of debtor failure will be rejected. We had to reject hypothesis  $H_1$  because our level of significance was lower than P-value. This situation is captured in formula number 5:

$$\text{Sig. (2-tailed)} > \text{level of significance} \quad (5)$$
$$0,347 > 0,05$$

Based on the information which we state about we accepted hypothesis  $H_0$  there is not a statistically significant relationship between the difference between market capitalization and book value of liabilities and the probability of debtor failure.

### 3. CONCLUSION

This paper provides selected information about issue of credit risk estimation. In this paper we tried to test the hypothesis whether there is a statistically significant relationship between the market value of company and the probability of debtor failure. But this hypothesis was rejected. It means that the market value of company is one of the factors which have impact on the credit risk of company but this is not a primary factors. This was the reason why we tried to test another hypothesis there is a statistically significant relationship between the difference between market capitalization and book value of liabilities and the probability of debtor failure. But the situation was the same as the first hypothesis. In both of case our level of significance was 95 %. Finally we can state that the market value of company and also the difference between the market value of company and the book value of its liabilities do not have significant impact on the credit risk of this company.

### ACKNOWLEDGEMENT

The contribution is an output of the science project VEGA 1/0656/14 - Research of Possibilities of Credit Default Models Application in Conditions of the SR as a Tool for Objective Quantification of Businesses Credit Risks.

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Software IBM. SPSS - software and solutions for predictive analysis.

## FINANCIAL INCENTIVES FOR RESEARCH AND DEVELOPMENT PRACTICES IN TURKEY

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### ABSTRACT

Provided financial incentives for research and development are extremely important. To realize approved research and development projects are always difficult without financial support of governments. In Turkey, even if there are a certain government support practices for Research and Development expenditures to Corporate Turkey, it may still be far from to meet the minimum requirements. For this purpose, in this study, government incentives for Research and Development activities of Corporate Turkey will be examined and analyzed. In addition, we will discuss Turkish Government expenditures about Research and Development, in general.

### KEYWORDS

Financial incentives, Research & Development expenditure, Financial supports

### JEL CLASSIFICATION CODES

M10, O30, O32

## 1. INTRODUCTION

Due to lack of enough private equities and capital stock, entrepreneurship, innovation, science and technology oriented new studies and research and development activities must be supported governments to sustain economic development in developing countries. Encouraging businesses to produce more value added products and services and to employ more advance production process and technics, governments must provide some ingenious financial and know-how support. Further, making acceleration possible in research and development activities will contribute both to national economy and competitiveness of companies. Also, the effective use of resources will help to adopt national and regional businesses into international competition.

There are two known resources are used in financing activities. These are equity financing and liabilities. Moreover support and incentives donated by the state in recent years will make a positive contribution to business financial structure.

Globalization together with technology, internet, mobile systems, and developments in social media has not only affected the production process of the companies, but also affected their marketing and consumer habits. Businesses are required to have strong financial resources to adapt to this rapid change and development. Therefore, the importance of government incentives to businesses is gaining a serious momentum. In developed countries support and encouragement activities are necessary to ensure economic development by building brand notion and to increase export capacity in small and medium sized firms.

In developed European countries, business growth generates innovations which respectively create quality projects and high-tech products and services supported by their own governmental incentive systems for medium and large businesses. In US and developed EU countries, provision of support to their businesses through public or national and global funding means minimizes differences in regional and social development.

## 2. RESEARCH AND DEVELOPMENT EXPENDITURES IN TURKEY

In recent years, it is observed that interest towards R&D and innovation activities has been increasing in knowledge-based developing economies. When Turkish Statistical Institute's data is examined, it is understood that share of gross domestic expenditure on R&D in gross domestic product (GDP) has increased and R&D activities have become much more important over the years as in many developing countries. This increase is also supported by public incentives statistics (Ozturk and Zeren, 2015). The R&D expenditures are considered as an investment in new technologies, and knowledge base systems which is transformed into more efficient production methods for available resources. If the higher level of R&D expenditures succeeds, the higher level of growth rates might be expected (Tuna, Kayacan and Bektaş, 2015).

Several approaches have been adopted to study the relation between R&D expenditure and economic performance. Most scholars have worked on related R&D outlays with productivity, output or economic growth. Several of studies have also generated private or social rates of return to R&D expenditure. Some scholars have estimated the contribution of R&D activities to economic growth through a growth-accounting framework by working with R&D stocks and estimated or assumed rates of return (Goel, Payne and Ram, 2008). Also research and development (R&D) describe as a tool of strategic growth. The world's best known companies have a common character is to develop and introduce new products faster and cheaper than their competitors. As a matter of fact, effective product innovation is the key to growth, even survival, for almost every business (Holtzman, 2008).

According to the survey results in public sector, business enterprise sector and foundation universities and calculations based on higher education sector registers for state universities, Gross Domestic Expenditure on Research and Development increased from 13.4% and to 14 billion 807 million TL in Turkey in 2013 compared to the year of 2012. Share of R&D in GDP was 0.95% in 2013. It was 0.92% in 2012 (see Table 1). Despite the share of R&D in GDP has increased by years which are still less than 1% in Turkey. This ratio is above 2% in the Euro Area, approximately 3% in United States, above 3% in Japan and %4 in South Korea. The countries where this share is high are developed countries. So there is still a distance to reach the 2023 targets as a nation. (Bozkurt, 2015)

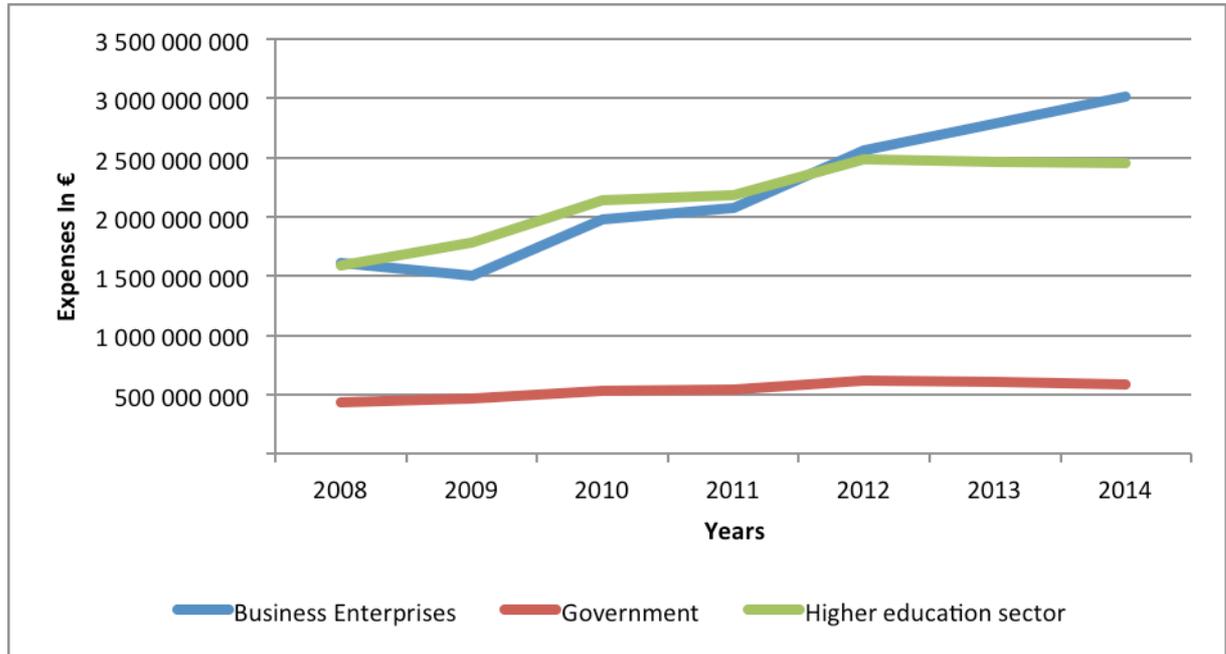
Table 1. Gross Domestic Expenditure on R&D in Turkey (% of GDP) Year R&D

Year	R&D	Total R&D (TL)
1998	0,37	260.422.137
1999	0,47	489.162.882
2000	0,48	789.437.970
2001	0,54	1.291.891.387
2002	0,53	1.843.288.038
2003	0,48	2.197.090.032
2004	0,52	2.897.516.250
2005	0,59	3.835.441.076
2006	0,58	4.399.880.662
2007	0,72	6.091.178.492
2008	0,73	6.893.048.199
2009	0,85	8.087.452.600
2010	0,84	9.267.589.617
2011	0,86	11.154.149.797
2012	0,92	13.062.263.394
2013	0,95	14.807.321.926
2023	3,0	85.000.000.000

Source: Bozkurt, 2015

After emphasized the importance of R&D on growth, there is need to observe the R&D expenditures of Turkey. Here are some statistics of Turkey below.

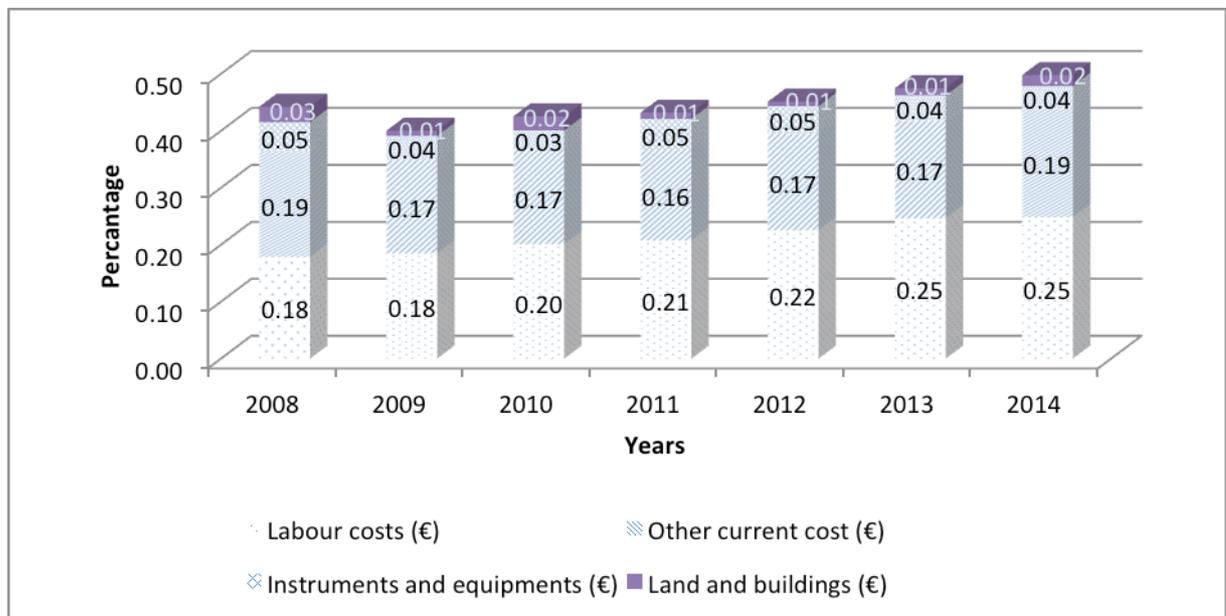
Figure 1. Trends On R&D Activities During 2008-2014 In Turkey



Source: www.tuik.gov.tr (accessed 10.04.2016)

Figure 1 shows the R&D expenditure trends of some sector. Between the years 2008-2014 R&D expenses have increased steadily. However, the highest increase occurred in higher education and commercial activities. R&D expenditures are still staying at the level of € 500 million each year made by the government. On the other hand higher education sector expenses increased alternately between € 1,5 billion - € 2,5 billion. Similarly, private sector's R & D expenditures reached to € 3 billion.

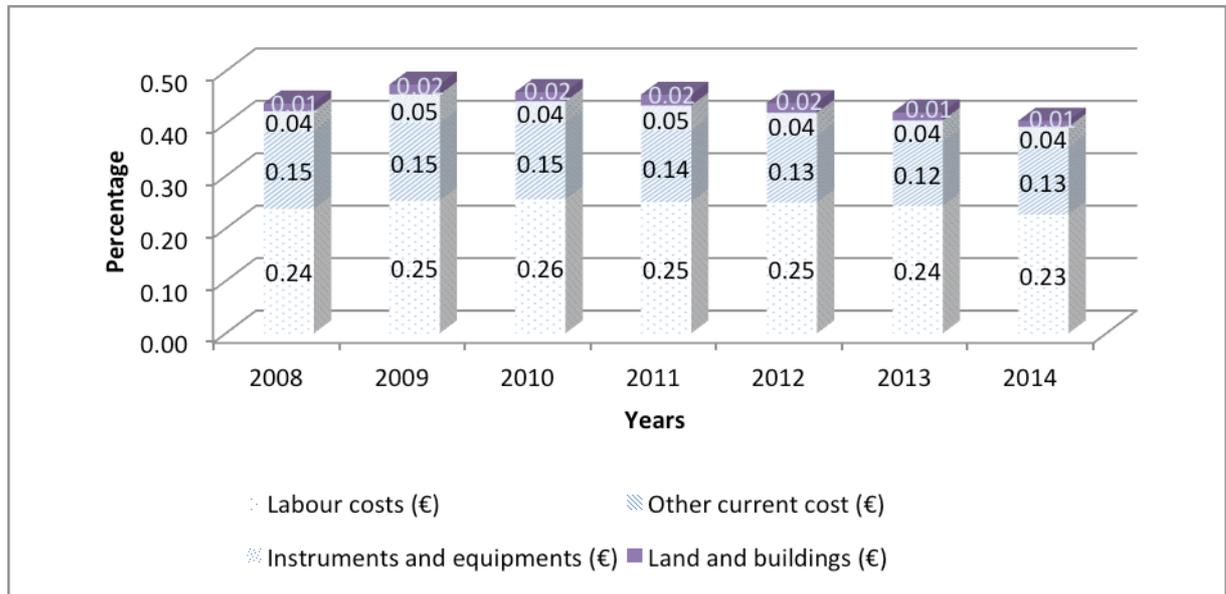
Figure 2. Percentage of Business Enterprises R&D Expenses



Source: www.tuik.gov.tr (accessed 10.04.2016)

The R&D expenditure examined in Figure 2 is clearly showing that the labor costs paid proportionately more by the private sector. Current expenditures heavily contain labor costs. Commercial enterprises in the total R&D expenditure decrease from 44% to 40% after falling in 2009, has been rising steadily in 43-43-45-47 and 50% next 5 years. In this increase the share of labor costs are quite high.

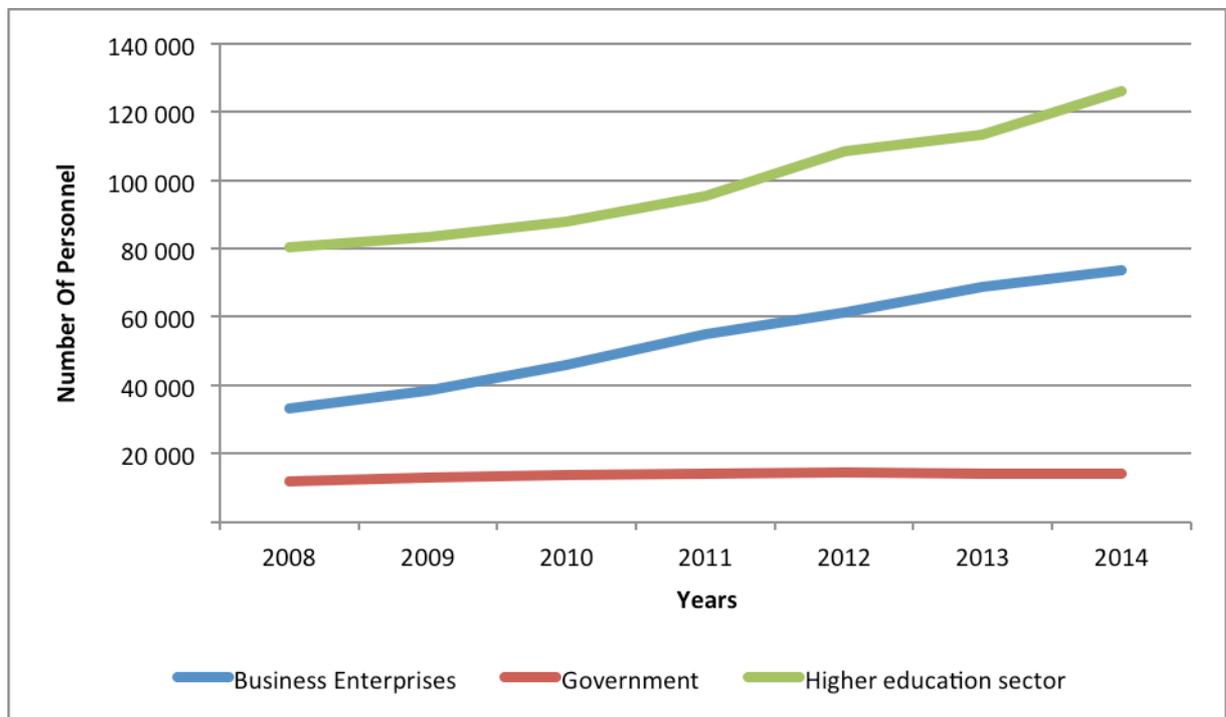
Figure 3. Percentage Of Higher Education Sector R&D Expenses



Source: www.tuik.gov.tr (accessed 10.04.2016)

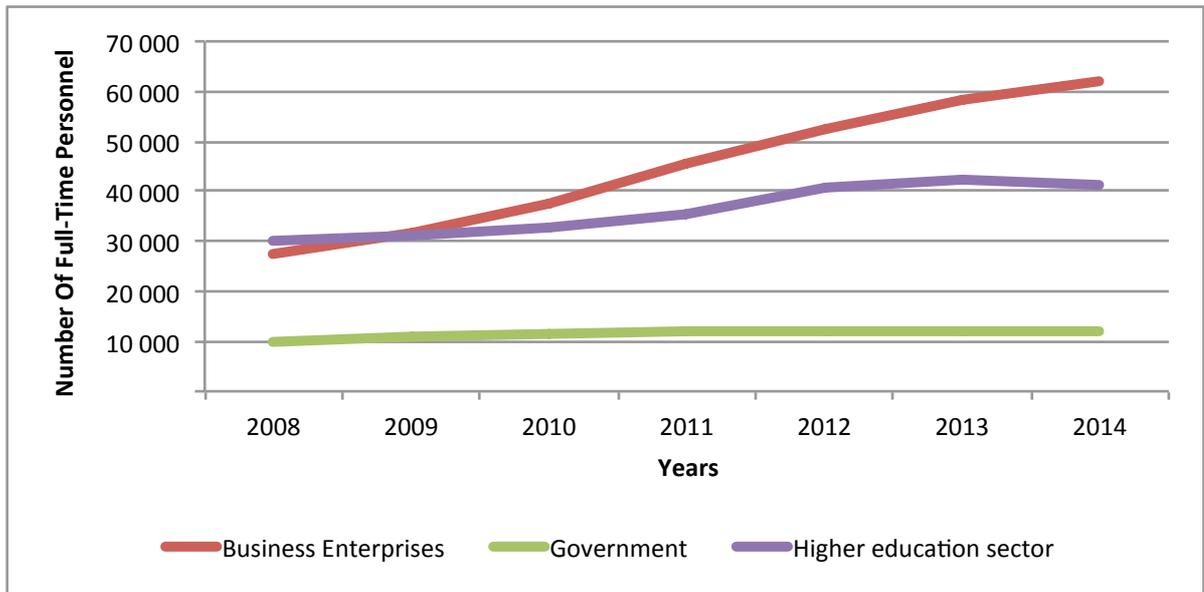
The distribution of expenditure on R & D in higher education is seen in Figure 3. Percentage of higher education in total R&D expenses increased from 44% to 47%, but then decreased steadily down to 41%. However, labor costs have been in continuous upward trend in the observed years.

Figure 4. R&D Personnel during 2008-2014 in Turkey



Source: www.tuik.gov.tr (accessed 10.04.2016)

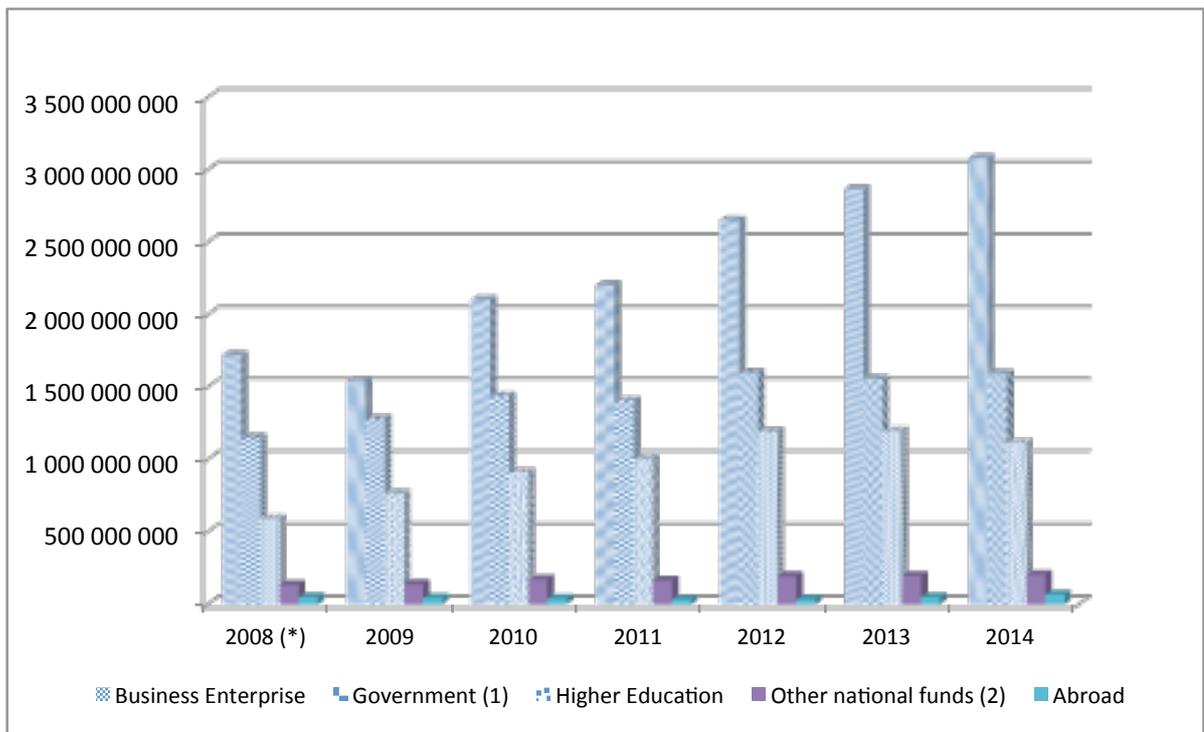
Figure 5. R&D Full-Time Personnel during 2008-2014 in Turkey



Source: www.tuik.gov.tr (accessed 10.04.2016)

For figure 4, although R&D expenses of the private sector were higher, the numbers of people working in R&D activities were more in higher education. However, considering the full-time working hours, according to the R&D staff reveals a different situation. Accordingly, the amount of R & D personnel in higher education is higher while the amount of full-time personnel is higher in the private sector in according to the both figures 4 - 5.

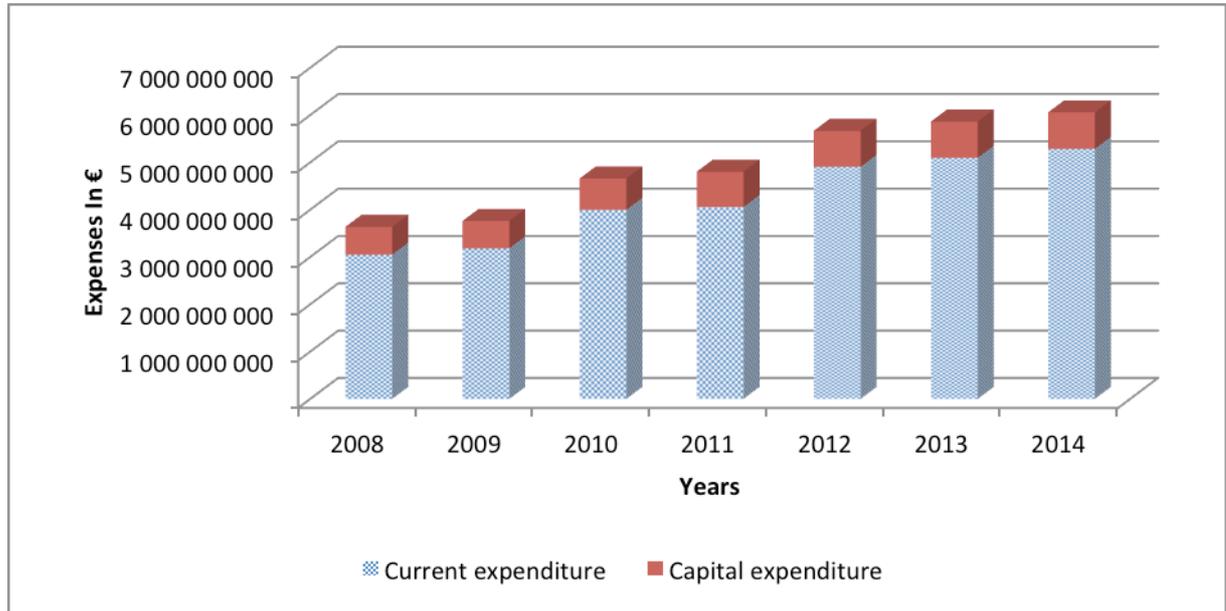
Figure 6. R&D Expenditure by Source of Funds during 2008-2014 in Turkey



Source: www.tuik.gov.tr (accessed 10.04.2016)

If we look at the R & D activities we see that the provision of support to domestic sources is being used by commercial funding sources. The second highest source of funds was public.

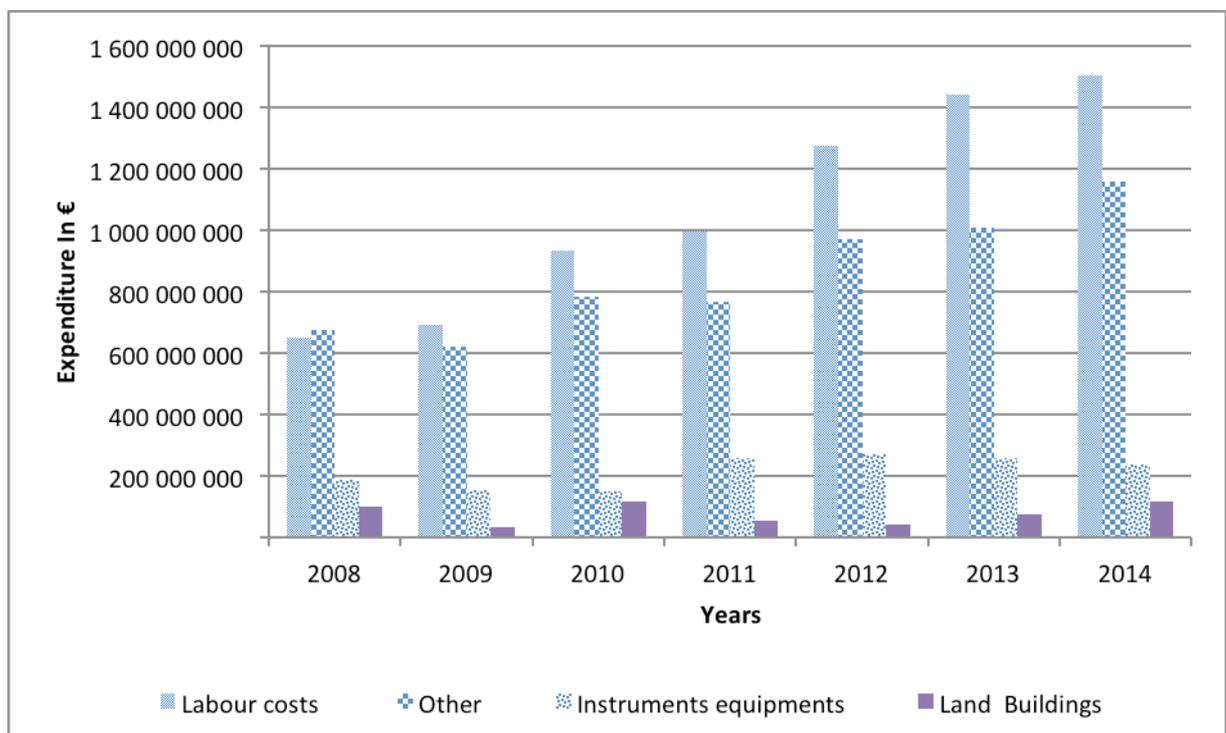
Figure 7. Total and Percentage of R&D Expenditure by Type of Expenditure



Source: www.tuik.gov.tr (accessed 10.04.2016)

According to the figure 7 it shows totals and percentages of R&D expenses by year and types of expenditures. Current R&D expenditures have the highest ratio. Labor draws attention with the highest expenses.

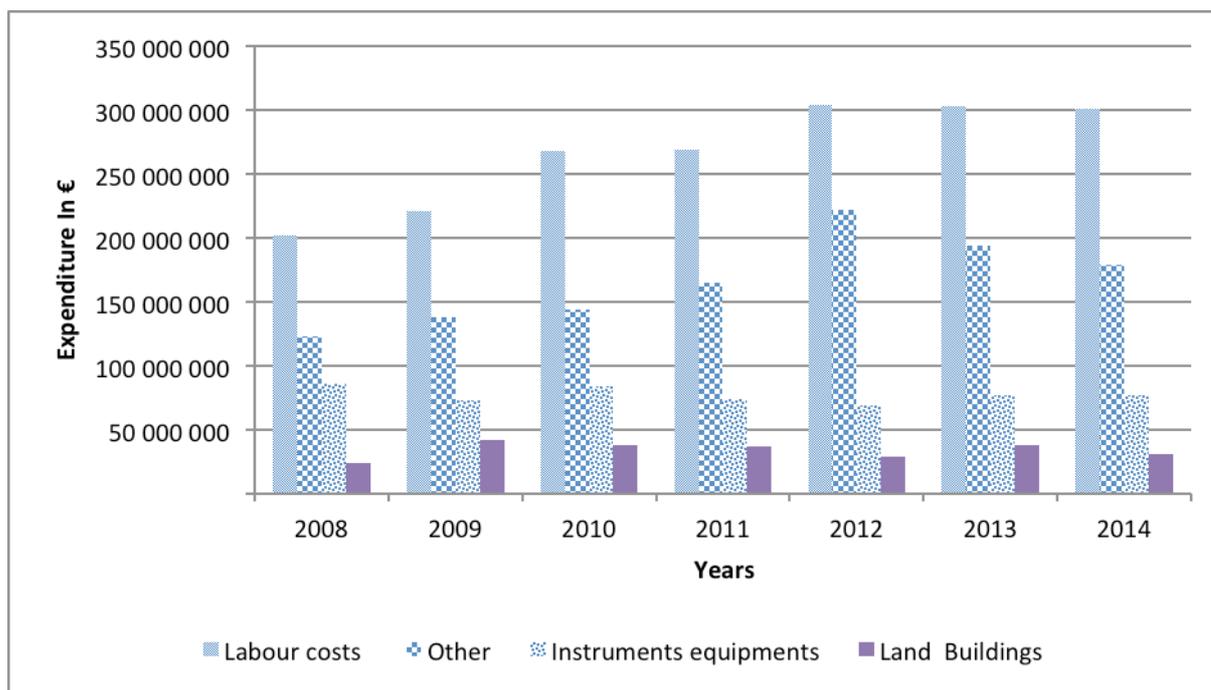
Figure 8. Type of Expenditure in Business Enterprises



Source: www.tuik.gov.tr (accessed 10.04.2016)

Types of R&D expenses in commercial enterprises had shown as the percent, here is the same thing shown as the amount. High share of current expenditures and labor costs are still more important. Current R&D expenditure of commercial business is seen that the level in billion €.

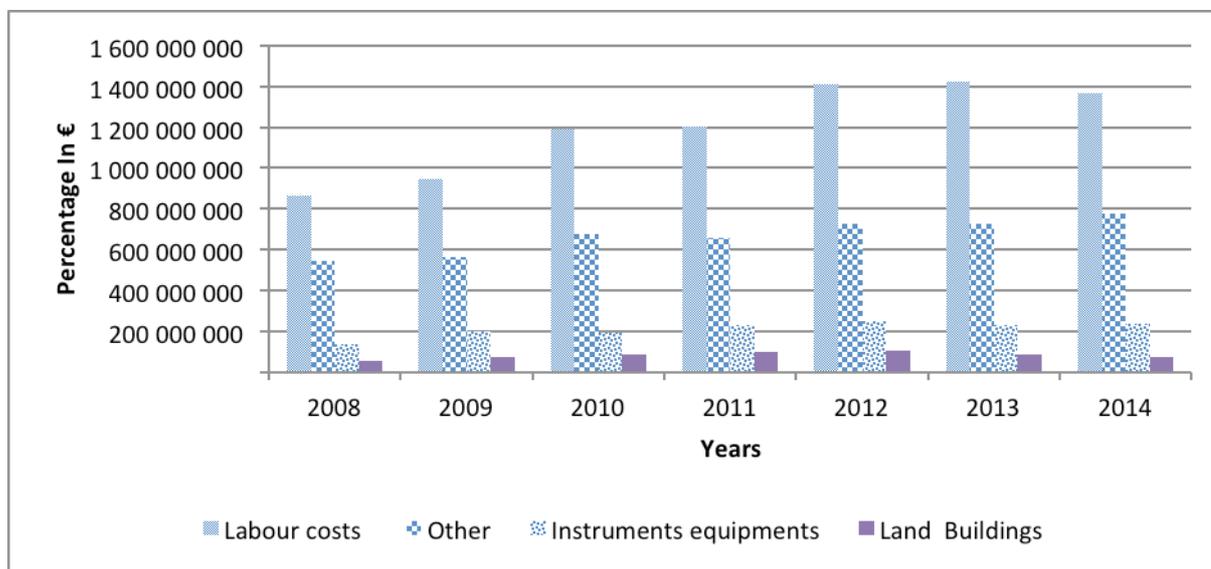
Figure 9. Type of Expenditure in Government



Source: www.tuik.gov.tr (accessed 10.04.2016)

Public R & D expenses came to € 300 million and high level of current R & D expenses is observed. High share of labor expenditures is seen in figure 9.

Figure 10. Type of Expenditure in Higher Education



Source: www.tuik.gov.tr (accessed 10.04.2016)

Higher Education R & D expenses came to € 1,4 billion and high level of current R & D expenses is observed. High share of labor expenditures is seen in figure 10.

### 3. RESEARCH AND DEVELOPMENT INCENTIVES IN TURKEY

A New Investment Incentive Package Program in R&D and Innovation has been announced in February 2016. Objectives of the R&D and innovation reform package are listed as follows (<http://www.invest.gov.tr>, accessed 18.04.2016):

1. To support design activities
2. To promote R&D investments, to ensure transition to qualified production, to ensure the production of high value added products
3. To promote the employment and enhance the qualifications of R&D personnel
4. To commercialize R&D activities; to support and reveal the potential of technology companies
5. To develop and institutionalize university-industry collaboration
6. To ensure efficient coordination of R&D and innovation support mechanism and to empower the ecosystem.

Generally, there are some incentives about R&D activities in laws. It is listed these incentives in the following (<http://www.gib.gov.tr>, accessed 16.04.2016):

On the other hand, in addition to the New Investment Incentive Program, there are different incentive programs to support the industry in Turkey. When examining the incentives in Turkey;

Support and Incentives provided to entrepreneurs by Turkish State,

- T.C. Ministry of Economy, Support and Incentives
- TUBITAK, Support and Incentives
- KOSGEB, Support and Incentives
- Development Agency, Support and Incentives
- Ministry Of Science, Industry and Technology Support and Incentives
- TTGV, Technology Development Foundation of Turkey, Support and Incentives
- Framework Program of the European Union, Support and Incentives

Support and incentives made by State generally are not well known by domestic and foreign enterprises. All incentives are not possible to explain, so only the Ministry of Economy, TUBITAK and KOSGEB's support and incentives will be summarized.

### 3.1 Incentives and Discounts Proposed in Laws

It can be explained Incentives and Discounts Proposed in Laws in the following:

#### a- R&D Deduction

- R&D expenditures incurred in the enterprises functioning as technology centers,
- R&D expenditures incurred in the R&D centers,
- Public institutions, R&D and innovation projects supported by public enterprises and establishments, foundations established pursuant to the Law or projects that supported by international funds,
- Pre-competition cooperation projects,
- Enterprises benefit from the capital support provided to techno enterprises;
- All of the R&D and innovation expenditures mentioned above and;
- One half of the increase in expenditures compared to the previous year at R&D centers that recruit 500 and more equivalent full-time R&D personnel, are made subject of discount while determining the corporate income and trade income in accordance with article 10 of Corporate Tax Law and article 89 of Income Tax Law.

Besides, these expenditures shall be redeemed by depreciation through the Tax Procedure Law (Law no: 213) When there is no economic asset created, these expenditures shall be directly recorded as an expense. The R&D discount that was not made the subject of discount in the related fiscal year due to the inadequacy of profits can be transferred to the following fiscal years. The transferred amount shall be increased by the revaluation rate determined for each year according to Law No: 213 in the following years. (Law No: 5746 a.3/1)

#### b- Income Tax Withholding Incentives

Wages of R&D and back-up staff except public servants recruited in the following enterprises are exempt from income tax, at a rate of %90 for staff with PhD degrees, and at a rate of %80 for the other staff:

- Staff recruited in enterprises that function as technology centers,
- Staff recruited in the R&D centers;

- Staff recruited in R&D and innovation projects supported by public enterprises and establishments, foundations established pursuant to the Law or projects that are supported by international funds,
- Staff recruited in R&D and innovation projects undertaken by The Scientific and Technological Research Council of Turkey (TUBITAK),
- Staff recruited in enterprises that are entitled to benefit from the capital support provided to technological enterprises,
- Staff recruited in pre-competition cooperation projects.

**c- Insurance Premium Support**

For each employee, one half of the insurance premium of the employer which is calculated over the wages of the R&D and back-up staff gained in the scope of the R&D and innovation activities shall be funded by a budget of the Ministry of Finance for five years. The insurance premium of personnel, whose wages are exempted from income tax pursuant to provisional article 2 of Law numbered 4691 concerning Technology Developing Zones, calculated over their exempted wages and also one half of the employer's share of insurance Premium shall be funded by a budget of the Ministry of Finance for five years at maximum as long as exemption implemented. (Law No: 5746 a.3/3)

**d- Stamp Duty Exemption**

All documents drawn up in connection of all types of R&D and innovation activities pursuant to Law Numbered 5746 have been exempted from stamp duty.( Law No: 5746 a.3/4)

**e- Techno Enterprise Capital Support**

In order to support the transformation of technology and innovation oriented business ideas to enterprises having high potential in creating added value and qualified staff; techno enterprise capital support of up to € 32.000,00 shall be donated for once without the demand for a guarantee. The techno enterprise capital support shall be donated to the persons having formal education and will be graduated from any field of universities in one year; master students, doctorate students or had the bachelor, master or doctorate degree maximum five years ago before the pre-application date. (Law No: 5746 a.3/5)

## **3.2 Ministry Of Economy Support and Incentives**

### **3.2.1 Design Support**

The main idea is to establishment of design and innovation culture in Turkey and to ensure dissemination. In the scope of this support can benefit for companies operating in Turkey.

But there are some limitations to this support;

- a) The gross salaries of designers and engineers to work on these projects could total up to US 1,000,000 \$
- b) Tool, equipment, materials and software expenses could total of up to US \$ 250,000
- c) Travel and website membership expenses which total of up to US \$ 150,000 is supported by 50% in related to in some projects, including. A maximum one project is supported in a company.

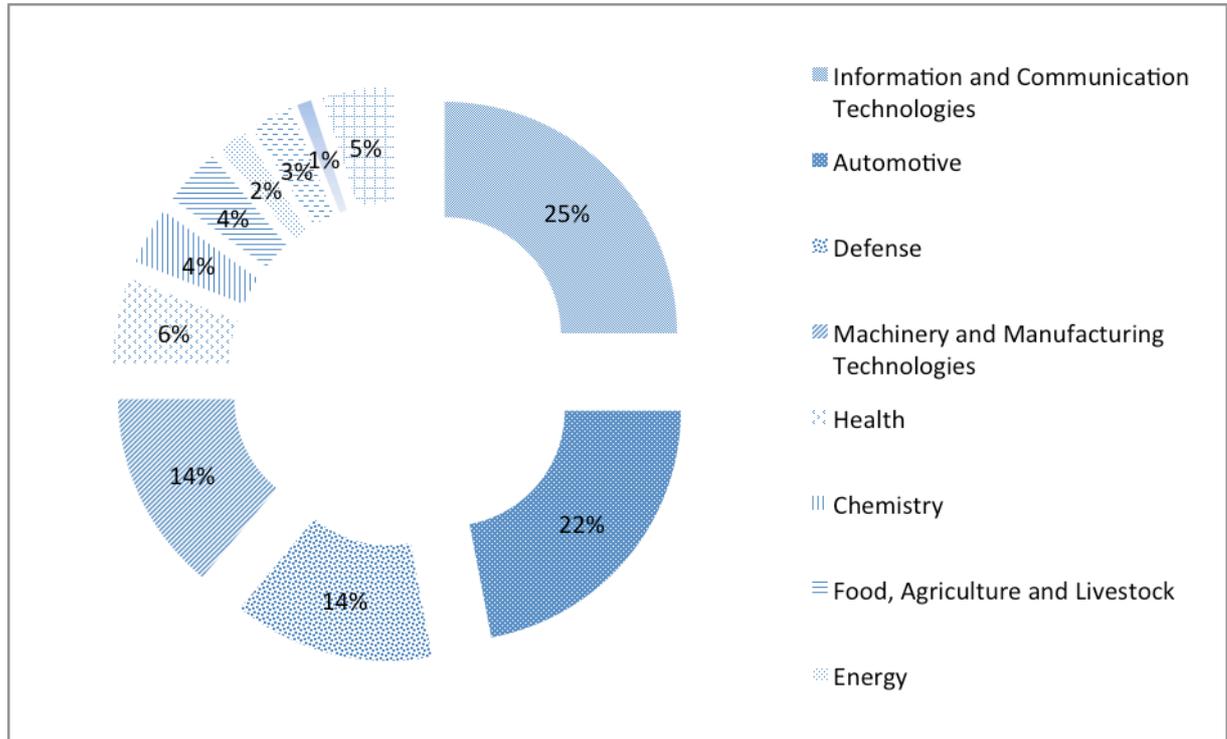
### **3.3. TUBITAK Support and Incentives**

TUBITAK was established to lead the development of science and technology culture for to increase and to sustain Turkish competitiveness and prosperity. So, TUBITAK provides support and incentives for R & D. in order to lead the development of science and technology, some of these supports and incentive programs will be mentioned explanations and in figure 11 and figure 12 during this section 3.3 and so forth (<http://www.tubitak.gov.tr>, accessed 19.04.2016)

23.342 projects have applied to TUBITAK for support and 14.344 of these projects supported between the years 1995 and 2014. 1,425 billion euros support was provided and 4 billion euros R&D capacity was created with the prices of 2014.

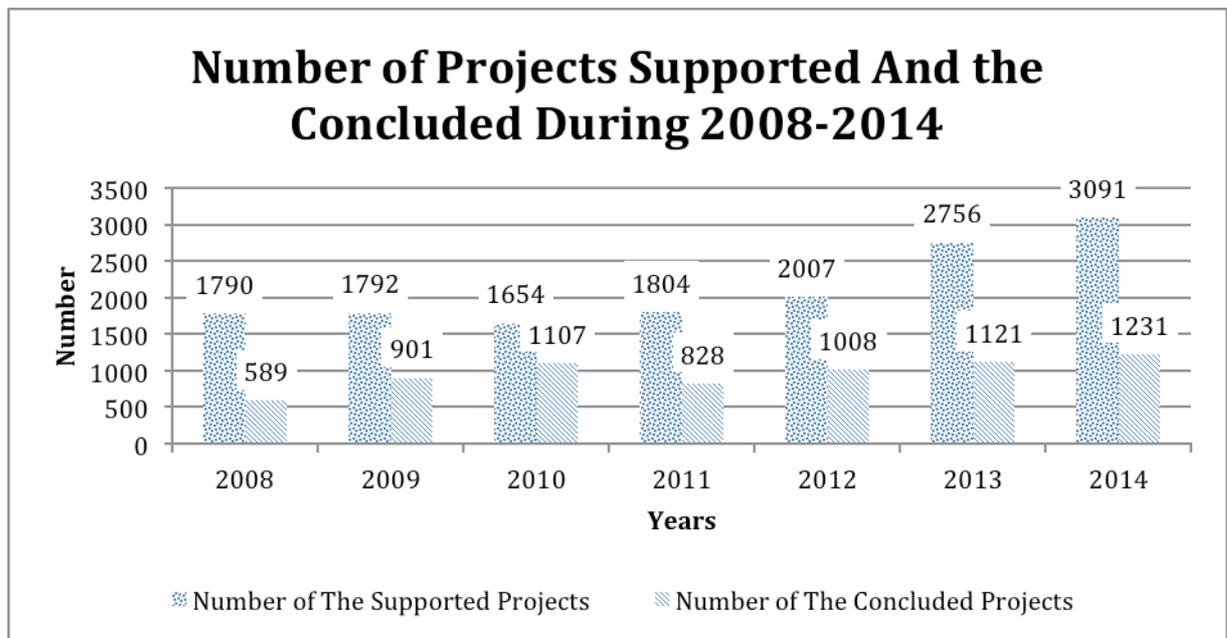
It is seen Distribution of The Donation Support According to Sectors in Figure 11 and Number of Projects Supported And Concluded During Years Between 2008-2014 in Figure 12. According to figure 11, hhe highest supports are taken in Information and Communication Technologies, Machinery and Manufacturing Technologies.

Figure 11. Distribution of The Donation Support According to Sectors



It is seen number of projects supported and concluded during years between 2008-2014 in Figure 12. So, number of the projects supported and concluded is increasing year by year.

Figure 12. Number of Projects Supported and Concluded During Years Between 2008-2014



### **3.3.1 Entrepreneurship Multi-phase Program**

The main idea of this support is to convert entrepreneurs to enterprises which have technology and innovation-oriented business ideas, contribution value and potential of generating highly qualified employment. Under the program are given entrepreneurship training for entrepreneurs, as well as industry experienced guides support is provided to entrepreneurs in the technical, commercial and administrative matters.

The maximum amount given as Techno Enterprise capital support collateral without the grace (donation) will be maximum € 45.000,00. From this amount the upper limit for project support is € 35.000,00 and the upper limit for capital support is € 12.500,00. Time is limited to 18 months.

3216 business ideas application was made between the years 2012-2014. 350 companies were founded. Approximately 7.5 million € support is provided.

### **3.3.2 Industrial R&D Projects Donation Program**

This program has been established in order to promote companies working and studies on Research & Development (R&D). New techniques or new production technologies for a new product generation, development of existing products, improving product quality or standard of raising or lowering the cost studies carried out R & D activities are supported. Support duration of projects on the basis of a maximum of 36 months.

### **3.3.3 R&D Project Brokerage Events Donation Program**

As is known, the project market, brought universities, representatives from research and private sector organizations together who are wishing to provide financial contributions. The basic principle here is; tangible R&D ideas or project suggestions meet with people who need to be supported in different areas of expertise. The donation that not exceed the upper limit set by TUBITAK as appropriate for the part of the organizers of the demands of the organization are provided. Support payments are made before the event. Support payments may go up to about € 10,000.

Total of 169 projects have applied, 127 projects have been supported between the years 2008-2014. Approximately 1,000,000 € support was provided.

### **3.3.4. SME RDI (Research, Development & Innovation) Donation Program**

The main objective is to increase SMEs productivity, increase the share in the added value and increase their international competitiveness. In our country, a significant proportion of R&D activities are limited to large-sized businesses. However, SMEs constitute 98% of the Turkish industry. With the support to be provided to the program under the project aimed to develop the SMEs technology and innovation capacity. So that SMEs will become more competitive and able to develop high value-added products. In addition, it will be possible to take a more active part in national and international support programs.

SMEs new product generation, development of existing products, improving product quality or standard or lowering the cost by new techniques or the new production technologies can be supported in € 150,000,00. Time is limited to the 18 months is intended to support first three projects by TUBITAK. Also in addition to these three projects, two more projects can be supported in this program if the applicant made collaborative projects. Support rate is fixed for each period is 75%.

### **3.3.5 Research Technology Development and Innovation Projects in Priority Areas G. P.**

Under this program call announcement made for strong R&D areas and strong innovative areas or the areas which are intended to be developed or needs of improving are supported.

Projects are evaluated in the following four different ways.

- a) The suitability of the subject and scope of the project content,
- b) Industrial R & D content of the project, the level of technology and innovative direction,
- c) The appropriateness of the project plan and the establishment of infrastructure,

d) Interchangeability of project output to economic benefits and national achievements,

The projects supported under the program supported by the support rate to be applied to the amount of spending to support periodic basis. The program support rate to be applied for each period is fixed at 60% for large enterprises, 75% for SMEs.

837 projects have applied, 378 projects have been supported between the years 2012-2014. Approximately 22.250.000 € support is provided.

### **3.3.6 Frontier R&D Laboratory Support Program**

The idea of the program is,

- Raising the quality of the research of Turkish scientists
- Our country is to ensure that the global center of science and technology in certain areas.

For the purposes specified, producing leading scientific and technological knowledge in the field of national / international organizations specific costs of R&D laboratories established in Turkey refundable (donation) will be supported.

R & D Laboratory support period is 5 years. The supports are non-repayable (donation) to the supported laboratories by the program during the support period. Support rate is 75% of the R&D Laboratory budget which is approved and taken in this program. The amount of support cannot exceed € 3.150.000,00.

### **3.3.7 Capacity Building for Innovation and Entrepreneurship Donation Program**

The aim of this program is; to create awareness of the real and legal persons in the field of innovative and technological entrepreneurship and to provide capacity building mechanisms for supporting to determine the procedures and principles.

The support upper limit cannot exceed 36 months. Projects which are supported by the program supported for up to 100% with non-repayable (donation) funds.

Total of 9 university's Technology Transfer Office supported in the year of 2012. 80% of Projects, which had maximum budget of 400,000 € and would last for 2 years, has been donated. In addition, 19 certificate programs in entrepreneurship are opened. 629 participants have been trained, 367 have succeeded.

### **3.3.8 Venture Capital Funding Program**

With this application SMEs are supported which are capable of providing added value to the national economy by innovations, products, processes, information and technology. For this purpose, the core capital and initial capital support will be provided to SMEs.

Core capital support; is an investment for research and development, evaluation to the creation of a product/service or an innovation.

The support of Startup Capital; are the investments made in order to provide additional funding for the product development, creation prototype or production after prototype, sales and initial marketing activities.

The support period of the funds will be maximum 12 years. First five years of the fund support is the investment period.

20% of the Venture Capital Fund which has a commitment to invest in Venture, supported by TUBITAK as a donation.

### **3.3.9 University-Industry Collaboration Donation Program**

The aim of this program is to convert R&D based knowledge and technology which is made by university/public research centers and institutes to product or process for the industry. The maximum support period is 24 months. Maximum € 300.000,00 amount of project budget is supported. The budget ratio that will cover by TUBITAK is 75% of the project budget for SME and is 60% of the project budget for the large-scale companies.

### **3.3.10 Technology Transfer Offices Donation Program**

Under the program, the framework of university-industry cooperation is to;

- Create and develop R&D projects and providing logistic support activities,
- Registration and protection of intellectual and industrial property rights, marketing and commercialization of them,
- Support Venture capital, setting up hatching center, business guidance, providing consulting and training services,
- Established or will be established technology transfer office projects in Turkey that organize activities to create awareness by making publications on issues that mentioned above, is aimed to support as non-repayable (donation).

This support will expected to provide to increase efficiency and dissemination of the technology transfer offices for contribute to the development of university-industry collaboration. Organizations apply to the program among are, universities, companies which universities are partners, techno-parks manager companies, the companies which techno-park managers companies are partners.

Under the program, the technology transfer offices will be supported in the form of pre-paid and donation for 10 years according to their annual budget planning. Support upper limit amount is € 300.000. in the form of the annual donation

Total of 25 universities Technology Transfer Office supported between the years 2012-2014.

### 3.4 KOSGEB Incentives

KOSGEB is an organization that aims to perform the integration of the industry in accordance with the economic developments and to meet the country's economic and social needs by increasing the share and effectiveness of small and medium-sized enterprises (SMEs), to raise their power of competitiveness.

Table 2. KOSGEB Business Types

Definition Criteria	Micro-Enterprises	Small Businesses	Medium-Sized Businesses
Annual Number of Employees	≤9	10-49	50-249
Annual Net Sales Revenue (€.)	≤ 312.500,00	≤ 2.500.000,00	≤ 12.500.000,00
Annual Financial Balance Sheet Value (Million €.)	≤ 312.500,00	≤ 2.500.000,00	≤ 12.500.000,00

Source: KOSGEB 2014 Annual Report s.2

#### 3.4.1 R & D, Innovation and Industrial Application Support Program

The purpose of this program is to support, small and medium-sized businesses and entrepreneurs who have new science and technology-based ideas and inventions also research, development, innovation and industrial application projects for new products, new processes, knowledge and/or services production and the commercialization. Initial capital support is 100%, while 75% of support related project cost amount will be met by KOSGEB, remaining 25% will be met by the company.

##### Supported Project Costs

a) Support costs of machinery and equipment, raw materials, software and services purchase, Support is provided € 32.000,00 as upper limit of a non-refundable, € 62.500,00 as the upper limit in back pay to business.

b) Personnel expenses Support

Support which total the upper limit € 32.000,00 non-repayable is provided to the staff working on the project.

c) Project development support

Within business project; total upper limit € 32.000,00 non-repayable support is provided for consultancy, education, industrial property and intellectual property rights application and/or registration, promotion, international convention / conference / exhibition visit, technological cooperation visit, test-analysis and certification costs.

d) Support for initial capital

According to the law no. 5018 ( The Public Financial Management and Control) public administration under the central government entrepreneurs who are eligible to get R&D support and the ones founded their company, students in the state will be able to graduate within one year of any undergraduate program of universities, master's or doctoral student or the ones who have received one of the license, master's or doctoral degrees a maximum of 5 years before the date of application and lecturers are all eligible to use this support. This support is provided for office equipment and expenses with business expenses of entrepreneurial organization that provides specified criteria. Support the upper limit is non-refundable € 6.250,00, support rate is 100%.

#### 4. Analysis of Turkish Manufacturing Companies R&D Expenses

So far, statistics on R&D in Turkey, the R&D expenditure structure and provided incentives are explained. In this section, over a 3 year period statements of income, 1289 small-size manufacturing enterprises in Turkey, the 876 medium-sized manufacturing enterprises and 571 large-scale manufacturing companies analyzed. The aim of this analysis was to determine the proportion of R & D expenses in sales and in operating expenses of the manufacturing enterprises. Our analysis was performed using three different calculation and interpreted separately.

**a) Small-Sized manufacturing enterprises:** The analysis has been made using totally 1289 firms' income statement data considering the years of 2012, 2013 and 2014. Both incomes and outcomes are calculated by exchanging TL data (which is gathered from 1289 firms) to Euro. ([www3.tcmb.gov.tr/sektor/2015/menu.php](http://www3.tcmb.gov.tr/sektor/2015/menu.php), Accessed date 12.04.2016):

Starting with the income-outcome data of 1289 Small-sized manufacturing enterprises:

Table 3. Small-Scale Manufacturing Companies, 2012-2014 (€ 000)

	2012	2013	2014
Net Sales	9.171.999,50	9.431.788,20	8.753.130,70
Cost of Goods Sold	(7.675.649,40)	(7.870.566,20)	(7.221.753,70)
Gross Profit or Loss	1.496.350,00	1.561.222,00	1.531.376,90
Period Expenses	(995.367,40)	(1.031.269,60)	(988.357,30)
R&D Expenses	14.828,10	15.032,00	19.913,50
Marketing, Sales and Distribution Expenses	399.834,70	414.122,50	392.781,60
General Administrative Expenses	580.704,60	602.115,20	575.662,10
EBIT	€500.982,60	€529.952,40	€543.019,70

- Whole of 1289 firms has R&D expenses of totally € 19.913.500,00 in 2014. This amount is yearly € 15.448,79 per firm.
- In 2014, the rate of R&D expenses among total period expenses is 2,01%.
- In 2014, the rate of R&D expenses to the net sales is 0,22%.

**a) Medium-sized manufacturing enterprises:** The analysis has been made using totally 876 firms' income statement data considering the years of 2012, 2013 and 2014. Both incomes and outcomes are calculated by exchanging TL data (which is gathered from 876 firms) to Euro. ([www3.tcmb.gov.tr/sektor/2015/menu.php](http://www3.tcmb.gov.tr/sektor/2015/menu.php), Accessed date 12.04.2016):

Starting with the income-outcome data of 876 medium-sized manufacturing enterprises:

Table 4. Medium-Scale Manufacturing Companies, 2012-2014 (€ 000)

	2012	2013	2014
Net Sales	26.402.421,97	27.830.380,19	28.394.313,67
Cost of Goods Sold	(22.629.188,12)	(23.447.087,43)	(23.808.528,01)

Gross Profit or Loss	3.773.233,8 5	4.383.292,7 5	4.585.785,6 6
Period Expenses	(2.420.367, 47)	(2.564.791, 62)	(2.616.332, 07)
R&D Expenses	44.189,07	50.663,13	45.127,46
Marketing, Sales and Distribution Expenses	1.262.730,66	1.342.377,72	1.354.085,39
General Administrative Expenses	1.113.447,74	1.171.750,77	1.217.119,22
EBIT	1.352.866,3 8	1.818.501,1 3	1.969.453,5 9

- Whole 876 firms has R&D expenses of totally € 45.127.460 in 2014. This amount is yearly € 51,515.36 per firm.
- In 2014, the rate of R&D expenses among total period expenses is 1,7%.
- In 2014, the rate of R&D expenses to the net sales is 0, 15%.

**c) Large-sized manufacturing enterprises:** The analysis has been made using totally 571 firms' income statement data considering the years of 2012, 2013 and 2014. Both incomes and outcomes are calculated by exchanging TL data (which is gathered from 571 firms) to Euro. ([www3.tcmb.gov.tr/sektor/2015/menu.php](http://www3.tcmb.gov.tr/sektor/2015/menu.php), Accessed date 12.04.2016):

Starting with the income-outcome data of 571 large-sized manufacturing enterprises:

Table 5. Large-Scale Manufacturing Companies, 2012-2014 (€ 000)

	2012	2013	2014
Net Sales	135.691.273,42	138.140.338,68	135.163.431,60
Cost of Goods Sold	118.063.409,69	117.226.880,92	114.913.961,61
Gross Profit or Loss	17.627.863,73	20.913.457,76	20.249.469,99
Period Expenses	10.579.788,10	10.989.080,50	10.937.377,85
R&D Expenses	457.656,80	534.037,52	547.210,32
Marketing, Sales and Distribution Expenses	6.327.130,31	6.678.698,50	6.507.422,49
General Administrative Expenses	3.795.001,00	3.776.344,48	3.882.745,04
EBIT	7.048.075,62	9.924.377,26	9.312.092,14

- Whole of 571 firms has R&D expenses of totally € 547.210.320 in 2014. This amount is yearly € 958.336,81 per firm.
- In 2014, the rate of R&D expenses among total period expenses is 5%.
- In 2014, the rate of R&D expenses to the net sales is 0, 4%.

As a result of the analysis, by the year 2014 it is seen that;

- A small manufacturing company is spending € 15.448,79 for R&D yearly, and this only constitutes only 0,22% of the net sales,
- A medium-sized manufacturing company is spending € 51,515.36 for R&D yearly, and this only constitutes only 0,15% of the net sales,
- A large-scale manufacturing company is spending € 958.336,81 for R&D yearly, and this only constitutes only 0,40% of the net sales,

Results show that R&D expenses in manufacturing enterprises immensely short and low. In the analysis which is made by proportion with the net sales, it is both unexpected and positive development that small manufacturing companies spend the cost of R&D more than medium-sized manufacturing enterprises.

## 5. CONCLUSION

R&D activities are very important for development of both companies and economy. For that reason, Turkey tries to give importance on R&D by incentives and support. Incentives donated in Turkey have been shown the effectiveness especially in higher education and the private sector, although they are not enough. Therefore, Turkey's increasingly providing incentives and support is very important for economy and companies. Although, results show that R&D expenses in manufacturing enterprises immensely low level. For example, a large-scale manufacturing company is spending € 958.336,81 for R&D in 2014 and this amount constitutes only 0,40% of the net sales. In our opinion, allocated share of R & D should increase. Companies should be supported via incentive from the institutions for achieving this aim.

Balkan countries work together on this issue is essential for regional development and economic growth. Balkan countries, public sector, university and private sector in the form of triple walking collaboration can improve the efficiency of R&D activities. Mentioned effort is also important in the European Union. Balkan countries which will be the future members of the European Union, incentives and support must be given on this issue. R&D activities should be revised and incentives should be planned considering the case of Turkey described in this article in terms of Balkan countries.

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